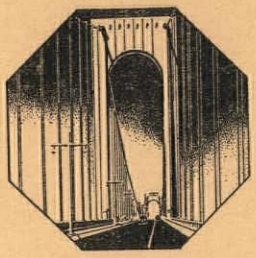
Journal of The American Institute of

ARCHITECTS



WHITESTONE BRIDGE

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Contents

ILLUSTRATIONS

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A Marriage of Convenience

By William Adams Delano, N.A., F.A.I.A.

THERE is so much said and written—such divergent views expressed—on the subject of our own and the other arts that I have hesitated to comply with the Editor's request to add another word. The eternal struggle between the conservative and liberal is as old as recorded history—much older, I am sure—so I refuse to get wrought up, for time will give the answer. Temperamentally I dislike rows; I much prefer evolution to revolution. Therefore, when I review the half century during which I have been a devoted and willing slave to architecture, I feel I have much to be grateful for.

I am grateful for the manner and the time I was launched upon the architectural sea. My years of schooling at Columbia, in the office of Carrère & Hastings, and finally at the Ecole des Beaux-Arts gave me at least a fairly solid foundation on which to base my architectural thinking. Above all, the years in Paris, under a great teacher, Victor Laloux, a man who saw "first things first." He impressed upon the pupils in his atelier the importance of a simple coordinated and easily read plan, from which would rise a well composed mass; its embellishment he left to the personal taste of the pupil. Furthermore, when in 1903 I began practice, I found that cultivated men like Messrs. McKim, Hunt, Richardson, Hastings and many others had given a standing to our profession, from which we youngsters profited. We started our voyage with a good compass, on what promised to be a fairly calm and unbefogged sea. The storm had not yet risen.

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In the diary of Henry C. Robinson, a lawyer, there is this entry on February 26th, 1813:

"Went to the Royal Academy and heard Sir John Soane deliver his third lecture on Architecture. It was not very interesting but the conclusion was diverting: 'As the grammarian has his positive, comparative and superlative, and as we say 'My King, my Country and

my God', so ought the lover of fine art say 'Painting, Sculpture, Architecture'."

Of course, Sir John's was an architect's opinion, but it was one generally accepted, by educated people, in the eighteenth and nineteenth centuries.

We are too prone to over-value "The good old days," but I do not think one can dispute the fact that at the moment, in the welter of self-expression, advertising and publicity, something of the dignity of our profession has been lost, which tends to destroy not only *our* self-esteem but the esteem of the public—and this, as a lover of the art, I deplore.

It was doubtless inevitable that as the number of architects increased with the growth of our cities, The American Institute of Architects should lose its original character—a small group dedicated to perfecting "the art of building well"—and become a more politically-minded body, which laid greater emphasis on rules for professional behavior and policed its members. This may have been inevitable but its savors of unionism, not art, formerly our greatest asset.

If I were asked to express in one word the confusion in the art world today, I should say "Commercialism." All the visual arts—painting, sculpture and architecture—suffer from the disease. Our own more—or less—than the other two, according to one's point of view, for we have no art dealer to exploit us and no press to sound our trumpet; so the storm that rages is largely a domestic one. The conservative thinks the liberal has gone "hay-wire" because, when he thinks at all, he envisions the worst examples of the so-called "Modern architecture; and the advance guard, when it expresses its contempt for the past, is thinking of the most outrageous examples. It is unfortunate that there should be this conflict of opinion but it is in this jerky manner that the world moves—as move it must unless we wish to become stagnant. George Vincent, that witty and intelligent head of the Rockefeller Institute, once said about a certain man: "Oh, Blank! he doesn't think: he just rearranges his prejudices." That is what, I fear, most of us do.

Not so long ago most of the students in our schools began to swallow—bait, hook and sinker—the examples that came by way of magazines from abroad. The students were too young and inexperienced for the diet; they had not had the fundamental training in

tradition that had produced the "intriguing" examples they copied; they swallowed the shell but spat out the kernel. "Freedom to express oneself," fostered by certain writers on the arts, became the slogan. To invent something entirely new, expressive of themselves and of the new era, was appealing. Some of their bewildered teachers, not wishing to miss the "bandwagon," tried to jump on board, and became as confused as their pupils. The latter left the schools with scant knowledge of the history of their art or of the civilizations that had produced it. They were more interested in getting to work than in pursuing the long hard road, paved with persevering study. In our case, new materials offered the students by advertisers in the magazines gave further impetus to their desire to be free of the past.

But all the new materials, methods and motives we have at our command do not release us from the necessity of using them in such manner as to produce a convenient and pleasing whole. Doubtless in due time, when their novelty has worn off, we shall learn to use them with greater understanding of their true value and fitness, and not in such haphazard fashion as is too often the case today. I do not believe an art, any more than a game, can be practiced without some generally accepted forms, which experience has taught improve it.

I have often thought that all that I learned in the schools could have been compressed into one short lecture, but I realize now that it was only by making mistakes time and time again, and having them pointed out and corrected, that I slowly and painfully learned my lessons. There is no easy road to learning an Art—and Architecture is a particularly exacting mistress.

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From what I have written, the reader will infer that I am a believer in a thorough education. I do not deny the impeachment. It gives anyone who survives its growing pains a realization of the value of discipline and of the importance of learning a language if one would speak intelligibly. There should be no need to use red and green lines to show how a building functions. Not only what one says but the way one says it is important.

No doubt many of my readers, especially the younger ones, will disagree with what I have said; to

them mine will be a voice from the past. I sympathize with them. The world must change and with it our profession. I am wholeheartedly for change but change based on reason.

Architects young and old—modernists and traditionalists—have spoken and written much about the depressed state of the architectural profession. The majority seem to agree on one point—that our profession has reached a low-watermark. This is not only not so, but a defeatist attitude. Our method of expression may be changing—but not what we have to say.

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A superficial survey of the history of architecture might lead one to think that at certain periods complete revolutions took place. This was never so. Each new expression was a slow development from a previous one, and so it must be today if we would progress normally. There is no reason for discouragement; rarely has there been so great an opportunity for a well-trained architect as awaits him. The gates are wide open. He has at his command resources never dreamed of by his predecessors, but he must learn to use them wisely and not be in too great haste to throw overboard all past experience.

We often hear it said that the Engineer is "stealing our thunder." This being preeminently a technological age, no doubt he is, but why whine about it? Perhaps another approach would be more realistic. Why not combine with the Engineer? In bygone days a man was known as an Architect and Engineer. Tomorrow he may be known as an Engineer and Architect. Steps in that direction have already been taken by the Federal Government, as all of us who have had war contracts know. But, after all, "What's in a name?" Is it impossible to conceive that a "marriage of convenience" might be arranged by the two professions? Both are constructive and each has much to offer the other. Instead of architects employing engineers, or engineers employing architects, as is done today in many cases, why should they not be partners in the enterprise, to the advantage of both professions and the public? Experience teaches that the engineer too often lacks the imagination of the architect, the ability to visualize the problem as a whole, and is often the slave of his slide-rule. The architect, on the other hand, is too frequently bored by and ne-

glects the very things the engineer is qualified to give. The student of engineering will have to be taught the value of what the architect has to contribute, and vice versa. No one man, be he engineer or architect, can compass the vast amount of knowledge each profession demands. We architects might have to place our high-hat on the shelf for a time, but if we faced the situation frankly we would spare ourselves and the public many words and emerge, I believe, the real masters, for if he is well-trained the architect has a wider vision than the engineer. All marriages are not love-matches; propinquity and self-interest often play great parts. I do not anticipate that the one proposed will be consummated in the immediate future—it will take time—but I belive it is inevitable. From this union may be born a child, "ARCHITECTURE OF HUMANISM," in whom both its parents and our country may well take pride.

Post-War Expectations in New Materials and Methods of Construction

By Bernard A. Savage

COMMISSIONER, NEW YORK CITY BOARD OF STANDARDS AND APPEALS

Excerpts from an address before the Building Officials Conference of America, at Rochester, N. Y., February 15, 1944

THE PROMISE of better techniques in construction and in the fabrication of materials, which has recently been so generously publicized, is not as new as our publicists would lead us to believe. The Bible started it. However, at no time in the history of man have such prophecies reached the dizzy heights of high promise, of the miraculous new things to come to the building industry, as the present confusing propaganda would suggest. The public is already smacking its lips and many are planning to own one of these miracle homes.

That is the promise; what can we expect in performance? In such fever of invention, great strides must have been made in the field of materials and construction practices. All new developments in materials and construction techniques, however, prior to their general use, will have to be adapted,

tested and proved with respect to the practical considerations of function, appearance, integrity, performance, maintenance, and public acceptance. When these new discoveries are incorporated into construction, scheduled for a use of 25 to 50 years, experience has shown that there are but few perfect materials; all have some advantages and disadvantages. Even the most promising may develop some "kinks" which only exhaustive observation, research and testing will disclose, with suggestions as to where corrections are necessary. It is entirely too much to hope that the war-time fever of invention will produce new developments in products fully conditioned for a long-range peace-time use.

Where plans are now being drawn for the post-War era, the designers are primarily concerned with the full production of finished plans and specifications for the projects involved. These naturally require specific determination of the integrity of known materials and methods of construction, so that only those that have been adequately tested and proven will be included in the specifications.

