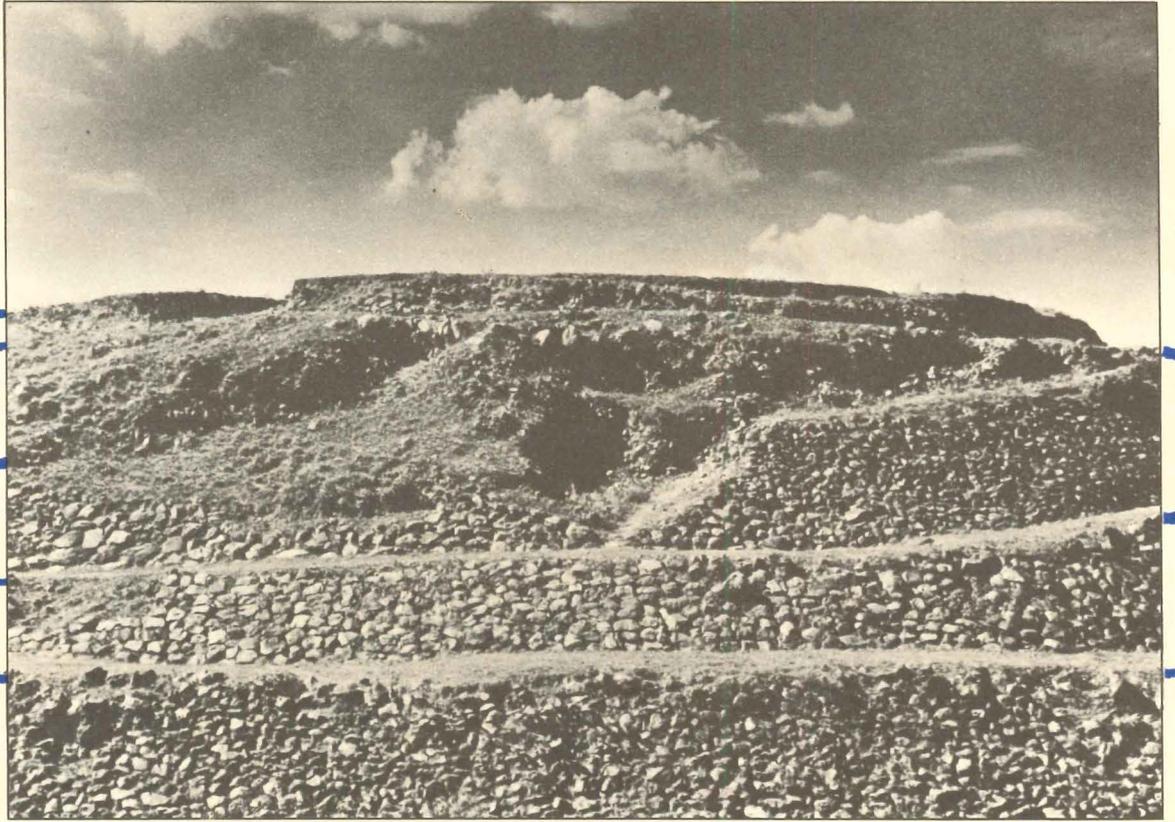




CENTRAL SCHOOL OF THE REVOLUTION, MEXICO CITY

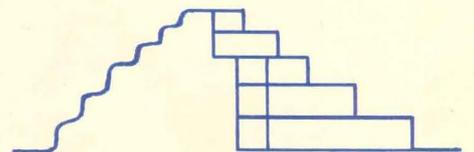
ANTONIO MUÑOZ GARCIA, ARCHITECT



THE PYRAMID OF CUICUILCO NEAR TLALPAM, D. F.
PROBABLY THE OLDEST STRUCTURE ON THE NORTH AMERICAN CONTINENT



CUICUILCO



AFTER LE CORBUSIER



THE NEW ARCHITECTURE IN MEXICO

This book shows modern architecture in Mexico, chiefly in Mexico City. The quantity of it comes as a surprise. Such a quantity would be unexpected in any North American city; but to the Northerner, acquainted with Mexico only through literature and hearsay, the energy displayed and the up-to-the-minute quality are doubly astonishing. We had thought of our neighbors as engaged in pursuits different than ours. These people were our opposites. Their territory was all mountainous, contrasted with our level central basin; it was occupied chiefly by Indians, not white men; colonized by Spaniards instead of Englishmen; spotted with huge ruins older than Rome and of a scale comparable to Egypt. The inhabitants, we were led to believe, supported themselves chiefly by handicraft, lacked a sense of time, were of a mystical rather than a practical bent of mind and, in countless other ways, differed from us as much as human beings could; besides, they were much happier.

Perhaps this myth is still nearly all true, but alongside of it runs the sort of episode, reported by René d'Harnoncourt, in which an Indian woman is ready to trade her Indian jug of incomparable design for a red gasoline can, which she values partly because it is scarce, partly because it is light, tough, durable, smooth, and shiny. Such intercourse of cultures would of course happen most regularly in the capital. This had been an Aztec city for two centuries before Cortés razed and rebuilt it, and Cortés came a century before the Puritan pilgrims set foot on the New England shore. Mexico City has been urban roughly twice as long as Boston or New York.

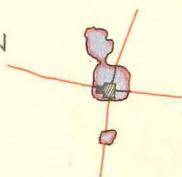
The value of a collection of buildings such as this one lies, then, not in the fact that the Mexicans follow a different pursuit but that they are engaged in the same pursuit as ours, out of this different background. The point of view is familiar but the accent is different. We may estimate, if we wish, what they have lost and what they have gained: we find them doing some estimating of their own about us. And they have the right, since many of them went to our own universities.

The book belongs to Esther Born. She interviewed the architects and photographed their work. She brought about the collaboration, and attended to the tedious details connected with assembling illustrations and material. Ernest Born was attracted to Mexico by the glowing enthusiasm of his wife during the early months of her sojourn in Mexico City. The format, the cover design and the general plan of the book are by Ernest Born.

PLAN DEVELOPMENT OF

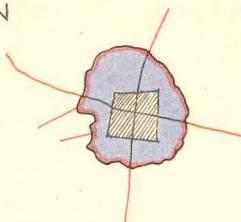
1325

POPULATION
500



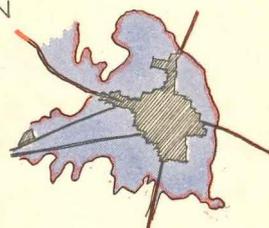
1550

POPULATION
40,000



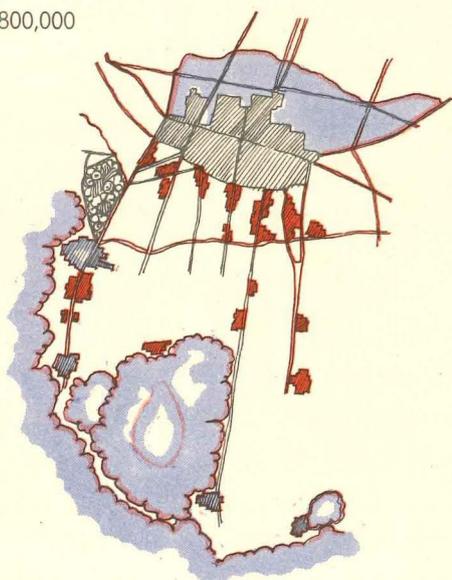
1670-1700

POPULATION
300,000



1900

POPULATION
800,000



I. HISTORY

Tenochtitlán, the capital of the Aztec Empire, was founded in 1325, on the principal island in the largest of the lakes that form the basin of the Valley of Mexico. The city was later joined to land by four "calzadas" or moleways which divided it into four great quarters. The streets ran north-south and east-west, and were of two kinds, dirt roads or canals.

On August 13, 1521, Cortés wiped out the Aztec capital and over its ruins laid down the City of Mexico with a checkerboard pattern; in three years the city had been completely rebuilt and its streets were wide, clean, and paved with stones. Three hundred years of Spanish rule saw the population increase from 30,000 to 360,000; the area in 1737 was over 500 acres. Water was brought down from the springs of Santa Fé and Chapultepec by aqueducts built of stone and masonry arches and ending in monumental fountains in the city plazas. The colonial buildings were in the baroque and churriguera styles blending the constructive force of the Spaniard harmoniously with the fantasy, mysticism, and manual skill of Indian, Creole, and Meztizo, leaving an essentially Mexican style. On the consummation of national independence, September 27, 1821, the streets of San Juan de Letrán were the western limit of the city, and the Alameda, surrounded by a ditch six yards in width, was still outside the city limits.

The real transformation of the city began with the Reform Laws and the seizure by the Government of church property used thereafter as public buildings, barracks, or for widening city streets. By 1869, when a new plan was made, the area had increased sevenfold, to 15,329,113 square meters (3,500 acres). From this time onward, expansion went forward by a peculiar patchwork or mosaic, as *colonias* or local subdivisions and new residential areas were absorbed into the city pattern.