The plans for this stage will include the usual steel-skeleton, concrete-floor systems, enclosure walls, elevators, plumbing and heating, all of pre-War vintage. Opportunities for the application of new techniques will be reserved and plans made flexible for the interior plumbing, lighting, sound and heat insulation, and air-conditioning. As the professions turn to the second phase of the post-War planning era, the full design application of newer materials and methods of construction will be utilized.

Now, just what can be expected in things new for the building industry?

Fluorescent lighting or ceiling spotlights give more efficient and better light, which should relieve chronic eyestrain; ultra-violet and infra-red ray improvements open new fields in therapy and heat application, and the many types of electronic tubes which have been developed make possible a new command of electrical energy; this in turn gives to industry tools so sensitive and powerful that product controls are improved, resulting in new, better and cheaper products. Electronic resistance welding, by means of an ignitron tube, already provides faster steel fabrication; electronic sterilamps will protect food in refrigerators by disinfect-

ing the interiors; paint may be applied to surfaces by a kinatron tube; dust may be removed from our living spaces by a precipitron tube; the baking of paints and enamels, as well as the cooking of foods, will be better done by electronics through infra-red ray ovens; the rectification of current from AC to DC to actuate fire-alarm systems in buildings, and the newly developed electric eye control with its countless applications, are only vanguards of the bounties promised in this fertile field of electronic exploitation.

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Commercial, and particularly residential, air-conditioning, of the gas-flame-actuated types, has been so improved that rapid installation of all-year air-conditioning plants would now be a reality were it not for WPB restrictions. These combination units are equipped with air filters, in some cases electronically operated so as to free the air from all dust, and are cleansed of odors by using activated carbon as an absorber, thus delivering conditioned clean air throughout the building with controls set as desired for comfort.

Developments in heating have not been too plentiful except for radiant heating, which can be of the steam or hot-water types, with piping embedded in the concrete floor and ceiling.

Radiant heating is not really new; in Daranth, Kent, England, on the Thames there is an old Roman villa with marble floors carried on brick piers, leaving a space where hot air was introduced to the underside of a floor from a fire outside the building, the gases going up a chimney on the far side of the house and the interior heated by the heat in the floors.

Gas and electric unit heating will be more generally used because of economies in material and installation costs resulting from the elimination of the boiler, the boiler room and chimney, steam or hot water piping and radiators.

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Plastic materials promise much in the decorative fields, as hardware, trim and in electrical applications, while plastic wood impregnated by resins may find a high place as a structural material, pressure-molded into structural shapes similar to steel. Certain glues have played important parts in the field of substitute materials in allowing the lamination of beams for structural purposes, of wall

boards, and for securing other construction assemblies, particularly in the house prefabricating field.

Light-gauge metals, whose physical properties have been recently investigated at Cornell University, have much to promise in the construction of light buildings, having channel and cellular types of wall, floor and roof constructions. With the use of these light-weight metals there will be interior and exterior partitions filled with materials improved as to their resistance to fire, heat, moisture and sound—the walls considerably less thick and much stronger than the conventional partitions. One of the most interesting developments in the light-gauge metal field is the development of a steel cellular plank-like floor system, supported on a skeleton frame, which provides accessible electric wire raceways. This construction reduces the total weight of a building, carries all construction loads, and only recently, with a 7/8-in. vermiculite gypsum hung ceiling on metal lath, passed a 4-hour fire test at the Underwriters' Laboratories.

Comparing light-weight metal insulated wall construction with the conventional 3- or 4-hour fire-resistive construction required by building authorities, the economies resulting from the use of a lighter assembly in enclosure walls will be reflected in corresponding reductions of steel sections and foundation loads to be carried.

Glass has been developed so that it may now be cut, drilled and nailed almost like wood. Tempered glass has found a structural application in ornamental entrance doors with or without rails and stiles. Considerable development has been made in glass blocks, which provide insulation against fire, temperature and sound; also in many other kinds of glass for double-glazing and interior and exterior decorative purposes. Glass fibers, like rock wool, have been developed in various insulating material forms for use in building construction. Glass cloth in pastel colors for use as incombustible draperies, covering and curtains should find a broad application. Wood veneers attached to steel sheets by means of a metallic adhesive have been developed to function satisfactorily and will be available for decorative purposes.

An interesting and promising advancement is the development of the drilled-in caisson, a new type of foundation column, its charac-

teristic being that a considerable proportion of the load is delivered to bed rock, not by direct bearing on the surface of the rock, but by bond in the rock. This is accomplished by extending the construction into a rock socket drilled below the bottom of the steel shell and into sound rock.

In the field of concrete construction, improvements and advances consist in the development of air entering Portland cement, which allows of the formation of small and well-distributed bubbles, reducing segregation and bleeding, increasing workability and durability, and resisting the action of salt and calcium chloride. Cements with low specific heat are available for use in warm climates or where setting has to be slowed up to prevent cold joints; and in real hot climates when necessary to further slow up setting, ice is added to the water. Concrete handling costs may be reduced by the use of movable gasoline cranes which can be spot-located as required, thus eliminating hod or bucket hoists and the necessity for long wheeling runways.

Light-weight aggregates will become more generally used. To the long list is added a new cinder manufactured at the mines from mine tailings and added coal; it appears to have a minimum of the undesirable characteristics of ordinary cinders.

The manufacture of pre-cast artificial stone, joists, planks and blocks has been improved by modernization of equipment, controlled batching, accurate water control, thorough mixing and adequate curing. A promising development in this field is in the increase in the rate of hardening precast concrete units. In this process, units are cast in hollow forms which are then heated by hot air or electricity at a high temperature, simulating pressure cooking. The use of this method permits units to be handled in three to four hours without any further curing or aging, since strengths equivalent to those of 28 days are attained in only a day or two.

Absorbent lining attached to the inside face of forms is now being used to provide tight surfacing, so as to permit better curing, and when desired, decorative enhancement. Advances have been made in a wider use of smooth-type forms which permit joints to be kept to a perceptible minimum. Improvements in the method of watertight patching of reinforced concrete structures are available, con-

sisting of a hydraulic gun which can force thin grout under pressure into openings or cracks in floors or walls. The prefabrication of reinforcing steel into complete frames or sections is a development of this war; it will permit not only better economy but more exact positioning of the reinforcement by using tack welding and better positioning of chairs, with elimination of tie wires.

In concrete design the trend engineers are following is to use analyses based on elastic theory instead of empirical moment coefficients. These analyses permit not only greater economy but provide a better distribution of steel and concrete materials, in better conformity with the elastic behavior of the structure under loading or other conditions of stability. Present indications are in the direction of a wider use of flat ceiling design, such as flat slabs without capitals or dropheads, and other smooth ceiling systems wherein the architect has complete freedom of interior design. Pre-stressed steel in concrete, intended to minimize surface cracking by inducing initial compressive stresses, will find greater use, particularly in the manufacture of tanks, planks and other special concrete constructions.

The art of handling and eliminating undesirable noises by preventing them from bouncing around a room will be more generously applied, not only to new construction but also to rehabilitation work. Varied acoustical materials of combustible and incombustible types, having properties of trapping the noises by means of a large number of air cells or holes, are now available to meet any applicable condition, and when applied in adequate thickness, undesirable noises can be readily eliminated.

The cavity wall or variations thereof, designed to eliminate moisture penetration, by means of an air space constructed between two withes of brick masonry, will find many uses in future construction. The withes are tied together with copper-protected steel ties, and have wick-filled weep holes in the bottom masonry course. Interior floating partitions constructed of various plaster bases held together by flexible clip systems will minimize plaster cracking and reduce costs of such construction.

A new pressure-hydrated lime is now offered, which should give improved performance in plaster,

eliminating popping, and minimizing shrinkage. In masonry mortar this lime can be used without presoaking and eliminates the necessity for slaking.

A stud splice has been developed for use in the manufacture of wood studs, permitting the mills better to utilize their products and, by eliminating waste, effect a reduction in costs of frame construction.

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The enormous impetus given welding by our war construction is bound to be reflected in the more general use of welding in structures when experienced war welders become available and when economies of welding are fully realized. Improvements in the art of welding have been progressive, and it is hoped that a tried and ready method of evaluating the integrity of welds will soon become available.

Fire-resistive performance of materials and opening protective assemblies for all purposes have been subjected to intensive tests in large numbers, resulting in the standardization of constructions which can be designed and built to meet any required fire-resistive rating. The fire-resistive properties of mill construction, comprising large beams and girders of fireproof wood, have been under test for some time, and while the results have not been made public, the future is promising, particularly for use in buildings subjected to corrosive acid-forming gases.

Prefabrication has been so glamorized by the housing needs of our war industries that considerable attention was focused on this field by the U. S. Government; it became a large mass buyer, interested only in large numbers of units which could be quickly obtained. The assemblies for these housing units are only further extensions of precutting, practiced prior to World War II, and it will not be until our peace-time economy is stabilized, that the practical evaluation of prefabrication can be made and its future course determined.

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One great advance which the designers and material manufacturers can safely make without fear is in modular or dimensional coordination. Thus the best interest of all engaged in the construction of buildings will be served, while the owner benefits in the savings made possible.

Post-War Planning Moves Slowly

A $26 BILLION program of public works and other public construction, consisting entirely of urgently needed and desirable projects, is forecast for the five-year period starting twelve months after the end of the war, according to a statement issued by Russell G. Creviston, general post-War chairman of The Producers' Council.

Although the volume of new public construction would be less than half as great as the estimated amount of private building during the period in question, the expenditures for needed projects to be financed by Federal, state, and local governments would be sufficient to provide annual employment for more than 2,000,000 on-site and off-site workers, and should remove all need for resorting to work relief plans or the building of non-essential public projects merely to provide employment after the war.

Pointing out that the estimates, prepared by the Council's Market Analysis Committee, are based on the level of prices expected to prevail after the war, and on the assumption that the national economy will be maintained on a plane which will provide jobs for virtually the entire labor force of the nation, Mr. Creviston stated that adequate advance planning of needed projects by public officials also is a controlling factor. Recent reports indicate that planning of post-War public projects is gaining momentum, but many localities still have failed to make a satisfactory start on this important responsibility.

"Less than $1 billion of municipal public works construction is now ready for contract, according to a recent survey," he stated. "Even if planned Federal and state projects are added, the total will fall far short of $3.5 billions of public construction which our committee believes can be accomplished during the first twelve months after the war. At the very minimum, blueprints should be ready in advance for much more than this first year's work in order to assure a steadily expanding volume and to reach the higher levels of the succeeding five-year period.

"SPAIN is the most highly civilized of contemporary nations because it is the least dependent on machinery."—RALPH ADAMS CRAM.

Engineering and Architecture

By Aymar Embury, II

Excerpts from an address before the Structural Division, American Society of Civil Engineers, at its annual meeting in New York, January, 1944

It is true that engineering and architecture have in principle the same function, and in practice are far apart; and it is also true that both professions suffer from this lack of common interest and common understanding. I tried a number of times to get down on paper what I believe to be the major differences between them and what can be done to reconcile them, without any result, until the other day a rather curious thing happened which has put me on what I believe to be the right track. A lady came in to endeavor to secure my interest in the preservation of a charming American house built in 1812 by the Northampton engineer, Isaac Damon, and in the course of her talk she spoke of another Northampton engineer, Ithiel Town, who had designed and patented in 1820 a parallel-chord lattice truss which was sufficiently successful to produce royalties enough to support him for the rest of his life.

Now, I didn't know Isaac Damon, the engineer, or Ithiel Town, the engineer, at all, but I did know Isaac Damon the *architect* of the old Berkshire County Court House at Lenox and of many of the lovely old churches along the Connecticut River. Ithiel Town, *the architect,* was even better known to me, for it was he who designed the magnificent building for the Merchants' Exchange in Wall Street (now the principal office of the National City Bank), the Center Church at New Haven, Connecticut, and the State Capitol of North Carolina, still perhaps the most beautiful of our state capitols. This Ithiel Town I knew well, but not Ithiel Town the *engineer,* so completely had the practices of engineering and architecture become compartmented in my mind.

It is not difficult to understand how the two professions became separated. Physics and mathematics progressed rapidly during the early nineteenth century and the technological processes kept pace with them, so that a vast new body of knowledge had to be acquired before a man was sufficiently

equipped to be competent to design the more and more complicated structures which our advancing civilization demanded. Specialists developed, some becoming architects and some engineers. Each lost much of value during this process. The engineer concerned himself primarily with strength and economy, the architect with plan and the appearance of things. All four are necessary elements to the ideal structure, and yet life is too short for anyone not a genius to be thoroughly trained in all. We haven't many geniuses, and for us pedestrian practitioners of our profession, who do the bulk of the useful work of construction in America, the time required to fit us thoroughly to practice both engineering and architecture (as these are commonly understood) would mean that by the time we were trained we would be too old to accomplish.

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The results of this unfortunate, although inevitable, separation of functions were early apparent. The architects concerned themselves more and more with the appearance of things, abandoning knowledge of structure to the engineer. Also, perhaps partially because the architect failed to acquire much of the growing knowledge of the strengths of materials, we had such anachronisms by very capable men as the revival of Romanesque, when the architects built walls of incredible thickness and tiny openings, in a reversion to the lack of knowledge of structure which obtained a thousand years ago. This was not, of course, the only or perhaps the real reason for the fashionable success of the Richardsonian style. The world had grown sick of the classic forms used in endless repetition on buildings of all sizes, from a mantel in a wooden cottage to the largest bridge which it was possible then to construct, and yet if the architects had fully comprehended structure, had had awareness of the possibilities that had already been developed by the engineers, it seems likely that men of tremendous inborn ability like Richardson would not have been content to institute variety by a reversion to a primitive type, instead of by development along the lines to which the engineers had already pointed the way; and which today we are using—more or less—in what is called "functional" design. Albeit many of the so-called functional structures show as little comprehension of modern structural knowledge as Richardson showed in 1880.

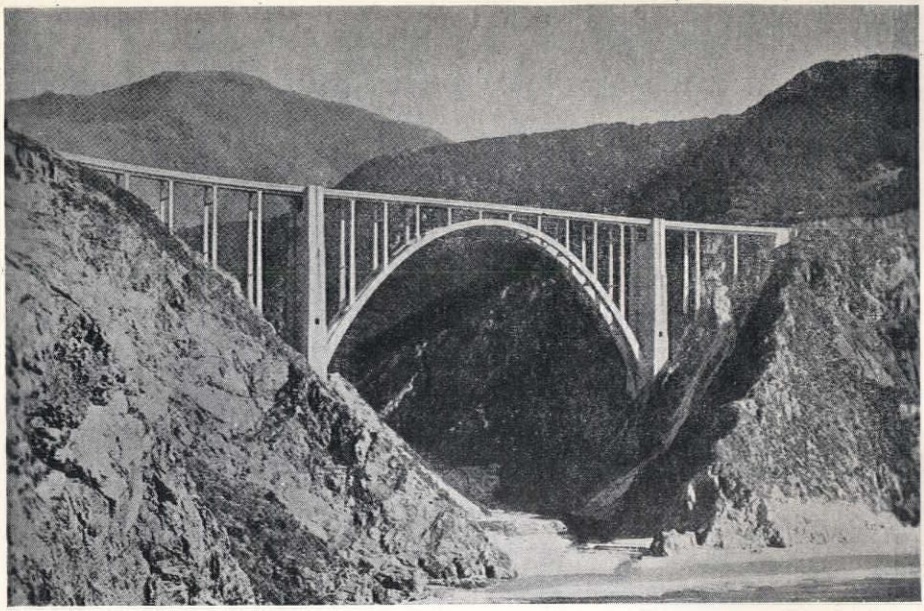
On the other hand, the engineers, in leaving the appearance of things to the architects, made perhaps an even more serious error, if we can compute the error by its effect upon American civilization as expressed in its monuments. Concerned only with the strength and economics of structures, they for many years abandoned all thought of the esthetic effect of their work, and produced a series of bridges of appalling ugliness which have unfortunately endured because of their utility. Take, for example, the large group of bridges over the Hackensack and Passaic Rivers in the Jersey Meadows, and over the Harlem River here in New York—to use only local examples. These are accepted by the public in blind admiration of the knowledge which was prerequisite to their design, without at all taking into account the fact that they could very easily have been as beautiful as they are useful. But they remain, while much of the work of architects of the same period has already been destroyed because its structural defects have made it useless to later generations.

In many of the older bridges, before the traditional union of architect and engineer had been forgotten, the appearance of things was obviously carefully considered even by men whose training was not primarily architectural. In 1818 Thomas Telford, chiefly remembered as a highway engineer, built what I understand is the first modern suspension bridge, from Bangor, Wales, to Anglesea Island, and obviously the appearance of the bridge was as carefuly considered as its structure; the Menai Bridge, built by an engineer, Robert Stevenson, as late as 1850, is a superb piece of architectural design. Of course these, in the history of civilization, are modern bridges, and in the same tradition is New York's own Brooklyn Bridge, regarded by all of us in New York with admiration and affection, not because it was the longest suspension bridge of its day, but because of the sheer beauty of its design. I know that structurally it is imperfect and I have been told that even in 1884 engineering knowledge had progressed far enough to have avoided these imperfections had Roebling been thoroughly acquainted with that progress, but the fact remains that in spite of these defects the Brooklyn Bridge is famous because of its esthetic quality, derived not from extraneous ornament, but from what the designer conceived to be

the functional requirements of the structure.

Here, as I see it, is the kernel of the failure of the engineering profession to realize its opportunities.

When the bridges of the early 1900's were built—the Manhattan Bridge, the Williamsburgh Bridge, the Queensborough Bridge, and the Hellgate Bridge, I know that Mr. Lindenthal, the engineer of all four, did believe it necessary to call in an architect to decorate the structures. But the architectural embellishment of a predetermined structure was considered by even so great an engineer as Lindenthal as sufficient to satisfy the growing sentiment that bridges should be beautiful. I know, because I worked as a draftsman on one of them. It was not thought that the lines of the structure itself were the determining factor as to whether a bridge would be beautiful or ugly. As a matter of fact, the addition of architectural embellishment to a predetermined structure worked out very well in the Manhattan Bridge, which has a very considerable amount of ornament extraneous to the structure, but so skillfully designed by a very competent architect—Thomas Hastings—that the span itself, the towers, and particularly the anchorages, are genuinely fine things. But the fundamental lines of the bridge were good. In the latest of the four bridges, the Hellgate Bridge, Mr. Lindenthal did definitely consider the shape of the structure as well as the architectural embellishment on the main span, but I cannot believe that that was equally true on the long approaches, particularly on the Bronx side. But even these Lindenthal bridges, while very definitely an advance in the realization of the designer that the principal spans should be treated esthetically, left much to be desired in their treatment of the approaches, which like most of the older bridges have much damaged the neighborhoods in which they occur. It is only within the last few years, particularly because of the vision of Mr. Robert Moses, that the bridge approaches have been made ornaments to the neighborhood in which they occur, rather than detriments to them. Even preceding the bridges designed under the direction of Mr. Moses, the Port of New York Authority had, in the George Washington Bridge approaches, proceeded very far toward improving instead of harming the neighborhoods in which they are placed.