The period of most rapid growth has been since 1900 and more especially during the revolutionary period since 1910, chiefly through the inward flow of population from the states. The limit is set by the topography of the Federal District which, as part of the Valley of Mexico, is hemmed in by mountains to the north, west, and south, and by the Lake of Texcoco to the east.

Industries, which have increased in size and importance tenfold during the last fifteen years, have brought a new confusion. Owing to lack of zoning regulations as to location, built-up spaces and open ones, use, height, volume, and set-backs, and on account of improperly located railroads and terminals, industries threaten a serious planning problem unless the question is dealt with right away.

Except for this intrusion the city is "naturally" zoned, since its central area is monumental and commercial in character, and the periphery residential. Within the residential section are not only the industrial sore spots already mentioned but buildings, markets, schools, theaters, banks, hotels and the old colonial mansions, also parks and gardens, and a few large unbuilt areas that should be acquired by the city at once as "reserve zones" to permit future planning when needs are better known; a much-needed elasticity in the master plan is also necessary. The present political limits of the Federal District are absurd and should conform more nearly to the logical, natural boundary as the watershed of the southern half of the Valley of Mexico.

II. PLAN RECOMMENDATIONS FOR MEXICO CITY

The central monumental Archaeological Traditional Zone should be preserved by creating around it a circular ring boulevard 200 feet in width and by controlling all building within this area as to use, height, bulk and architecture which should harmonize with the best examples to be preserved within the zone, tending to create civic centers and open spaces thus providing for slum clearance and better housing; to remove buildings attached or built close to churches or other monuments; to diminish construction within the zone and to reduce instead of increase the height of buildings.

All this subject to a building plan for this zone with its corresponding zoning and building regulations.

BY CARLOS CONTRERAS

Outside of the central Monumental Zone the city will expand and it should be divided into residential zones of three types R-1, R-2 and R-3: for business people to be housed in apartments and several-storied houses (R-1); middle-class, light industry workers (R-2); railroad, heavy industry and agricultural workers (R-3).

There should be a distinctive agricultural zone from the northeast: the Lake of Texcoco treated like Xochimilco in small agricultural units and large parks and forests; to the south: Ixtacalco, Ixtapalapa and Xochimilco which should be saved immediately from utter destruction (gasoline launches, posters, and too much "tourism"). The industrial zones should be of two kinds: the heavy industrialized type to the northwest (I); and the light industry type (II) west of the Cuernavaca Railway.

Finally, the large areas to the east as far as Amecameca should be condemned as Reserve Zones to take care of any additional extension of the Federal District in that direction, due to the importance of the roads of Puebla, Cuautla, National Park of the Volcanoes, Popocatepetl and Ixtaccihuatl, and the Pan-American Highway to Guatemala.

The solution of the railway problem should comprise the simplification and reduction of the number of rights-of-way entering the city to four: (1) Mexican Railway to Veracruz combined with Interoceanic (turned from narrow into standard gauge) entering the city through the right-of-way of the old Hidalgo Railway to Pachuca; (2) Laredo road eliminated, turned into a boulevard and the railroad connected to El Paso right-of-way; (3) the Uruapan-Acamcaro-Toluca Railway; (4) the Cuernavaca Railroad, improved in its course, and possibly electrified.

The Industrial Railway's right-of-way plus the "Cintura" Road extended to the south and then east to join the Cuernavaca Railway would form a circular electrified railway ring to feed *all industries* in the Federal District with the shortest possible hauls.

This railroad ring and the rights-of-way entering the city would have a broad highway on each side and all grade crossings would be eliminated.

The freight terminal, yards, warehouses and shops should be located to the west of the combined right-of-way of the Laredo and El Paso Railways, on the crossing of the Consulado River and the right-of-way of the Cuernavaca Road (to be turned into ample boulevard), and near the zone destined for heavy industry, with adequate large-sized plazas opening into wide avenues which should make the location easily accessible from all parts of the city.

The passenger terminal ("through" and not "stub" type) should be located north of the Consulado River Boulevard, south of the Industrial Railway right-of-way, and on axis with the main north and south axis of the city: the streets of San Juan de Letrán.

The railway problem should be solved as part of the coordinated system of transportation of the Federal District including tramways, busses, aviation and their corresponding terminals.

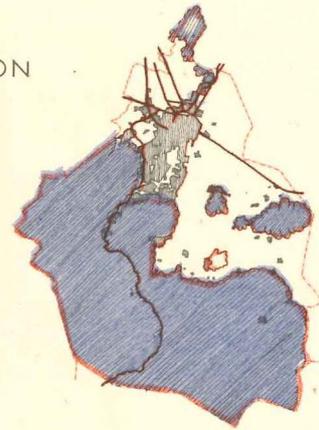
The river beds of the Consulado and La Piedad canals should be used as open viaducts for rapid transit lines around the city.

Finally, the railroad workers' and heavy industry workers' residential zone should be near the railroad and heavy industry zone.

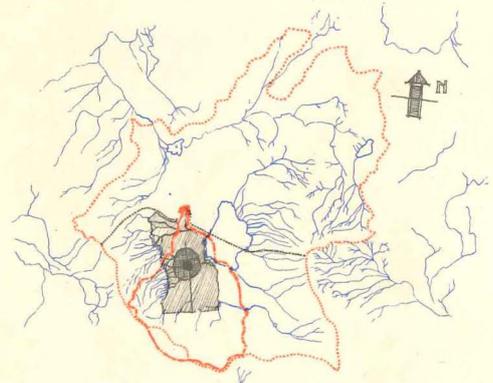
The city authorities should work in close cooperation with the National Railways and possibly handle the financial end of the undertaking since the City Government is the only agency capable of expropriating the present properties of the Railways so as to sell them, acquiring in addition large areas to the north and northwest for railway needs, by excess condemnation, and thus obtaining the funds to pay for all expenses required for all changes of rights-of-way, tracks, shops, warehouses, terminals, avenues, plazas, etc., leaving without a doubt, a large surplus from the sale of these properties and parts of the excess land purchased.

Together the City Authorities and the National Railways of Mexico should formulate a 10-year program based on accurate data and statistics and in accordance with the ideas previously outlined in this brief presentation.