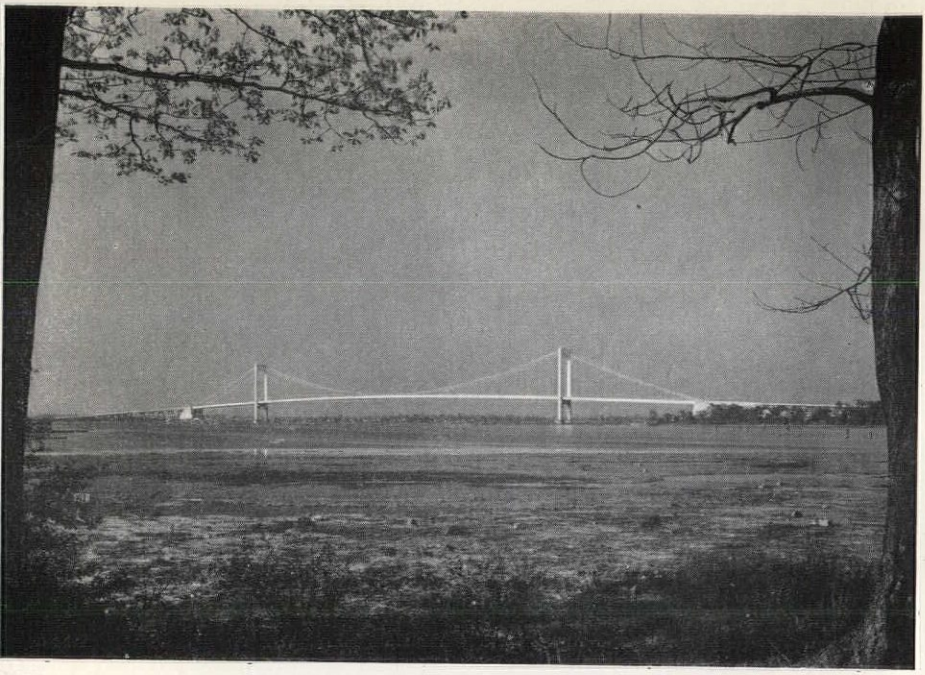
THE BIXBY CREEK BRIDGE

CALIFORNIA STATE HIGHWAYS

F. W. PENHORST, ACTING BRIDGE ENGINEER, 1933

From "A Decade of Bridges" by Wilbur J. Watson

"Esthetically a worthy companion to Ronda and, in my opinion, superior to any of half a dozen other recent bridges, very fine in themselves, but not quite of the same equisite perfection."—Aymar Embury, II



THE WHITESTONE BRIDGE OVER THE EAST RIVER, NEW YORK

O. H. AMMANN, CHIEF ENGINEER

ALLSTON DANA, ENGINEER OF DESIGN

AYMAR EMBURY, II, ARCHITECT

There is no excuse for ugly engineering structures. Ugliness and economy by no means march hand in hand. It seems to me that an inward consciousness as to the value of the appearance of things is the one thing that the engineering profession most lacks, although most of the engineers with whom I have been fortunate enough to be associated have been acutely conscious of the fact that the structures which they design are enduring monuments, and that their appearance is no more to be neglected than is their economic value; and I am perfectly certain that they represent only a small fraction of men in the engineering profession who feel as they do. I remember as one of the most beautiful things in America, the Bixby Creek Bridge, built by the California State Highway Department; several of the great dams built in recent years in the West which are as superb esthetically as they are sound structurally; I never go through Baltimore on the Pennsylvania Railroad without craning my neck to see the splendid arch spans of the Howard Street Viaduct, of which the J. E. Greiner Company were the engineers; and I remember one day passing by train in southern Louisiana through miles of flat, dull forest, crossing the Atchafayala River, and seeing to the south the airy, lovely spans of the K-braced highway bridge over the river, designed by the Louisiana State Highway Commission, presumably inspired by the administration of the late Huey Long.

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Now, there is one thing common to all these structures, they are functional. I have never happened to hear a really good definition of "functional." It is like the Holy Ghost—everybody knows about it, but nobody knows what it is. The dictionary says, "pertaining to or connected with a function or functions," which is not very enlightening; but I think the modern use of the word is to describe a structure without ornamentation except that which arises from the structure itself. Implicit in the approval of a structure as "functional" is the theorem that the structure shall not be distorted from the form it would naturally assume, in order to be ornamental. It is a word the architects love to use, especially the architects who have found that they could torture buildings into unusual forms by a layman's knowledge of what the cantilever

can accomplish. Whenever an architect says his building is functional, I am pretty well convinced that it is ugly; conversely, I am even more convinced that no engineering structure which is not strictly functional can be esthetically satisfactory.

Engineers have too often employed architects to decorate their bridges with a few curlycues of iron which cost money and add nothing to the structural value, under the impression that the architect by some magical process could make a mule look like a horse. These are both functional animals —they can both carry loads to some extent and both can draw wheeled vehicles with considerable ease. They are functional animals all right, but the horse as a rule is esthetically satisfactory and the mule is not. So, in the design of engineering structures there are many possibilities of completely functional design, some of which may be esthetically satisfactory and some the reverse, and the only way to find out which is which, is to draw them.

I don't mean that all engineers, any more than all architects, are God-inspired judges of their own work, but at least most of them have sufficient taste and judgment to pick the best, or at least the better, of several designs when they know what they look like. Usually engineers don't know what they look like, and don't trouble to find out; even the mechanics of finding out what they look like is partially unknown. I have been told, and I believe it to be true, that a good many bridges are designed with stress diagrams and a slide rule. A more careful engineer makes a diagrammatic elevation of one side of a bridge, but this is not much of an indication as to how the bridge looks in perspective. No direct elevation shows the transverse wind bracing, or gives any idea of the confusion of form which occurs in a diagonal view. Most of the engineers with whom I have worked do study their jobs in perspective, but I know that there are a great many that don't, and how on earth they are going to know whether their bridges are esthetically satisfactory or not, without ever drawing them from the points of view from which they will most likely be seen, I don't know!

Part of the training of an architect is the sharpening of his constructive imagination. He is trained to see in his mind's eye a picture of how his plan will appear when it is enclosed in walls, col-

ored by the material he has selected, and with windows shining with new glass. But there are very few who trust their constructive imagination enough to build a building without putting down the facts in perspective, and there are equally few engineers who even think of this fundamental test of their designs. I might add that a lot of bad design by both architects and engineers is due to the human weakness for employing in a new problem a solution which has been satisfactory in a former one, completely ignoring the fact that the surrounding conditions may be entirely different. But the nature of the training of an architect makes him a little less apt to substitute memory for imagination than is the case with the engineers.

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The architect starts with a sketch and the engineer with a slide rule. The slide rule will only prove that the design will carry an H-20 load, while the architect's sketch will show him immediately that the building which looked so well in one location looks like hell in another. A few minutes ago I spoke of the Bixby Creek Bridge. This is a superb design. I will go all out for it and say it is a supreme design in its particular location, yet I cannot imagine anything worse than the Bixby Creek Bridge built in the flat country over the Chesapeake and Potomac Canal with a couple of miles of plate-girder approach ramps attached to each end of it.

One of the shrewdest observers among my engineer friends has suggested that the methods used at the engineering schools must be modified before the engineers start to see things in the round—to visualize in perspective. He says that it is a never-failing source of interest to him to see an architect work with tracing paper—very quick, inexact drawings, but close enough to fact to enable the maker to see at once whether or not he is on the right track. An architectural draftsman will habitually make five or ten or fifteen sketches in the time that the engineering draftsman is making one laborious calculation, and immediately the architect is able to see by inspection and by what he knows about structure whether what he has in mind is a rational solution or not. If, for example, he has the problem of a street crossing, he can almost at once determine whether a single span with a deep girder, or a series

of girders with intermediate supports, or a rigid frame, or a brick arch will look the best. An experienced man can also make a pretty good guess at the costs of the several structures, and then if two or three of them happen to be esthetically of about equal merit, some further computations would immediately govern his decision as to which to use.

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The architectural schools train their students by giving them problems without indicating solutions. The engineering schools, as I have seen them, tend to require an analysis of a solution without ever stating the problem. It would seem that, occasionally at least, an engineering school could give its students the problem first and then require them to analyze their solutions as far as they are able to do so. I don't mean that a first-year man in engineering school should be required to figure a rigid frame, but I am certain that the students' interest in their problems, and particularly on the esthetic side, would be more stimulated by a program which called for a small bridge over a stream in a specified terrain, permitting the student himself to choose the type that he prefers to use, than to say to him simply, "I want you to design a fixed arch 120 feet long, 27 feet wide and 42 feet high above the roadway."

I am a kind of engineer myself—at least I have a couple of degrees—and have been fortunate enough to have been associated with a number of very great engineers during the past ten years, most of whom gave me credit for knowing far more than I do know, God bless 'em. Among them, Mr. Dana has given me more education than Mr. Ammann or Mr. Hardesty or Mr. Macdonald, because he has given me no credit for knowing anything, so that I have been able to understand him; but I find that even Dana is fallible, because, when he hasn't liked the appearance of something I have been working on with him, it has always been bad engineering, and when I have changed the design to suit his esthetic sensibilities, he has immediately discovered that it was good engineering. Which leads to a repetition of the only thing I have to say to you gentlemen which I believe to be at all worth while saying: you should not permit your esthetic sensibilities to atrophy; you must not feel that if you call in an architect to decorate the structure which you

are afraid may be ugly, you have satisfied your consciences. I don't believe that architecture and engineering are very different. As a matter of fact, they are essentially one and the same thing, although most engineering problems are of heavy construction for the use of machines, and most architectural problems are of light construction for the use of human beings. Nor do I believe that engineers lack esthetic perception any more than architects lack a sense of structure. The inventor of the truss was Palladio, an architect. For many thousand years buildings were built, and stood up, and were beautiful. It is manifestly impossible that in the last fifty years there have suddenly been evolved two different breeds of cats—one of which has esthetic sensibilities only, and the other only a sense of structure.

However, all construction problems have become so complicated during the last half century that very likely the ideal structural design is done by architects and engineers working together from the beginning of the problem in a true partnership of ideas. The architect habitually calls in an engineer to help him solve structural problems, and it might be to the best interests of engineering structures if an architect were called in by the engineer to help him solve problems of esthetics.

Take Off That Tie!

LISTENING to a lecture by the eloquent Dean of The Harvard Architectural Department, we hear a great deal about the proper place for ornament and decoration. It seems that these are always to be regarded as an unwarranted intrusion unless they be an outgrowth of function. These frivolous accessories are not to be regarded simply as plus quantities, like extra dividends by the financier, or unearned increment by the economist. No, they are irresponsibles and only to be admitted if accompanied by a parent.

As we listen we find ourselves gazing thoughtfully at the speaker's gay cravat and wondering at what must be the confusion of his thoughts as he knots it of a morning.

It is very puzzling. If the Dean had been speaking of engineering

it would be easier, for ornament and decoration are properly outside the engineer's purview. He is satisfied when his structure is strong enough and fulfills its purpose. But the architect is more than engineer, and in his building is still going on in his thought from where the other leaves off. So, perhaps for him these rules and aphorisms limp behind and are not valid for distinguished building.

So when we see a slender human figure with a gay (but useless) knot of color about its neck and recognize the Dean of The Harvard Architectural Department, may we perhaps dare to ask if we cannot in turn be allowed to decorate the tops of our columns with a little (unnecessary) ornament? And speaking as artists rather than as logicians, may we not mutually agree that Beauty with her wings is above the plodding scholar's sterile rules, with special rights and indeed not without unacademic friends and champions in this increasingly dreary world?

ALLEN W. JACKSON,
Lincoln, Mass.

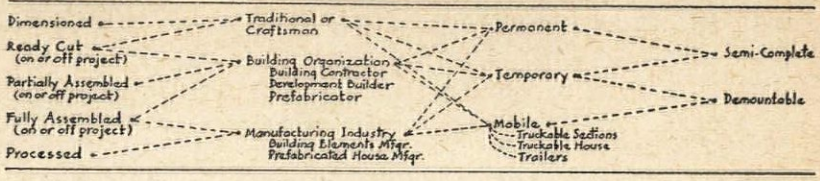
Progress in Prefabrication

By Robert L. Davison
DIRECTOR OF RESEARCH, PIERCE FOUNDATION

An address before The Architectural League of New York, March 9, 1944, at the opening of a special exhibition

MANY attempts have been made to define prefabrication. The simplest and broadest that I have heard states: "Prefabrication is a state of mind." Another definition which is a little less inclusive reads: "Prefabrication is a movement to simplify construction by increasing the proportion of work completed before erection." Since prefabrication is all things to all people, I should like to submit a chart showing the inter-relationship of various factors which not only indicate the difficulty of an accurate definition of the term, but which may clarify the inter-relationship of various types of so-called "prefabricated construction."

Prefabrication might be classified (1) by proportion of work completed before erection, or (2) by the type of individual or organ-



ization doing the work, or (3) by the intended use of the building. Much of the misconception concerning prefabrication has arisen from failure to recognize the significance of all the permutations and combinations possible in arranging these three factors.

The proportion of work completed before erection constitutes the major difference between traditional and prefabricated construction methods. This matter of degree of prefabrication is also a primary factor in any attempt to classify prefabrication by types. The proportion of work completed before erection progresses from (1) lumber accurately dimensioned as to cross-section but not as to length, to (2) ready-cut lumber and other building materials which are cut to predetermined size, to (3) partially and (4) fully assembled subassemblies of the building, and ends with (5) processed units to which I shall refer later.

I should like to call particular attention to the fact that the proportion of work done previous to erection is not affected by whether such work is done on or off the project. The major point is whether it is done before erection of the house.

We might differentiate between traditional and prefabricated houses or types of prefabrication on the basis of type of person or organization doing building. First we have the traditional or craftsman builder who, as the word craftsman implies, does the work largely by hand tools. Next in stage of evolution we have the Building Organization. This may use craftsman methods but, due to increase in size and increased organization, it is more apt to be able to make use of power equipment and quantity production methods. The techniques used and degree of work done before erection may be identical whether the work is done by a Building Contractor, a Development Builder, or a Prefabricator.

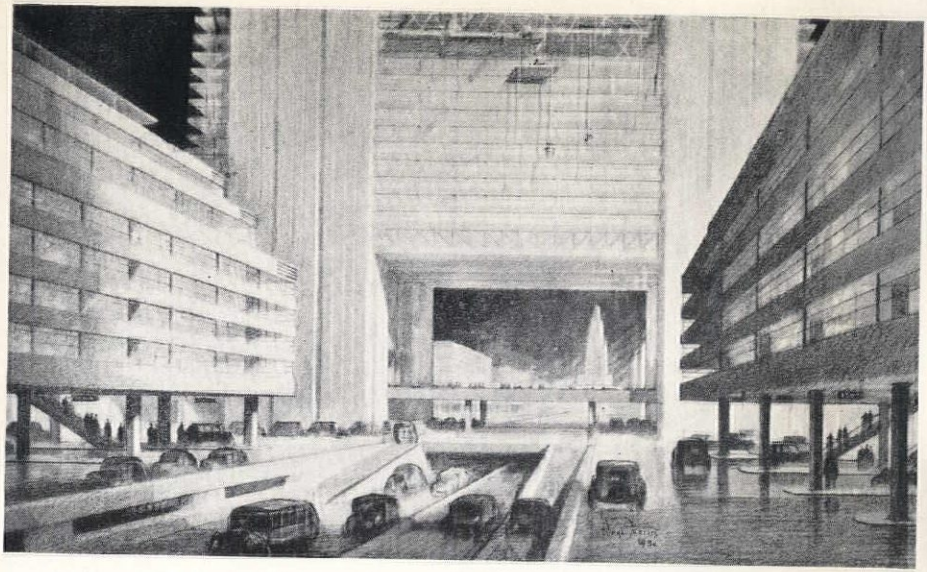
The difference between these three types of building organizations is largely one of "state of mind."

Starting from scratch, if *only one housing project* is to be built and built *in a hurry,* the contractor can do it as cheaply as anyone else. If a community is to be built, sold, and payments collected, the Development Builder has certain advantages in "know how" over the general contractor. If an area is to be supplied over a period of years with individual houses on different sites, or small groups on different sites, the prefabricator type of organization has certain distinct advantages over the Building Contractor or the Development Builder. These advantages arise not so much from difference in proportion of work completed before erection as they do from a different concept and therefore a different organizational and physical set-up with which to carry out the program. In this latter case the plant is off the site.

There is another type of organization which is somewhat difficult to classify. This type of organization manufactures walls that are 100% complete before erection, but since they do not do the actual erection they do not classify as a Building Contractor, Development Builder, or Prefabricator. I am referring to organizations such as plate glass companies. When glass is used as a curtain wall for the front of a store the proportion of work completed on the wall before erection is certainly 100%.

Another example of a wall which is 100% complete before erection is one of Cemesto Board. This is a processed wall composed of bagasse fiber and cement asbestos. The Celotex Company, which makes this board is a building materials manufacturer but, according to my definition, both Celotex and the plate glass companies are part and parcel of the prefabrication movement.