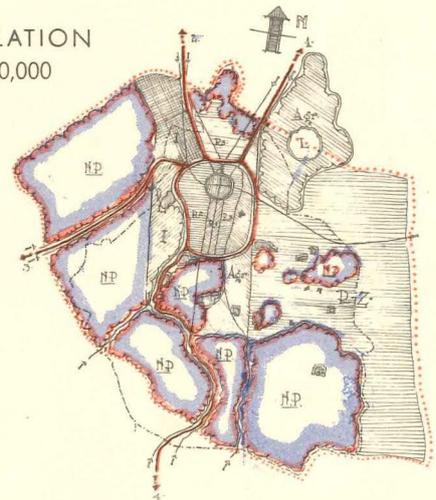
1935
POPULATION
1,200,000



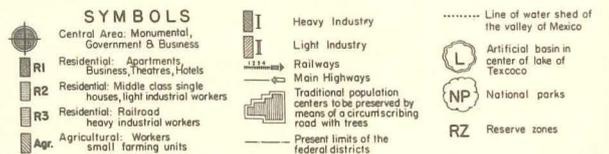
Watershed of the FEDERAL DISTRICT



1985
POPULATION
2,000,000



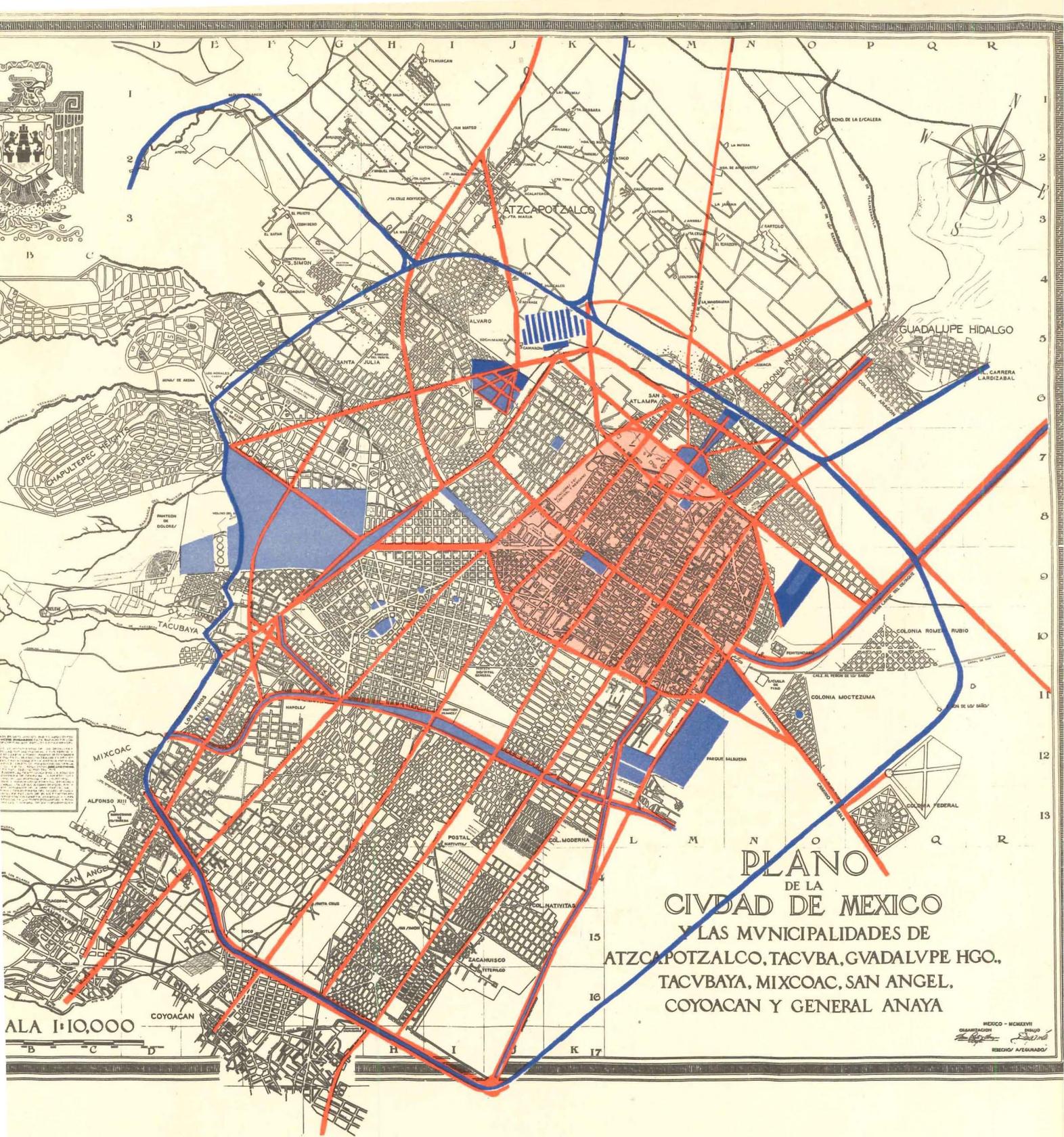
REGIONAL AND ZONING PLAN OF THE FEDERAL DISTRICT
(Southern half of the Watershed of the Valley of Mexico)





CARLOS CONTRERAS

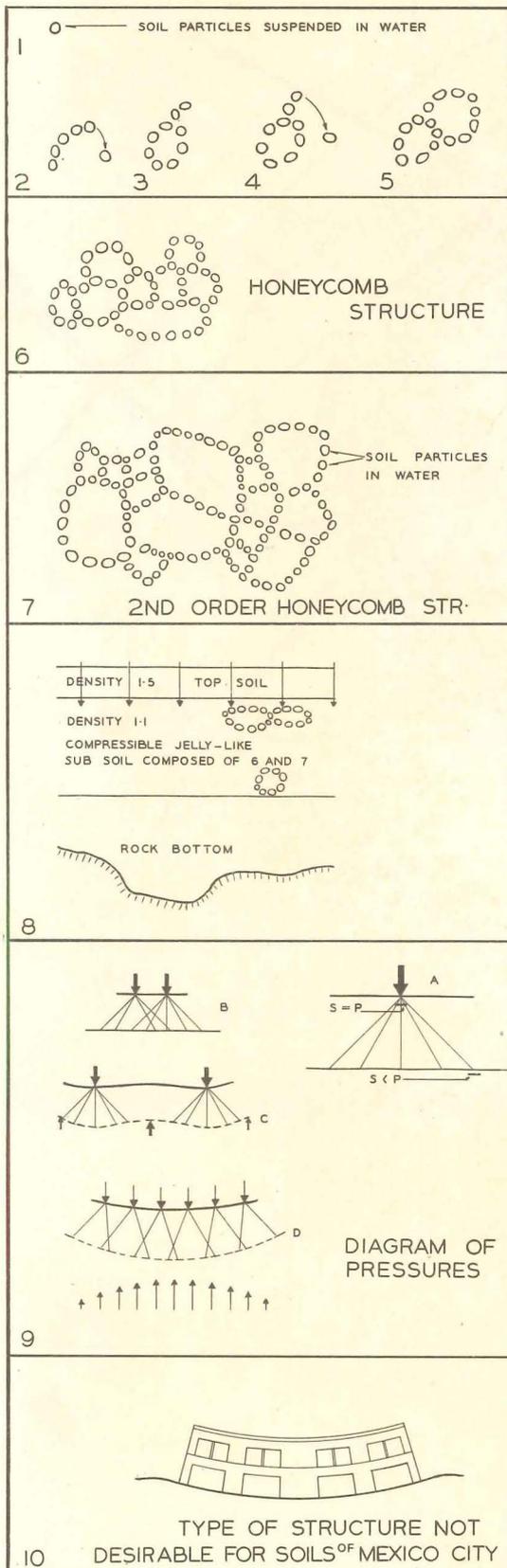
Born in Aguascalientes, March 16, 1892, the son of Jesús F. Contreras, a noted Mexican sculptor. Entered School of Mines, Columbia University, 1909; on faculty of Columbia 1918-1925. President, "Asociación Nacional para la Planificación de la República Mexicana"; delegate of the Society of Mexican Architects and of the Mexican Government to the International Housing and Planning Congresses: New York, 1925; Paris, 1928; London, 1935. Vice-president of the National Planning Commission. Editor and publisher of Planificación, 1927. Professor of City Planning in the School of Fine Arts of the National University of Mexico, 1926-27. Author of planning laws for Monterrey, N. L., 1927, Federal District of Mexico, 1933. Planning studies made for Monterrey, Veracruz, Acapulco, Mazatlan, Nuevo Laredo, Tampico. Author, Master Plan for the Federal District.



MEXICO CITY showing zoned business center in red benday, main traffic arteries in red and bypass roadway in blue, also centers zoned for specific use, industry, parks, recreation, housing, etc.

SOIL AND FOUNDATION CONDITIONS IN MEXICO CITY

BY PROFESSOR JOSE A. CUEVAS



A CITY ON A LAKE

The soil on which Mexico City rests, or rather *floats*, is a remarkable jelly. It is the fill of a large basin that might have remained a lake, hundreds of feet deep where the city stands. The rock bottom of this basin is very irregular; in parts it protrudes above the fill, in parts it is submerged as much as 700 feet. The fill itself is composed only in a very small part of ordinary alluvial soil washed in by brooks and torrents; most of it is formed by the fine ashes of hundreds of volcanoes now extinct. The fineness of volcanic ashes was splendidly demonstrated some fifty years ago when they were dispersed by the eruption of Krakatoe in Japan through the atmosphere of the entire world, manifesting themselves in the marvellous twilights then noted on all five continents.

Honeycomb structures for which there were silts and clays and proper conditions of sedimentation, and principally *honeycomb structures of the second order* for which there was fine dust, plenty of volcanic ashes, and fit conditions of flocculation, are the formations of the light, extraordinarily porous, and very compressible jelly-like subsoil of Mexico City. The water content of a sample of it is more than three times the solid content; with so small a solid mass the fill was rapidly formed during the most recent geological ages.

This cineritic fill is almost impervious, and when water is squeezed by pressures as moderate as those found in our subsoil it takes years for it to come out of the pores and flow upward through the whole mass; in the meantime it withstands internal pressures which explain most of the bearing capacity of the subsoil.

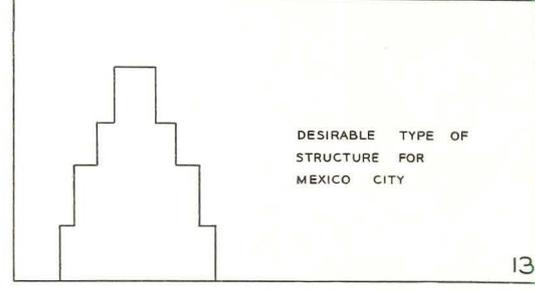
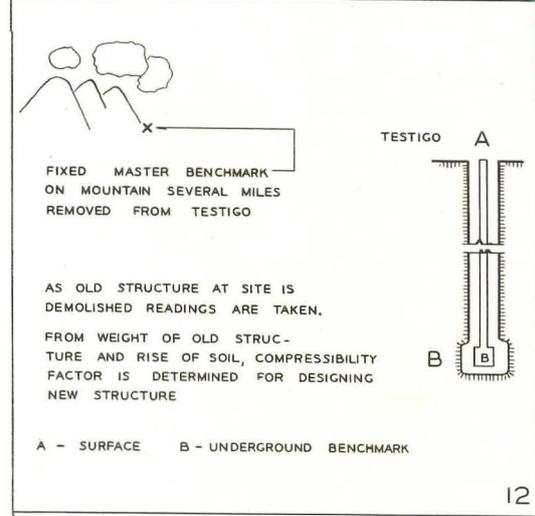
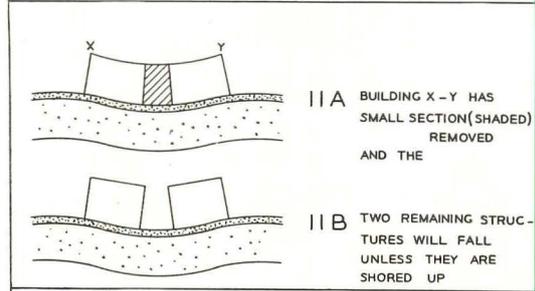
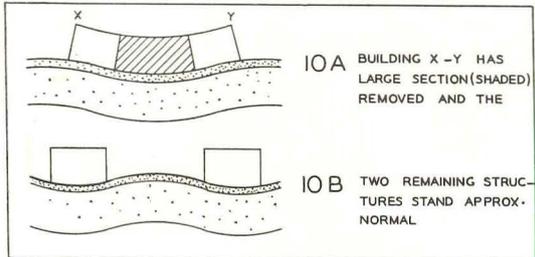
When the height of a building is uniform, especially when the construction is poor or when the horizontal dimensions are long enough, the building generally settles more at the center. The settling of the building then affects the surrounding subsoil according to laws some of which have been made clear by *testigos*.

This simple device, the *testigo*, is a pole AB (figure 1) with its hook anchored in the layer BB to be studied, the rise or drop of the pole being measured against benchmarks on a distant mountain. When the load is taken from the subsoil by the removal of an old building or by excavation for a new one, the subsequent upheaval can be measured in this way permitting determination (b) of the proper size for the excavation, (a) the best type of building to suit the conditions, and (c) the ballasting necessary to preserve equilibrium during erection.

Observations taken on the *testigos* during one excavation showed an irregular but continuous rise of the ground to a maximum lift of as much as four feet. The method of ballasting is described in fuller detail elsewhere.* It consists essentially of laying a tight but flexible grille of inverted reinforced concrete T-beams on a wood floor covered with weatherproof membrane. Over this concrete grille are laid the rigid reinforced concrete trusses, which are then loaded with gravel equal in weight to the excess of the new building over the material (whether old building or new excavation) previously removed. This loaded substructure is expected in a few months to bring ground movement to sufficient stability so that work can proceed, the ballast gradually being replaced by the superstructure.

The supposition that any building in Mexico City ever comes to a point of stability is erroneous. The subterranean lake is seasonally affected by the alternation of rainless dry seasons in winter and heavy rainfall in summer, so there is always slight movement in the soil. To take up these stresses I have placed mechanical jacks between the flexible T-beam grille and the concrete trusses of the building.

* International Conference on Soil Mechanics and Foundation Engineering. Harvard University, June, 1936. Full report of proceedings in 3 volumes. Abstract in *Engineering News-Record*, July 9, 1936.



JOSE A. CUEVAS, Engineer

Born in Mexico City, 1890. Former director of the National School of Engineering of University of Mexico. Taught structures and statics in the School of Fine Arts for 11 years; taught in School of Engineering for 13 years. One of the organizers of the new School of Construction. Was one of the delegates from Mexico to the first International Conference on Soil Mechanics and Foundation Engineering at Harvard University in June 1936, presenting a paper on the foundations of the National Lottery Building in Mexico (26 stories), the highest ever attempted on this soil.



RIGHT: An old apartment house in Mexico, showing uneven settlement of building due to nature of the soil.

ARCHITECT AS CONTRACTOR

BY F. SANCHEZ FOGARTY

NOTE: *In Mexico there is no such restriction as applies in the United States against the architect undertaking contracting work. Special conditions in Mexico, moreover, almost compel him to do it. There are no responsible firms that make contracting their business, and the architect who wants his building properly put together must either build it himself or actively superintend subcontractors who work for him. Engineering firms, which do a large part of the building in Mexico, habitually do their own contracting, and competition requires the same of the architect.*

The procedure is most favorable in the field of small structures. By doing their own building young architects rapidly learn better methods. A number of young architects work year-in year-out in the speculative field, usually with their own capital or as partners in small concerns. In almost every case the houses built by these architects are better designed and better constructed than the straight "builder" product, and would contrast most favorably with our speculative developments in the United States.

*The young architect thus finds an opening through a business depending not on the whims of particular clients but on the housing market in **general**. Success comes from knowing houses rather than "knowing people." Moreover, most of his transactions yield him a profit to be plowed back into an expanding business.*

Larger structures, on the other hand, require a more specialized organization. The architect who attempts his own contracting there "has to spend too much time counting bricks," as one of them put it, not to mention time spent on legalistic disputes. For this reason even in Mexico many architects prefer to put the building of their larger jobs in the hands of others (sometimes other architects with larger organizations). In government work separate contracting is the custom, the architect proper working for a fee or salary. Without personally advocating one system over the other, Mr. Sanchez Fogarty has here, in argumentative style, set down the principal points in favor of the architect as contractor.

ESTHER BORN

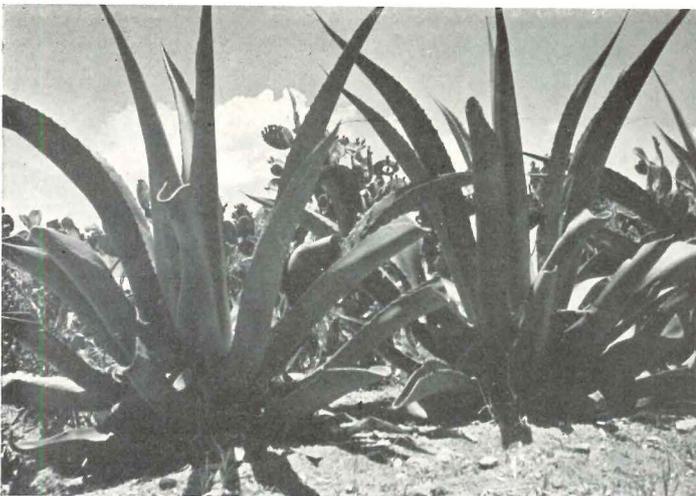
Esther Born has asked me an interesting question: Who is most likely to assume the leading creative role in the construction field in the future: the architect or the engineer?

If, as is now the case in the United States, the architect were forbidden to contract and if, conversely, the engineer were eventually forbidden to design, then the answer would be that neither of them could hope to create.

The art of building implies both designing and construction. In theory there is a difference between the two as there is between the drawing and painting of a picture; but in practice it would seem as unreasonable to deprive a designer of the right to build as it is to forbid the artist who has drawn a picture from completing it with paint.

Let us examine for a moment this limited conception of

MAGUEY PLANT



STAFF OF LIFE OF THE MEXICAN PEOPLE

From which pulque, mats, cord, houses and even clothes are made.

IN MEXICO

the architect. According to Webster's Dictionary there can be two kinds of architects. One is "a person skilled in the art of building," and this definition corresponds to what an architect has been everywhere except in the United States. The other sort, the American, is a person "who makes it his occupation to form plans and designs of, and to draw up specifications for buildings, and to superintend their execution."

Architect is a noble word. It means, etymologically, "super-technician," and from its inception was bestowed by the Greeks on master builders. The art of building must have already become so complex that it was felt necessary to honor those masons or sculptors whose higher knowledge and ability enabled them to assemble a number of stones and statues into a structure worthy of the epithet *architectural*. Thus was born this other noble word: *architecture*.

In our own time such tasks as planning, specifying, superintending, and even settling disputes that may arise between owners and contractors, are doubtless quite useful and unavoidable functions that must be performed by somebody if a building is to be erected; but there is nothing new about these functions, and meanwhile *execution* continues to be of the very essence of building. Consequently, I cannot help feeling that it amounts to sacrilege that the profession of architecture in the United States no longer should involve the actual execution of building.

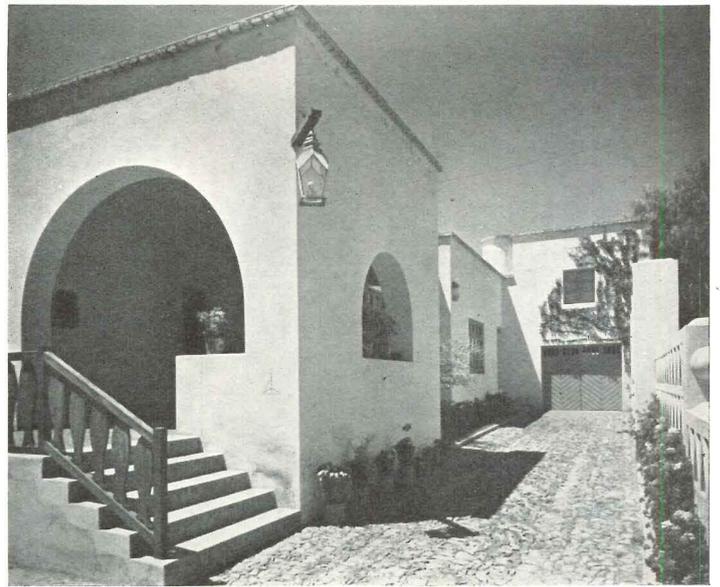
Such procedure, besides, sounds quite unbusinesslike. If the architect by profession or temperament is the one best qualified to settle disputes between principals and builders, then he would do better yet as a contractor himself, minimizing the chance of any disputes arising. If there must be men especially brought in to settle disputes, let them be trained and licensed; but why call them *architects*? Why not *attorneys-at-building*? It is very poor logic to subordinate the architect to one branch of architecture, a branch less related to architecture than to law.