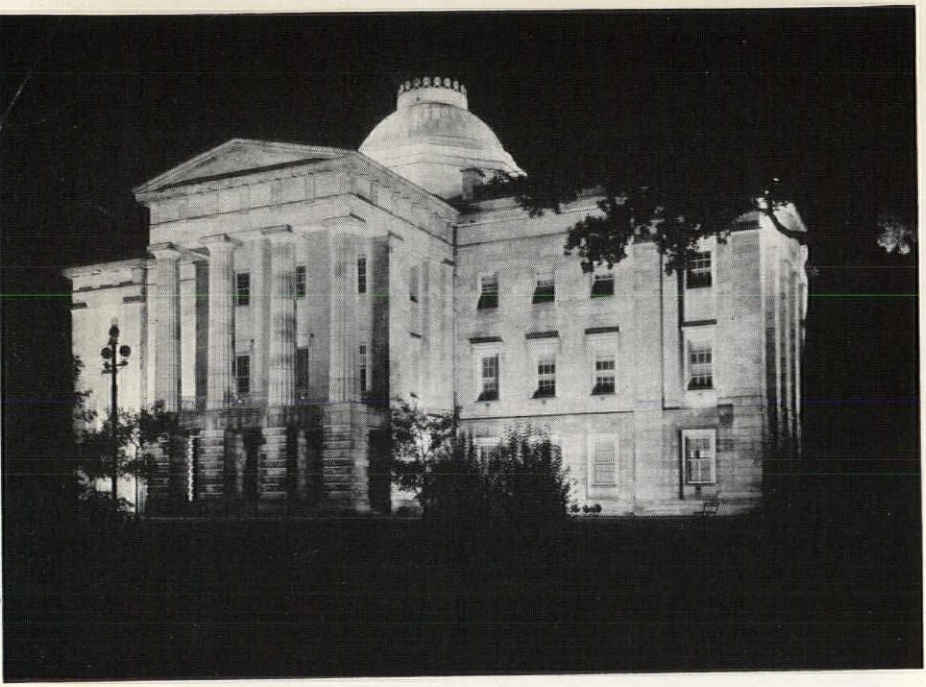
The processing of raw materials by manufacturers into complete walls, floors, roofs, etc. will be a very important factor in prefabrication of the future. Such processing may be done by present building material manufacturing organizations, provided they make the necessary changes in their thinking and organizational set-up. To do so they must get the concept of producing—not materials such as studs, joists, plaster board, plywood, etc., which are *to be assembled* into walls, floors, etc.—but *producing by processing* finished building elements. These might be



THE CITY OF THE FUTURE

FROM A DRAWING BY HUGH FERRIS

This concept, made in 1930, points the way to a possible development of prefabrication, as explained in Mr. Davison's article



Do you know this building?

STATE CAPITOL OF NORTH CAROLINA (1833-40), RALEIGH
TOWN, DAVIS AND DARIN, ARCHITECTS

sold in much the same manner as wall boards or plate glass are now sold. If this job is not done by a revitalized building material manufacturing industry, it may be done by some of the new mass production industries that are now looking to prefabrication as an answer to their post-War expansion problem.

A third classification of prefabrication might be based on intended use. We find various degrees of permanence and mobility. There is no direct relationship between degree of permanence and whether a building is prefabricated or built with so-called "traditional methods."

Traditional construction methods have been used to build demountable barracks, dormitories and houses, but in the minds of many people all such temporary buildings are lumped as "prefabricated." Houses have been built with prefabrication methods which can not be distinguished in any way, after being erected, from traditional permanent houses. In the majority of methods of prefabrication the materials used, sizes, studs, spacings, etc., are identical with traditionally built houses, the only distinguishing feature being the joint where sections come together. Even in mobile housing there is no basic difference in the final house between the use of truckable sections or truckable house, and a structure from the same plan built on the site by traditional methods. Only in the trailer does the classification by use show any difference in final dwelling between traditional and prefabricated units.

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So far I have tried to give an over-all picture of what prefabrication is and is not, and where it is today. I should now like to discuss its future as I see it. I shall take the liberty of using one item from our research work to illustrate where we may go from here.

I recognize that the exterior wall is only a small part of the whole problem. We have done considerable work on floors, partitions, roofs, doors, plumbing, heating and wiring, as well as on studies of family living requirements. For the sake of illustrating a wall of the future, I will start with Hugh Ferriss' sketch of the City of the Future (p. 237).

Ferriss has given us a concept of buildings of the future which transcends present construction methods and materials. This building could be built with brick, concrete and steel, but it strongly sug-

gests new materials and methods. Artists and architects often anticipate the products of science and industry.

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Let's take a look at some of the functions to be performed by the wall in this design. It should keep out rain and aid in maintaining thermal comfort. The wall must be of such materials and construction methods as not to endanger life or property in case of local fire or conflagration. It is obvious that if 50% of the wall is glass, which will fail in 10 minutes, it is not necessary for the balance of the wall to resist a 4-hour fire test. The function of carrying the floor loads through the walls to the foundation has been completely eliminated in this design; in fact, in most of our skyscraper construction the function has been completely reversed. Instead of walls carrying floors, the floors now carry the walls.

A wall such as shown in Hugh Ferriss' illustration might be constructed of cellular glass panels, approximately 4 inches thick and extending vertically 4 or 5 feet in height from window head of one floor to window-sill of the floor above it, and in length extending from column to column, roughly 20 feet or so.

The cellular glass is of vapor- and water-proof material weighing approximately 11 lbs., per cu. ft., and it would be surfaced with rustless metal or a sheet of plastic material.

I shall compare functions performed by a wall such as this with those performed by a traditional brick wall as it might be used in his illustration. The exterior face of metal or plastic would give absolute seal against rain. We all know that brick walls are apt to leak, and in the better class of building the inside of a brick wall is covered with an asphalt coating or membrane to prevent the water that may leak through the brick from coming into the building. The second function, insulation against passage of heat and sound, is performed by the core of fireproof insulating material; in this case cellular glass. This has four times the insulating value of an 8-in. brick wall (8-in. brick wall heat loss, .48 B.t.u.; cellular glass, .11 B.t.u.). In addition to this improvement in thermal insulation of 300%, there is a very important added factor through the use of cellular glass which does not exist in a brick wall or in any other material that I

know of; that is, that cellular glass is absolutely impervious to vapor penetration, as each of the cells in this material consists of a completely closed bubble of glass. The problem of internal condensation, with the resultant damp walls, peeling of paint, etc., is a very real problem.

The interior surface might be covered with Compreg wood, a resin-impregnated plywood which has been highly compressed. This is one of the points where plastics may be used in a large way in the building industry. Such a wall would cost less than half as much as a brick wall as now used. There are many possible variations of the materials to be used. For example, to name just a few of them, the exterior wall may be ordinary sheet steel with one of the following weather-protective surfaces: integral finish of aluminum or stainless steel, enamel, or weather-resisting plastic coating. One might use one of the non-ferrous metals—for example, the patina finish on copper might be extremely pleasing for certain types of residential construction. There are also possibilities of using sheets of plastic-impregnated asbestos board.

Recent developments for the war effort in the field of plastics will find important application for surfacing of exterior and interior walls, partitions, floors and ceilings. In place of the cellular glass core, the core might be of Microporite, weighing approximately 1 lb. per sq. ft. an inch thick. This material consists of very finely ground sand and lime and a small amount of asbestos fiber, forming a crystalline structure of high insulating value and very good resistance to fire. Both cellular glass and Microporite are now in commercial production for war uses but have not been used commercially for walls of buildings in the way that we contemplate.

As I see it, prefabrication in the future will not consist of pre-assembling existing materials in more or less traditional forms into panels, to be assembled on the site into more or less traditional structures, but will involve the processing of radically new materials into sheet forms, which materials in themselves will perform all the functions required of the various elements of the structure, such as walls, floors, partitions and roofs.

Prefabricators are at the present time studying new products which have been developed for the war effort which may be used in post-

War housing. Although we are not likely to see the "Miracle Home" that advertising agencies have been publicizing, prefabricators and manufacturers of building materials will probably come out with some real improvements over their existing products in the years immediately following the end of the war.

Slum Prevention

By Albert O. Larson

MUCH HAS been written on housing and slum clearance. Most of it follows a long-familiar pattern of theory that the public expenditure of vast sums of money through slum clearance projects will eliminate the slum from our social problem. Even the so-called housing authorities are but little concerned with the economic or tax problems involved in slum clearance. They are even less concerned with slum prevention.

In the larger cities there have been more slum type dwellings created during the past twenty-five years than during the twenty-five years previous. And during the war, with a shortage of labor and materials, slums are being created at a much faster rate. With the physical deterioration of homes and schools comes the physical and moral deterioration of those who live in those homes.

The medical profession has made notable strides in achieving public support for preventive medicine. The real hope for the future health of the nation will come with the widespread public understanding of the importance of preventing sickness and disease. This program must be greatly handicapped unless we can soon prevent not only the existence of slums but also the creation of new slums.

In order to grasp the problem, let us define the word "slum." Every place of habitation, whether it be a tenement, an apartment or a single-family dwelling, which because of lack of light and air, or because of structural or sanitary conditions, becomes unfit for human habitation, may be defined as a slum. Slum dwellings are not confined to the large cities. Just as bad housing may be found in many New England and Middle West cities as in New York or Washington.

Has any housing authority really investigated the cause of slums, and more particularly those which are right now in the making? A typical block is right now deteriorating toward the slum period which few of our housing experts would even recognize as such. In that block but few of the homes have well kept yards; most of them need paint; repairs have been reglected; plumbing and heating are out of repair. With that condition disappears the pride of home ownership. Disease and petty crime become a part of the life of that block.