As between architect and engineer:

According to Webster, *engineering*, "originally the art of managing engines, is now the art and science by which the mechanical properties of matter are made useful to man in structures and machines." No one, I believe, will disagree with this definition.

Further on, unfortunately, the same wordbook tells us that "*structural engineering* includes the design and erection of modern large structures," as if *size* determined what was architecture and what engineering. But no, *architecture* is defined as "the art or science of building, especially the art of building houses, churches, bridges and other structures for the purposes of civil life," with no mention of a limiting size. It would appear, then, that the specific difference between architecture and structural engineering lies not in quantities but in the qualitative functions of the building, with special reference to "civil life."

Now, if there is any sense attached to the expression "civil life," one must interpret it as synonymous with "city life"



ENTRANCE AND GARAGE



GARDEN

HOUSE OF MR. AND MRS. A. ELOSUA
GUADALAJARA, MEXICO

IGNACIO DIAZ MORALES, ARCHITECT

ARCHITECT

"—AND, A SMART, IMAGINATIVE, ADVERTISING MAN"*



FEDERICO SANCHEZ FOGARTY

* "This style (the so-called functional house), born in the U. S. and nursed in France, Germany and Holland, is nevertheless still a novelty almost everywhere except in Mexico, where it is now so completely acclimated that it is taken for granted.

"It is worth recording, with a smile, how that happened. First—the Tolteca Cement Company had concrete to sell and happened to command the services of an indefatigable and sophisticated advertising manager, Federico Sanchez Fogarty, who stormed the town with art contests, magazines, lectures, and all sorts of restless, intelligent pro-modern propaganda"

* Anita Brenner, *Your Mexican Holiday* (1935).

AS CONTRACTOR IN MEXICO

or *civilization*, and certainly throughout many centuries the life of a citizen could be conceived as the opposite of primitive or *rustic* life. However, now that "civil life" literally overruns the country it would be unkind and very misleading to describe architecture as urban and engineering as rural, merely because until a few decades ago there were scarcely any architectural structures out in the fields or any engineering structures within the cities.

Generally speaking, the problem could be solved, I believe, both in theory and in practice, if engineering stuck as much as possible to machines and machine-like matters such as irrigation, mining, industry, transportation, and the like, and architecture were given a fair chance wherever the main function of the structures was not to house machines or act as machines, but *to house men*. The construction of a dam or bridge would always pertain to engineering, that of a factory might pertain to engineering or architecture—depending on the ratio of one to the other element—and the construction of a residence or a theater would always pertain to architecture.

Such a conclusion does not deny the high validity of M. Le Corbusier's apothegm: the modern house is a machine to live in. As a definition this was quite deficient, but it did possess valuable precipitating qualities against that excessive sentimentality toward past architecture that had practically destroyed every incentive among the architects to do any truly creative work. This impotence came to view in the United States more than anywhere else, partly because during the present century more building has been executed there than in the rest of the world put together, and partly because the United States was the source and breeding-place of the skyscraper.

The skyscraper is a type of building unique in history, and yet with too few exceptions skyscrapers are marvels only from the engineering and structural point of view, while *architecturally* they cannot stand comparison with the excellence of average steamers or airplanes. According to Mr. Alfred C. Bossom, in his book "Building to the Skies," there was awarded a prize, as "the best building erected in New York during 1921," to a structure whose design effectively disguised the number of stories inside. If such was actually the case, what an illuminating example of the damage wrought by divorcing design from construction!

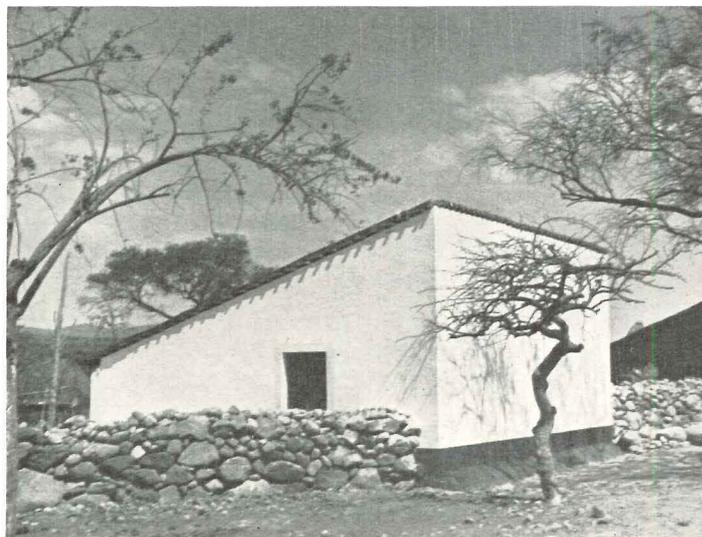
To design is not to disguise.

There is nothing in a skyscraper to be ashamed of, and there is much in these buildings demanding new architectural expression. A modern building is *skeletal* in structure and, as a rule, *asymmetrical* in function, and somehow or other architecture must find expression for both of these characteristics. A modern building is made of steel, concrete, and glass, and new materials have always called for new treatments. A modern building is no longer a semi-dead mass of stone and mortar: it is a quasi-organic structure throbbing with the life of charged wires, conditioned air, and running water. Skyscrapers are the outcome of a mechanized system of production. Roman pillars cannot withstand, still less symbolize, the conflict of forces in our dynamic buildings. Gothic finials cannot crown them and leave any hint to future generations of the soul that animated the giant builders of our time.

Architecture never was a branch of decoration. Architecture always worked *from within* and decoration was its offshoot, never its motivation. Superimposed ornamentation is artifice, not art.

Some such reasoning gave birth in Mexico to the School of Building in 1932. The founder was Mr. Juan O'Gorman. He probably thought that "architect" should be an appellation of honor given to *licensed constructors* only after the work executed by them entitled them to it.

HOUSE NEAR CUERNAVACA



ADOBE WALLS, PLASTERED — TRADITIONAL METHOD

HOUSES IN XOCHIMILOC



ADOBE WALLS, THATCHED ROOF — LOCAL



REED WALLS, THATCHED ROOF — RURAL

THE NEW ARCHITECTURE IN MEXICO

AN OUTLINE OF ITS DEVELOPMENT

BY JUSTINO FERNANDEZ

of the Institute of Aesthetic Research of the National University
of Mexico

1797

SCHOOL OF MINES

TOLSA



Architecture in Mexico at the end of the Colonial period, 1810, was neo-classic. The establishment of the Royal Academy of Fine Arts of San Carlos had begun the conquest of simple Greek and Roman treatment over baroque and the variegated "churriguera." These influences persisted for half a century. In 1843, the Academy was reorganized, and the first School of Engineers and Architects was put in charge of Don Severio Cavallari, formerly director of the Academy at Milan. "Papa" Cavallari, a man of vast knowledge, brought his pupils increasingly under the influence of the French Ecole des Beaux Arts. By the end of the nineteenth century the "romantic attitude" was rampant; residences were built in any style including the Chinese, and office buildings might be designed after operatic decorations. "Art Nouveau" was represented by Adamo Boari, who designed the new National Theater, now called the Palace of Fine Arts. There were efforts to revive the old baroque, and Nationalism bethought itself of dressing its facades with pre-Cortésian Indian sculpture.

Some buildings nevertheless were based on logical structure. The main Post Office, built by the engineer Gonzalo Garita after designs by Boari, serves in spite of its Venetian ornament as an example, and so does the Mexican Light and Power Company Building by architect José Luis Cuevas.*

In 1925 the Exposition des Arts Decoratifs in Paris gave a new turn to architectural thought throughout the world, and was reflected in Mexico

in the work of Obregón Santacilia, whose Bank of Mexico interiors are a good example of this new kind of Art Nouveau.

The idea of functionalism, in the modern sense of the word, was seriously considered in Mexico for the first time by the architect José Villagrán García. He was invited to teach architecture at the National Academy in 1926 by a group of students that have since distinguished themselves in architecture—Juan O'Gorman, Enrique del Moral, Mauricio Campos, Alvaro Aburto, Leonardo Noriega, Salvador Roncal, Francisco Arce, Jesús Robado, Javier Torres Ansorena and Carlos Vergara. The discrimination of Villagrán between what is functionalism and what is sentimentalism found echo in his intelligent pupils, who became the first propagandists of his ideas.

O'Gorman, del Moral, Campos, Arce and Vergara worked with Villagrán in the "Granja Sanataria" in Tacuba (finished in 1926), a group of buildings which for the first time showed functional tendencies. Nevertheless, this work as well as others of this time planned by Villagrán can be considered as a transition between the old and the new ideas. The important part is that they served Villagrán as examples of his theories, and unquestionably had a great influence on the minds of his followers.

Juan O'Gorman represents functionalism in Mexico in its purest expression. He was the first after Villagrán who fought for the realization of

*Not to be confused with engineer José A. Cuevas.

modern tendencies, and no doubt went farther than Villagrán because he advocated a more radical change, assuming an uncompromising attitude against current ideas. When functionalism was looked upon in Mexico as a strange idiotic thing (and this is still largely the case) O'Gorman built, with his personal savings, the first truly functional house in Mexico in San Angel. Later, he had the extraordinary opportunity to plan twenty primary schools which were all built after his designs.

In 1935, engineer José A. Cuevas and Juan O'Gorman organized and established the new School of Construction, based on functional theories. A number of young enthusiastic architects were invited to teach in this school, among whom was the intelligent Juan Legarreta. For his graduate thesis in architecture Legarreta had presented a problem of a minimum house for workmen, which he had actually constructed in the Calzada Vallejo in Peravillo. In 1932 he won the first place at a competition organized by the "Sociedad Mexicana de Arquitectos" for the improvement of the living conditions of the humbler classes, with a study of minimum houses. This type of minimum house was later developed into a large group of workmen's houses built in Balbuena by the Departamento Central, or City Council, as an example for other groups that have afterwards been built in different parts of the city.

Villagrán, O'Gorman and Legarreta may be considered as representatives of the purest functional tendencies of the moment, if not absolutely successful in their productions, at least very definite in their ideal conceptions. From the younger generation there have come other enthusiastic followers of the idea—Enrique Yañez, and Enrique de la Mora, both of them having distinguished themselves in the construction of apartment houses and office buildings. If they have not worked much yet, the few things they have produced are of outstanding merit.

In 1933, an architectural council was created by law, the first members being José Luis Cuevas, José López Moctezuma, and Juan Legarreta, the function of which was to pass on the architectural merit of buildings to be erected in the city of Mexico. The council put all their knowledge and experience at the service of the public, without receiving salaries, and were a particular force in guiding the general opinion of the public and the older architects to the understanding of the new theories. Others followed through the open road.

The architects that have been mentioned are those who have distinguished themselves particularly by their attitude toward functional tendencies in architecture, and who have consistently fought for this development and realization, against an atmosphere of the most conservative nature. But there are many others who have done excellent work in this field.



END OF 19TH AND BEGINNING OF 20TH CENTURY
THE BANK OF LONDON AND MEXICO

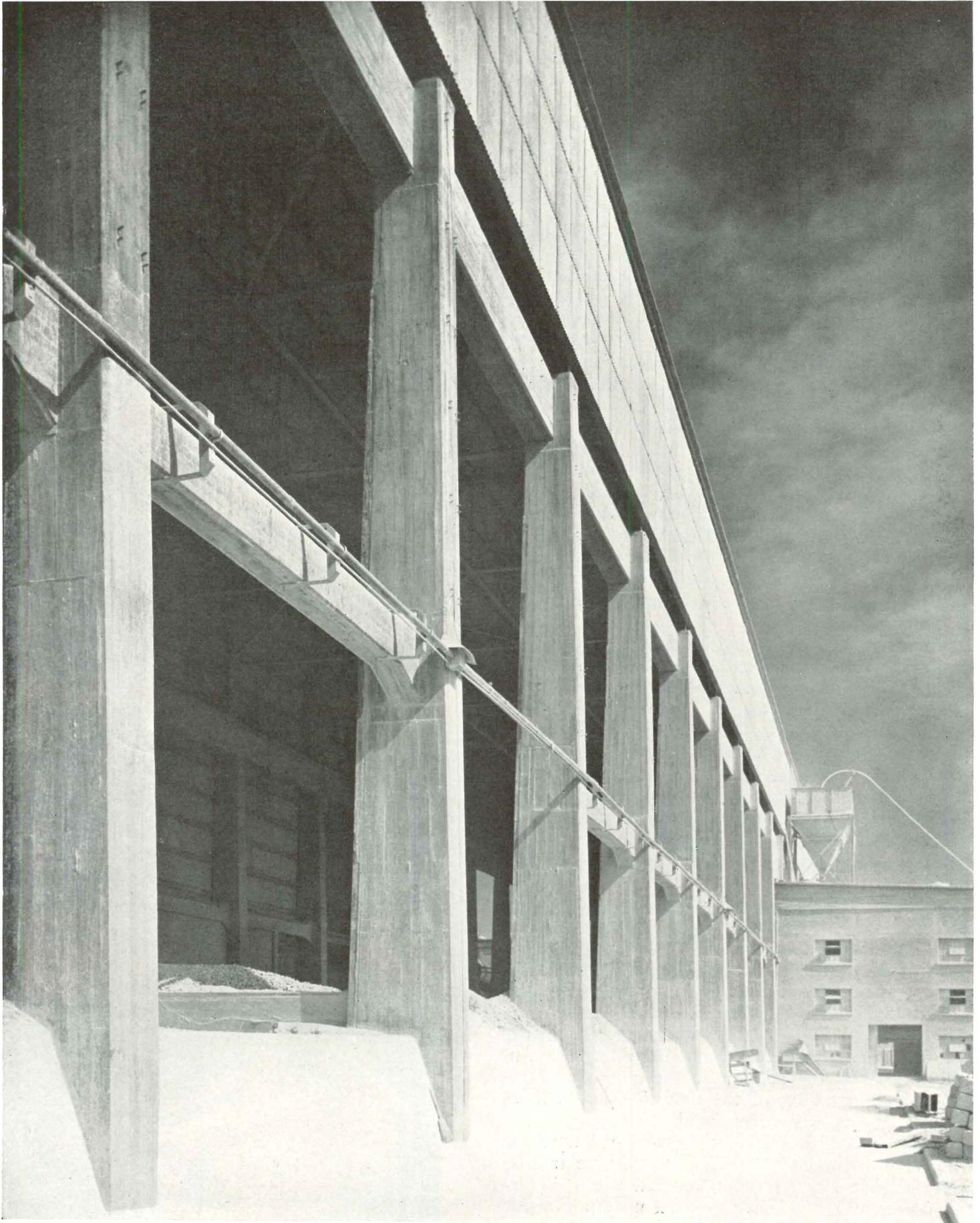


1925 • HYGIENE LABORATORY • VILLAGRAN

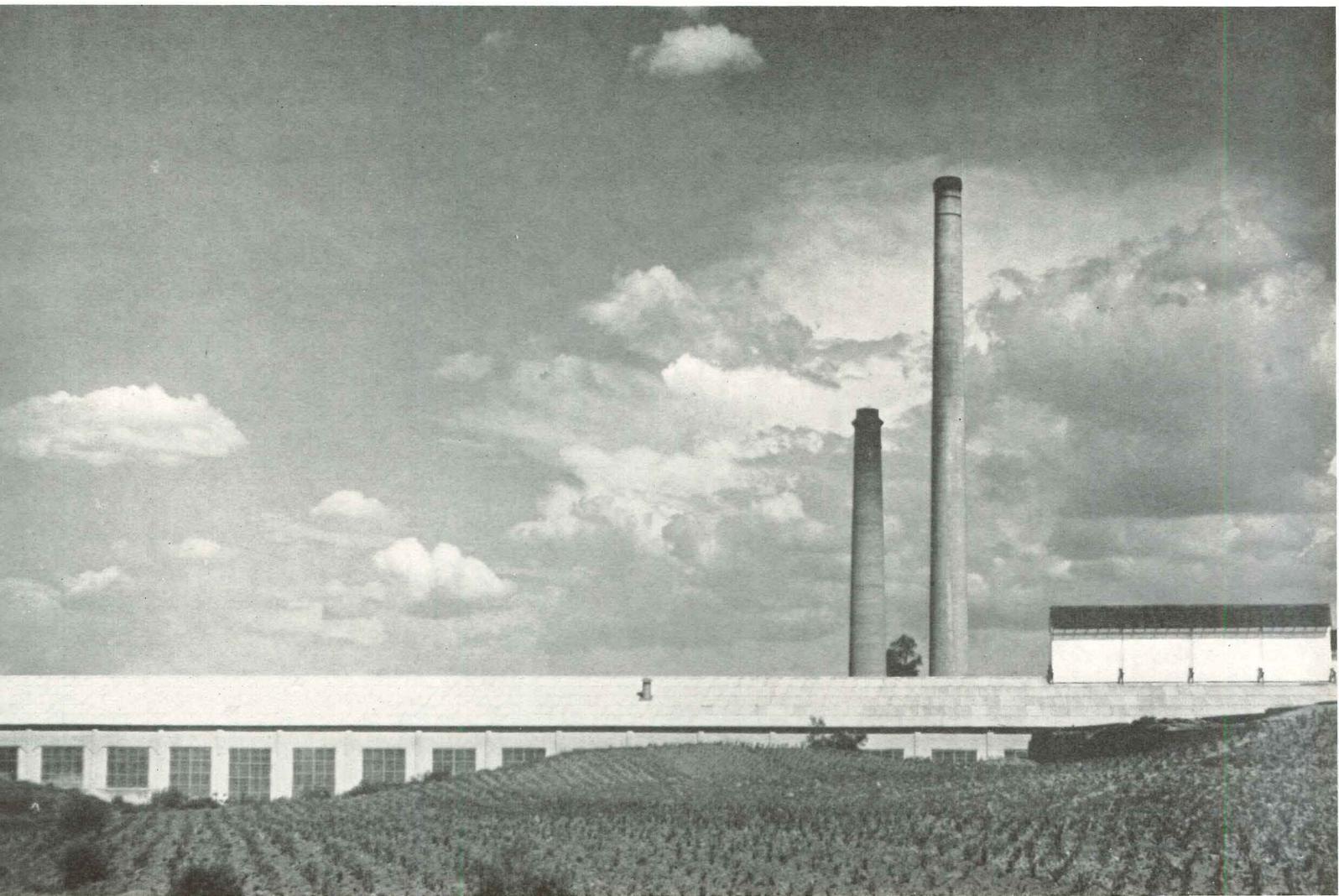


1935 • SCHOOL OF THE REVOLUTION • MUÑOZ

I N D U S T R Y



TOLTECA CEMENT PLANT, MEXICO, D. F.