The corner stores have started down the road to dilapidation and the neighborhood merchants no longer attempt nor are able to meet modern competition. Typical schools in such areas are all similar: gray forbidding institutions, poorly lighted, with antiquated plumbing in a bad state of repair. While the teaching methods may be quite on a par with other schools in new residential districts, the average school in the deteriorating district is in every other way a symbol of the approaching slum. The church, also, in that district, with fast thinning membership, is a characteristic part of the same picture. Within a surprisingly few years those homes, with the stores, the school and the churches, will be a full-grown slum, with all the social problems characteristic of the slum. Then comes the housing expert, who at one stroke, at public expense, would erase the whole picture and start over again.

What has caused the change in that average block—a change which may be duplicated by the thousands in every city in the land? The breakdown starts with the lack of self-respect and civic pride on the part of only one or two families. An accumulation of rubbish or an unkempt yard by one family, and the downhill trend starts. Neither the school nor the church has seen the problem and attempted to restore that neighborhood self-respect and pride which would delay the slum from replacing what was so few years ago a community of good American families. The school and the church should be the first to set the example with new, modern buildings which would keep alive that neighborhood pride which is so essential for the perpetuation of clean, livable homes. Good living is the first necessity for good health, and good homes will hold in check those influences which create the social sins in the slum.

The bank, the real estate owner

and civic authorities all play important parts in turning that neighborhood into a slum. If, through legislation and public opinion, the profit can be taken out of slum housing, then slum housing will disappear. Those same financiers would now attempt to salvage their souls through the sponsorship of a few slum clearance projects. Nearly all housing units are owned or rented by banks or trust companies or are mortgaged. An early interest by those mortgagors and a community responsibility for good housing would require that all renewals or new mortgages be contingent upon reasonable upkeep and modernization. When those financial institutions refuse to make loans on any property which is on its way toward becoming a slum, then the majority of those buildings will either be rehabilitated or torn down.

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Not a state in the Union has a comprehensive or modern housing law, nor regulations which protect the health and well-being of our families in prohibiting unsafe or unsanitary housing. There has been no disposition on the part of health and building officials to enforce existing housing laws. The vested real estate interests are definitely opposed to housing legislation.

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Poor construction and bad planning have been characteristic of most of the government-sponsored housing construction. Most of the slum clearance projects will again be slums in but a few years. The cost of these government projects has been much greater than if planned and built by those having had experience in good housing construction. War-time hysteria is the inevitable excuse for all the blundering which has been done. It is to be hoped that we have seen the end of government-sponsored housing projects.

New and modern schools have been constructed, but rarely in the older residential districts. The drab, antiquated schools of the older districts are definitely contributing toward the speed with which those districts are becoming slums. A survey shows that in one of our larger cities the lighting in the average school is approximately ten per cent of that required for maximum efficiency in classroom and shop work. In that same city a ridiculous union rule prohibits school janitors from doing any

cleaning above a six-foot height. Slum-like schools are a characteristic part of every slum area.

Let us visualize a program which would result in the complete elimination of slums during the next generation:

1. The enactment of comprehensive housing legislation which would make the sale, rental or ownership of unsafe or unsanitary housing illegal.

2. The rigid enforcement of all existing and new housing legislation by health and building authorities.

3. Public-spirited cooperation by all financial institutions in a program for the rehabilitation or elimination of all slum or near-slum properties, including residential and commercial.

4. The construction of the most modern type school facilities in such areas, together with a long-range program of educational work toward good citizenship and better housing.

5. A continuous better housing program on the radio, in the press and from the pulpit.

Such a program would stop that blight which is now taking a large portion of the residential areas of every city. We must approach the whole problem with preventive measures. It will pay big dividends in better health and citizenship in the future.

Again I say that under present laws and with public approval, slum housing is now financially profitable to a few. If those profits are legislated out of slum housing, slums will disappear. Where have we public officials who are bold enough to grasp or put into effective execution such a long-range program of housing reform?

"I AM SUSPICIOUS of all planners. Planners jump in on the middle of this or that problem, splash around, and come out—all wet."—FRANK LLOYD WRIGHT, broadcasting in *The Forum of the Air.*

"THE NORMAL OPERATING PROCEDURE for designing a house is to make a plan, which involves working with a floor. Yet there is more wall space than floor space in a house . . . There are few houses of any kind where the walls have been designed with a fraction of the attention given to the floor plans."—*The Architectural Forum.*

Housing for Britain

IN TWO PARTS—PART II

By Ralph Walker, F.A.I.A.

DURING the interim between the wars, England and Wales built some 3,800,000 houses, and in the five years previous to the present war the average was approximately 334,000 dwellings each year. Much of it was done by public agents, especially in the beginning when labor and material costs were so high as to prohibit private building. Later the great mass was built by private money. The success of the latter in setting up anything except shoddy shelter is doubtful. Long streets of houses, ribbon developments following arterial highways, much bad site planning—in most cases worse than the shoddy houses which occupied it. In fact it might be said that of the two evils shoddy building is less than that of bad site planning, for the latter, fixed by public utilities, persists far longer to plague the future. One must confess that, in comparison the private enterprise development, with rare exceptions, suffers with that of public housing.

The British are anything but timid when they think of a housing estate: Wythenshawe, Manchester, has 5500 acres; Speke in Liverpool is 2500 acres in size, and Becontree is built on 2800 acres.

There is a persistent quality of romanticism in the best English site planning, whether in private or public work. Where the single family house is the objective the curving road is largely used, whether the terrain demands it or not. Where flats are the unit, the same hard rigid planning which characterizes all large flat developments the world over is to be seen.

There is no doubt in British minds that public housing is going to be a necessity after the war. The indicated failure in housing has been stated as follows: "In the past private enterprise has been fairly successful in combining the provision of housing with the realization of a public service, but the cost to the community has been high, measured from every point of view—financial, social, and amenity. Such success only served to postpone the real crisis, which is the crisis of responsibility. If

housing becomes unprofitable, then private enterprise would cease to function, quite regardless of the social effects of the cessation of activity. If housing became profitable, owing to a rise in real estate values and interest rates, private enterprise would provide houses in such quantity that they could not be used economically. If private enterprises had any other source of investment which would render the same yield with less effort, it would place its capital in that investment. If private enterprise had any reason to believe that housing would not, over a period of years, be profitable, it would substitute more profitable sources of income; but, in all its activity the main question, namely, the provision of houses as an essential public service would not be discussed." ("Housing and Slum Clearance in London," by Hugh Quigley and Ismay Goldie).

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The British think of the immediate need of over 4,000,000 houses as a public service to be performed, a need that all concerned wish could be resolved by magic. How will they go about it? Immediately after the last war the British mason was credited "with laying but 300 bricks a day," ("Housing," by H. Barnes, 1923) and recently it was stated several times by different city engineers and architects that the daily stint at present was reduced to 200; (the English brick is slightly larger than those used in America). To the British a masonry house is a "proper" house, one which high and low alike look upon as home. Naturally 400,000 houses or dwellings of any sort, individual or flat, cannot be accomplished in a year at a pace set by such standards of production.

Alfred Bossom, a Member of Parliament and an architect, stated that the great difference between British building practice and that found in the U. S. was that "in America the building was first built on paper." In other words, that a greater care was taken by the American architect in preparing his plans. But there is a wider difference than that of the architect's efficiency, and it is that the whole organization in the American building industry has been trained through the years in voluntary cooperation; for, contrary to common belief, the building industry in this country is a highly efficient organization, especially when confronted with large work. The team—architect, engineer, builder, subcontractor and labor—knows and re-

spects the inherent qualities of each other. This does not exist to the same degree in Britain. There has been, of course, a further disintegration of the British building industry due to the war—men leaving it for the armed services, the war munitions factories, and other fields as well. In the four years of the war, and throughout possibly the next two, there will have been little or no chance to train new men in the present building crafts. It took ten years to integrate the British building industry after the last war.

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The slow reconversion of industry, the absence of suitable materials, the low efficiency of building labor, will tend to produce high construction costs; these will stop private industry and force public building with relatively high subsidies. "Those who witnessed the housing shortage after the great war are anxious to avoid a similar situation. Yet the outlook is not too bright. We have to give up the illusion that the situation after this war will be very different from the last post-war period; we might find it is considerably worse, even without taking the loss of houses through enemy destruction into consideration." ("Housing Before the War and After," by M. J. Elias, 1942).

The great slogan of the last war, that the men coming back from the armed services were to have "Homes for Heroes," was like so many other good resolutions; it became a paving stone. There was no great success; in fact the story is of slow starts and many failures.

There was then an attempt to do housing by prefabrication methods, and steel-frame houses were designed but were early recognized as inefficient, and, as the costs proved not to be any cheaper than the masonry house, which is the "proper kind" to the British, they were soon abandoned. (All the claims of four-day field work were present, but the final costs were disappointing.) Prefabrication therefore starts with some handicap in the minds of the present-day "Heroes," whose letters to the newspapers contain comments such as, "Are we to become a nation of shack dwellers?" "Britain will present the appearance of a pioneer mining camp more than that of a civilized country." "We need real homes and not cement and sawdust rheumatism traps." This is not stopping, however, the Ministry of Works and others from

making studies of prefabrication methods; and America, of course, is looked to as the source of all information concerning preassembled houses. Great Britain is at a peculiar disadvantage when it comes to materials suitable for prefabrication. Centuries ago the forests were used up in smelting iron. All wood must be imported from Scandinavia or Canada, also all gypsum and asbestos.