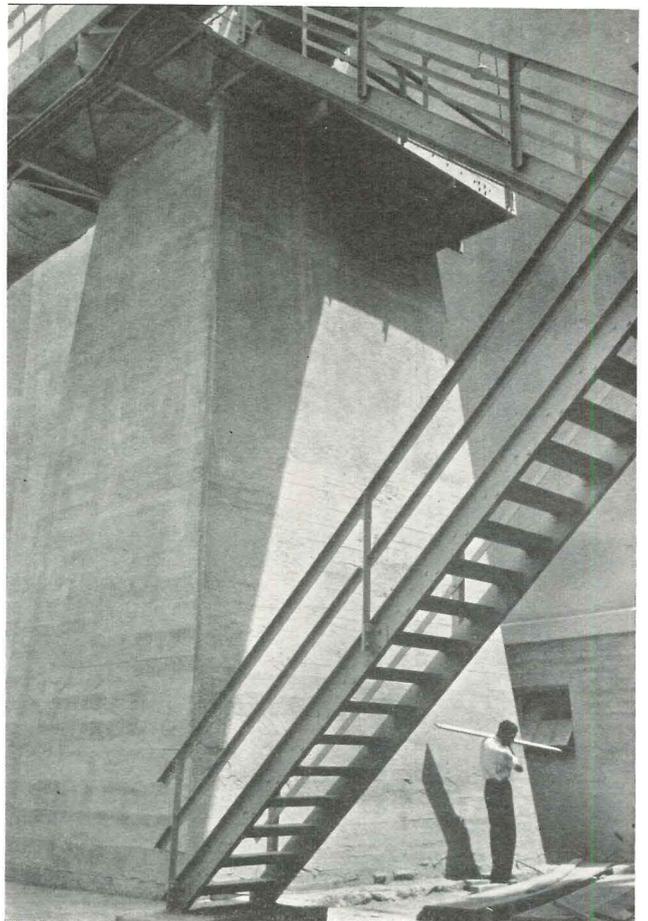


PEÑA POBRE PAPER MILL, TLALPAM, D. F.

“The importance of the School of Construction founded by Juan O’Gorman under Bassols, the Secretary of Public Instruction, in 1932 cannot be over-emphasized. This school treats building construction entirely as a branch of engineering, and while its curriculum is somewhat one-sided, it will begin to contribute tremendously to the vigor of the movement when it begins to turn out graduates within the next year or so.”

In Mexico, as elsewhere, the influence of industrial forms on modern architecture is evident. The extent of general appreciation of logical beauty growing out of functional architecture was shown by the enormous popular interest in the Tolteca Cement Company’s Competition, in which prizes were given in painting, drawing, and photography for representations of the new Mexico City Cement Plant.

STAIRWAY DETAIL
TOLTECA CEMENT
PLANT, MEXICO, D. F.



Augustin Jimenez, Photographer

S O C I A L P R O G R E S S A N D

BY BEACH RILEY

Too much has been written in tourist guides and steamship circulars about Mexico, the romantic country of ancient Indian and Spanish customs, a picturesque land of Fiestas, colorful native costumes, and guitar music. All this is true in its place, but it has been so much publicized from the point of view and for the interest of the amateur curio hunters that a wholly false impression has been created—the impression that Mexico is picturesquely primitive and backward—that it is the land of mañana where the Fiesta is of more importance than getting anything done. Nothing could be farther from the truth than this highly profitable myth. Mexico is a country of growth and movement, of social change and progress, to an extent of which we are only beginning to be aware in the United States.

The fact that Mexico has an architectural movement of probably far sounder and more extensive development than anything we can boast of in the United States is an example of what I mean. It is the purpose of this paper to give a brief description of the origins and social relationships of this movement. The knowledge of where it came from and how it developed will of necessity give us a much better idea of just what this new architecture is and what it stands for, as well as an idea of the vigor and movement of the country that produced it. We have not a little to learn from the social experiments and progress of the Mexican Republic—a subject that has received too little mention and some distortion in the North American press.

Like most of the new developments that have emerged in Mexico within the last two or three decades, this architectural movement is, in the last analysis, a child of the Mexican Revolution. It got its start in the late twenties, on the tide of the intellectual and artistic revolt that was irreverently challenging the traditional, and actively seeking new methods of expression and sounder ways of meeting the new problems. One of the traditional forms that came in for this post-revolutionary intellectual fire was the continued repetition of the inherited architectural forms which had little or no meaning in terms of the new era. This revolt, surprisingly enough, came not from the architects but from a group of painters, led by Diego Rivera. At about this time there was constructed the Institute of Hygiene, by Villagrán García, as something of an answer to the demand for a new way of building. In spite of evidence of the influence of the Paris Exposition of '25, of a preoccupation with symmetry and decorative uses of cement, this work, in its use of the new material and in its simplicity, is of the greatest importance. But for two years more, until about '29, little was done to meet a very definite social problem. At that time there appeared in the *Revista Tolteca* (a magazine put out by the Tolteca Cement concern under the direction of Sánchez Fogarty, a young Mexican businessman of unusual perception and enthusiasm) a series of articles expounding the theory of the new functional approach to building. These articles became the focal point for the development of the new group and its approach, and probably have done as much as anything else to give impulse to the movement and its idea. For it was only after this that the architects began to take up the fight and to explain and defend their ideas against the almost universal prejudice and misunderstanding they met.

But all this intellectual ferment was necessary—the question remained: Where and for whom was this building to be done? Ideas like these are not taken up and estab-

THE NEW ARCHITECTURE

lished in practice merely because some people may approve of their logic. There had to be some social need, some soil ready to be sown with the seeds of so radical a departure from the traditional. Fortunately the same Revolution which had given the impulse to the release of the new ideas also provided the opportunity for their realization. For a great wave of long-awaited reform was rising in the country, and the government was beginning to answer popular demands for such things as new schools, hospitals, housing developments, recreation centers—in a word, facilities for a fuller life for the have-nots so long denied them under the stagnation of the Diaz regime.

Now it had already been proved by demonstration that the old forms were not adequate—during one year under the leadership of the famous Vasconcelos fifty-two million pesos had been spent for the construction of seven or eight schools in the neo-colonial style, built around a patio with a general convent plan. Such a cost was prohibitive. For the time being mistaken concern with the attempt to recreate the atmosphere of the past was submerged in the demand for more actual building, and that of a more useful nature, for the money spent. Here is where the small group who wanted to build in a direct, rational manner, without the dead weight of traditional forms and heavy ornamentation, found their opportunity.

From now on, the first few years of the present decade, we find a period of rapid, extensive and little-hampered work. The leaders of the movement among the architects, those who made the start with the example of their work and their ideas and teaching, were Zarraga and, above all, Villagrán. Neither of them seems to have been altogether thoroughgoing in his approach. Villagrán is at the present time associated with the School of Architecture, stronghold of the Beaux Arts tradition. It is enough for our purpose to note that they showed the way and that a group of younger workers, among whom O'Gorman and Legarreta stand out most prominently, took up their work and carried it on to a clear functional approach. Legarreta did the first workers' housing development, and is more or less regarded as the leader of the movement. O'Gorman's numerous schools probably constitute the most solid and extensive contribution to the body of their work. He built cheaply and so eminently and clearly from the point of view of use, that even now we find various attempts to reintroduce the colonial consisting of nothing more than his solutions with a little dressing plastered on to give the desired appearance.

At about the same time Legarreta succeeded in getting an appointment to the Department of Architecture and from this time on the functional approach of the new group of builders was almost completely dominant in government construction.

But such success was not to be uninterrupted by opposition. For about two or three years now the campaign inspired and directed by Sánchez Fogarty in the *Revista Tolteca* has been dropped. Ignoring the fact that Sánchez Fogarty was a Mexican and the *Tolteca* publication merely a passive agent for the expression of his ideas, the opposition began to howl that this new architecture was being foisted on Mexico by imperialist interests. Now the Mexicans have ample reason to hate this sort of outside pressure, and the propaganda struck a note so piercing to Mexican ears that the *Tolteca* interests were threatened—the construction was using their Cement, but the propaganda threatened to become a boomerang. The unfortunate thing about this attack was its complete erroneous-

ness. The architectural movement was, in the first place, an essentially native Mexican affair, as we have seen. By no stretch of the imagination could any imperialist nation have any interest in forcing this type of architecture on Mexico. The United States with its enormous consumption of cement was almost completely guiltless of any such natural approach to building problems. The reactionaries could have stated their case obversely and been as near the truth.