There remains, however, plenty of steel and cement and other masonry materials. It would seem, with a properly integrated building industry, that as much could be done with these latter materials as in any other way. In fact, after many fresh starts it is easy to foretell that the "proper house" will be in the majority of those built. The idea of importing houses from abroad is receiving serious consideration, but the packaging and freight costs when weighed thoroughly no doubt will prove too high.

Consideration is being given to recall some of the men from the armed services for training in the job to be done. War Housing has not been bad where it has been done. The "Hostel" is said to have proven to be a failure. At Coventry it was said, "They were first designed with accommodations for 1200, then 1000, and finally 200 persons." It was found that people preferred to live in "less clean lodgings but have a family atmosphere." A hall bedroom was to be preferred to a cubicle. On the other hand, the British restaurants, a method of Government-controlled mass feeding, was stated to be a success.

The standard of English room sizes is somewhat higher than that found in New York, and in general the space relationships are now well designed. The British have endeavored in the past to save money in low income housing by using inferior plumbing fixtures, but otherwise the things found lacking are those typically American, namely: central heat, refrigerators (now coming into popular appeal) and adequate hot water.

It is difficult to understand the British antipathy to central heat. A revolution may occur, however, through the improved sense of style in the clothing that the women are now wearing. With the short clothing rations, a newspaper report indicates that to appear well externally both men and women, and especially the latter, are going with-

out underwear. The British climate requires warmed houses, and a changed attitude toward women's clothes may cause the reverse of the trend long followed in America, where heated houses led to lighter clothing.

The British are faced with several problems which will require great ability to overcome, but they still have four qualities which made them the leaders of a great empire, namely: coal, iron, brains and courage. With them they can tackle a badly trained building industry, the lack of proper materials for prefabrication and, most serious of all, the fact that the necessity for new dwellings is immediate and urgent if the young people of England's tomorrow are to be properly housed.

The larger problems of planning for the housing of Britain are the need of conservation of land; a redistribution of industrial population to avoid further increase in present cities—this to be so planned as not to further despoil the limited agricultural land; and particularly the growing need for an encouragement of the democratic community idea, together with the need for an urban stimulus in scale with the average man. And all English planning for housing would seem to have these objectives in mind.

Appointments With Honor

GARDNER A. DAILEY has been appointed by Mayor Lapham of San Francisco as a member of the San Francisco City Planning Commission.

FREDERICK H. REIMERS and WILLIAM C. AMBROSE of San Francisco, and HERBERT J. POWELL of Los Angeles have been appointed members of the California State Board of Architecture by Governor Warren. Mr. Reimers had served as president of the Board under the preceding administration.

SHERLEY W. MORGAN, Director of the Princeton School of Architecture, has been appointed by President Ashton to the National Architectural Accrediting Board, as representative of the Association of Collegiate Schools of Architecture. The term is six years, ending with 1949.

Architects' Committee for American-Soviet Friendship

DURING the past winter an Architects' Committee has been formed in New York under the auspices of the National Council of American-Soviet Friendship. Its purpose is to bring the professions of the United States and the Soviet Union closer together by developing an understanding of each other's background and present problems, and thereby create a basis for constructive cooperation after the war. The Committee hopes to be instrumental in developing ways in which our profession can help our Soviet colleagues in their tremendous task of reconstruction, while their wide experience in housing and planning procedure will be of great interest in this country.

The Committee intends to be a medium for an exchange of data on matters of a general professional interest in both countries, such as housing, community planning, industrial building, new materials and building methods, and problems of post-War reconstruction. At the same time it will act as intermediary in obtaining specialized information. Another aspect to be covered is historic architectural research. There is to be an interchange of data on professional organizations and their aims, standards, and practice; on architectural education and technical training, leading eventually to exchange visits by architects, engineers, technical personnel, and students. An important part of the Committee's work is the preparation of traveling exhibits on architectural and allied subjects for circulation in this country and Russia.

The establishing of the Architects' Committee followed the formation during the past year of other professional committees under the auspices of the National Council of American-Soviet Friendship, such as the Artists with Paul Manship, the Musicians with Serge Koussevitsky, the Scientists with Dr. Walter B. Cannon, and others.

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The Committee is to function nationally and hopes also to develop regional subcommittees. The chairman is Harvey Wiley Corbett, with Vernon DeMars, Philip L. Goodwin, Talbot Hamlin, Hugh R. Pomeroy, John W. Root, Henry R. Shepley and William Wilson

Wurster as vice-chairmen. They are assisted by an executive committee in New York consisting of Simon Breines, Serge Chermayeff, Henry S. Churchill, K. Lonberg Holm, Joseph Hudnut, Robert Allen Jacobs, Walter H. Kilham, Jr., Jules Korchien, George Nelson, Antonin Raymond, Kenneth Reid, Morris B. Sanders, Eugene Schoen and Kenneth Stowell, with Hermann H. Field acting as executive secretary.

The Committee welcomes suggestions and requests for information. Any architects or allied technicians who want to participate in the work of the Committee either in New York or in other parts of the country, should write to the Committee at 232 Madison Avenue, New York 16, N. Y.

Books & Bulletins

AMERICAN HOUSING: PROBLEMS AND PROSPECTS. The factual findings by Miles L. Colean; the program by the Housing Committee: Henry E. Hoagland, Lilian M. Gilbreth, Frank P. Graham, Henry I. Harriman, Arthur C. Holden, John A. Lapp, William I. Myers and Coleman Woodbury. A Twentieth Century Fund survey. 488 pp. 6 by 9¼ in. New York: 1944: The Twentieth Century Fund. $3.

Here is a chart for building progress. Painstakingly and dispassionately, Miles Colean has assembled a dossier of the building industry in its relation to the provision of shelter. The cumulative portrait is not a pretty picture, nor is it a caricature; it is a convincing likeness of a member of society who has never grown up. Based on these well-documented findings, an able Committee plots a course of action. It will surprise many members of the industry to learn the complexity of the causes of our backwardness. Land subdivision, transfer and ownership, methods of finance and distribution, the attitude of labor, building codes, half-way governmental measures, instability of equities—all these factors, added to technological sluggishness, contribute to our difficulties. Facing a post-War need of well over a million dwellings a year—much greater than has ever been built in the past—our capacity

under present conditions is not encouraging. The drastic curtailment of house building during the war, if long continued, must result in the disappearance of building organizations, the dispersion of building labor and the deterioration of skills. Even with the stimulus that government provided to recovery from the last depression, it took nearly five years to bring building organizations back to something approaching adequate strength. As the Committee says, we cannot afford to wait so long again.

The Editor's Asides

THIS ISSUE'S Book Reviews mark what seems to me a real event in the history of American building. That event is the publication of Miles Colean's "American Housing: Problems and Prospects"—the culmination of the Twentieth Century Fund's painstaking research into the major problems of the building industry. It is a risky thing to prophesy great achievements for a book that still bears the pungent fragrance of new paper and fresh ink—a fact well attested in the experience of publishers and literary critics. Nevertheless, I am herewith crawling far out on a limb to proclaim my personal conviction of that impending achievement. If the measured answers this book brings us do not have a marked effect in straightening the meandering trail of our American building habits, then the industry will indeed have added to its well-established reputation as the backward child in America's industrial family a convincing demonstration of its blindness. You may not agree with all of the answers—I have my own reservations, particularly with regard to the book's advocacy of rent subsidies—but "American Housing" takes first place in today's required reading.

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PROBABLY a comparison of internal boiling points among the various groups and professions would show the architect's boiling point to be low. He doesn't, as a class, get up and yell at social mistakes, injustices, stupidities. We do, however, have a few who boil easily—nearly every Chapter has one or two of them, and these few keep the rest of us from growing

too supine. Ellis F. Lawrence of Oregon, for example, boils rather regularly at the approach of a match flame. "Music, art, drama," he says, "call for—and get—trained critics in the journalistic field. Why not architecture? Who pretends to tell the public, 'Here is an architectural crime,' or 'There is a thing of beauty.'" And again: "Democracy can't work without a mechanization by which the people are allowed to do their own planning, their own governing. What we must have is a rebirth of the Town Meeting—a forum or forums in which are elected Citizens' Councils of Health, of Art, of Recreation, of Taxation, of Industrial Relations. Together, these forums and these councils would make the civic programs. We must have a place in which to be heard. Then indeed we planners might find an opportunity to serve our communities. Then indeed the experts would come into their own."

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MOST OF US have been so annoyed by the feature writers' stories of miracles that are promised the day after unconditional surrender that we discredit any and all news of progress. We have gotten into a frame of mind wherein we're pretty nearly convinced that the client is going to have a 1943 model—and like it—not only the day after V-Day but for some years to come. This mood has its dangers. We know that we have to discount these tall tales of tomorrow's wonders — but by how much? They are not *all* false. Scattered in among the bright pieces of colored glass that form the kaleidoscopic images, there are a few bald facts. Commissioner Savage, whose "Post-War Expectations" appears on another page of this issue, isn't a man easily hypnotized, nor is he trying to sell something. His observations form a good check upon our runaway pendulum.

THESE PROPHETS OF DOOM who deal with our oil supply make me nervous. According to which one is speaking, we'll be out of oil in 300 years, in 931 years, or in 1356 years. Then up steps another statistician with the estimate that we've taken out of the earth 1 cubic mile of oil. Still another says the earth should give up 700 billion barrels. Another says there are 23 cubic miles of oil yet to be discovered. Years, miles, barrels! How many miles to the gallon, is what we want to know.

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