But the campaign continued and more and more began to be heard the demand, based on this mistaken nationalism, for a native Mexican architecture, which meant to these individuals the return to the plagiarism of the styles and periods imported into Mexico at an earlier date. An amusing corollary to this is the fact that much of the interest in the colonial arose after it was "discovered" and publicized by visitors from foreign countries.

Then came the death of the talented young leader Legarreta, and activity began to slow down more and more as it met increased opposition on many fronts. At the present time it cannot be said that the movement has come to a complete halt, but within the government the forces of opposition, basing their attack on this pseudo-nationalism that we have been discussing, seem to be for the time being at least more or less dominant.

Leaving for the moment this question of the growth and progress of the movement, let us make a rapid survey of the construction done in order to ascertain just what has been turned out—the nature of this group's work and of other work influenced by it.

After what has been said we need not reiterate that this architecture is peculiarly a product of recent social changes and movements in Mexico. We need not repeat that government construction, in its effort to meet the popular demand for more concrete results of reform activity, has been the predominating field in which this building has taken place. By a simple process of comparison we can find out that the working out of the problems put forward by these social measures of reform has developed and produced the best architecture and the leading architects in Mexico today. For the government work has not been the only work of this kind done in Mexico. That it is clearly the best I think no one will dispute. But scattered about Mexico, principally in the wealthier districts, we find evidences that other architects have taken up the same type of architecture to be used for private residences. But here we find certain tendencies which indicate a somewhat different approach. We can see that, while there are overlappings in both directions to be sure, another group is at work here. We find a definite tendency towards stylization, towards the decorative use of cement, towards an arbitrary manipulation of planes and surfaces not always based on the logic of use. This architecture, which is essentially the negation of all concern with "styles" and "periods," is itself becoming stylized. Now I do not wish to give the impression that all the government work is without any of these faults, or that all private construction suffers from them in one form or another—that would be far from the truth. Some of the very best work has had no connection with the government or any other public or semi-public group, but is entirely for residential or business purposes. And some of the government work is undoubtedly of an inferior nature. But the tendency I speak of does exist and is patent to any one who cares to make the survey, and it is this tendency that seems to

SOCIAL PROGRESS AND THE NEW ARCHITECTURE

me to be a matter of the greatest importance and interest. It shows that this architecture, having grown out of the need to meet new social problems, finds its most congenial atmosphere and its healthiest growth in this social application. We find that where it has been taken up by the wealthier classes, where the urgency of its social function is lessened, where the astringent action of necessary economy and high utility is somewhat diluted, the quality of the work falls off and confusion in purpose and execution begins to show. An essential clarity and seriousness is lost and we begin to develop a new style—"modernistic" has made its appearance.

If, then, it has been the case that this architecture is so eminently a popular and indigenous affair, if even its misuse seems to emphasize its real nature, how is it that it has encountered so much opposition as to be virtually prohibited in all but the newer sections of Mexico City? This opposition is principally due, I am convinced, to a reactionary group who have consistently and loudly opposed every move of innovation or progress in the last two decades, ranging from the agrarian reforms to the music and conducting of Carlos Chavez. Their active dislike of any architecture more recent than colonial is only to be expected. Their playing upon a bogus nationalism and mistaken concern for native tradition has been successful in taking in tow, in this case, influential followers who are honestly confused. But this success, such as it has been, is in part due to certain mistakes of the architects of the functional school themselves.

One of these errors was brought up recently in a conversation with an active member of this group, whose knowledge of the history and background of Mexican architecture is unusually broad, and whose work is of the best being done. Briefly, his idea was that in some degree he and his colleagues merited the attacks leveled at them in that they had failed to adapt themselves sufficiently to local conditions—climate, materials, ways of living and so forth. They had done building that might have been put up almost anywhere in the world. This fault, if it does exist, is by no means a glaring one. The problems met by these men are to a large extent universal—school children, for example, have much the same needs in Mexico that they have in Europe. The question raised is one that I have neither the detailed knowledge nor the space to deal with. It is sufficient to say that the correction of the fault would certainly lie in the direction of continued study and work, and by no flight of the imagination in a return to neo-colonial or pre-Cortés forms.

A greater mistake, I think, on the part of these architects is their failure to organize themselves into a definite group with a program of education which would clear up much of the misapprehension about their work, and would do much to gain them more of a popular following. For the present Cardenas regime is evidently quite sincere in its determination to continue as a democratic, popular government, and would undoubtedly respond to more widespread interest and understanding in this matter.

The confusion that now impedes lies essentially in the idea that forms of building evolved for an earlier and different society are the only ones truly Mexican. The fact that these forms themselves were imported partly from without, some of them with very little native adaptation, is ignored. It is necessary to make clear that a truly native Mexican architecture is that architecture which best meets the peculiar problems of Mexico and the Mexican people. In this sense the neo-colonial or pre-Cortés forms are, for the purposes of contemporary construction, less native, less Mexican, than the uncompromising schools of Juan O'Gorman or Enrique de la

Mora. These obvious truths are nothing new in Mexico, but the architects and those interested in this new and important work must realize that they do not propagate themselves automatically, nor even by the example of building activity itself.

In view of all that has been said let us look around to see how things stand at the present. What do we find to indicate progress or stagnation for the near future? In general I think we may conclude that we may look for continued activity in this field where such a magnificent start has been made.

In the first place there is the prospect that outside interest attracted by this work may have a favorable effect on some who are now indifferent or more or less hostile. This we can only judge in the future. The best hope is that it will spur defense and activity where it is needed—within Mexico, for it is there that the first and last word is to be said.

Another factor of more importance is that the growing and powerful labor movement in Mexico, headed by the Confederacion de Trabajadores Mexicanos, is turning to the modern school for the construction of its headquarters and halls. In the last few months projects for the Union of Electricians, for the Cinema Workers, and for the general headquarters of the CTM have all been given to members of this school. The central organ of the CTM has taken up, also, the theoretical defense of modern architecture. This, I think, is of the greatest importance. Not only does it afford an ideal field for this work, but these developments may definitely influence the policy of the government, closely allied as it is with the labor movement, particularly the CTM.

And, of course, the importance of the School of Construction, founded by Juan O'Gorman under Bassols, the Secretary of Public Instruction, in 1932, cannot be over-emphasized. This school treats building construction entirely as a branch of engineering, and while its curriculum is somewhat one-sided, will begin to contribute tremendously to the vigor of the movement when it begins to turn out graduates in the next year or so. Its publication, *Edificacion*, while not popular enough to have any very wide influence, has been including valuable articles.

There is the possibility that opposition in and around Mexico may force some architects to take up work in the outlying districts. Here the necessity of utilizing local materials, the closer contact with actual Mexican life than is the case in the cosmopolitan center, will undoubtedly have a healthy effect on the work done. There are profoundly stimulating problems to be solved, such as leper colonies, penitentiaries built for the purpose of rehabilitation rather than punishment, agrarian and cooperative centers, and so forth.

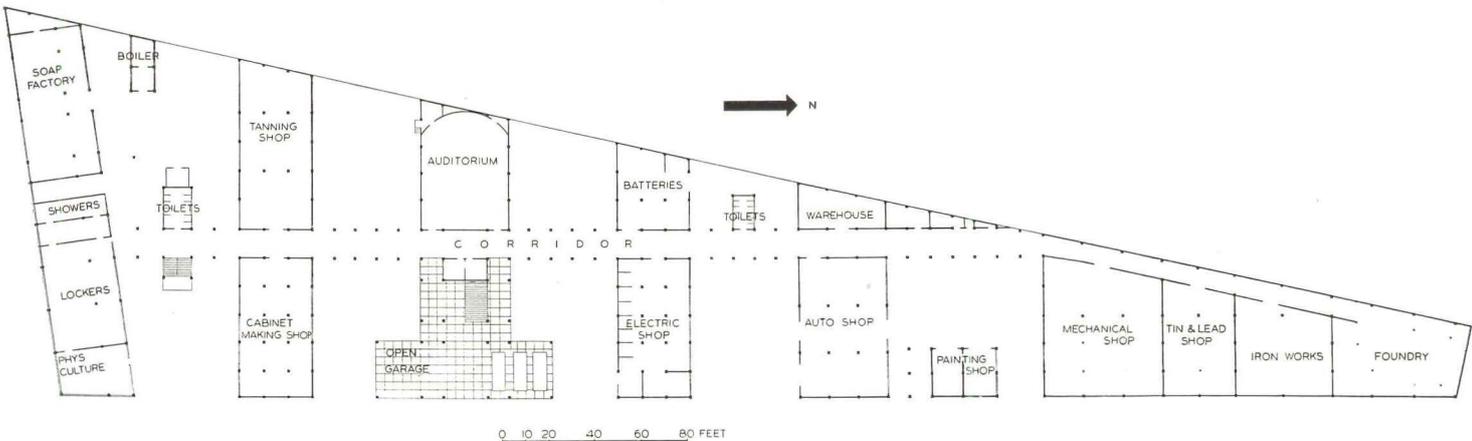
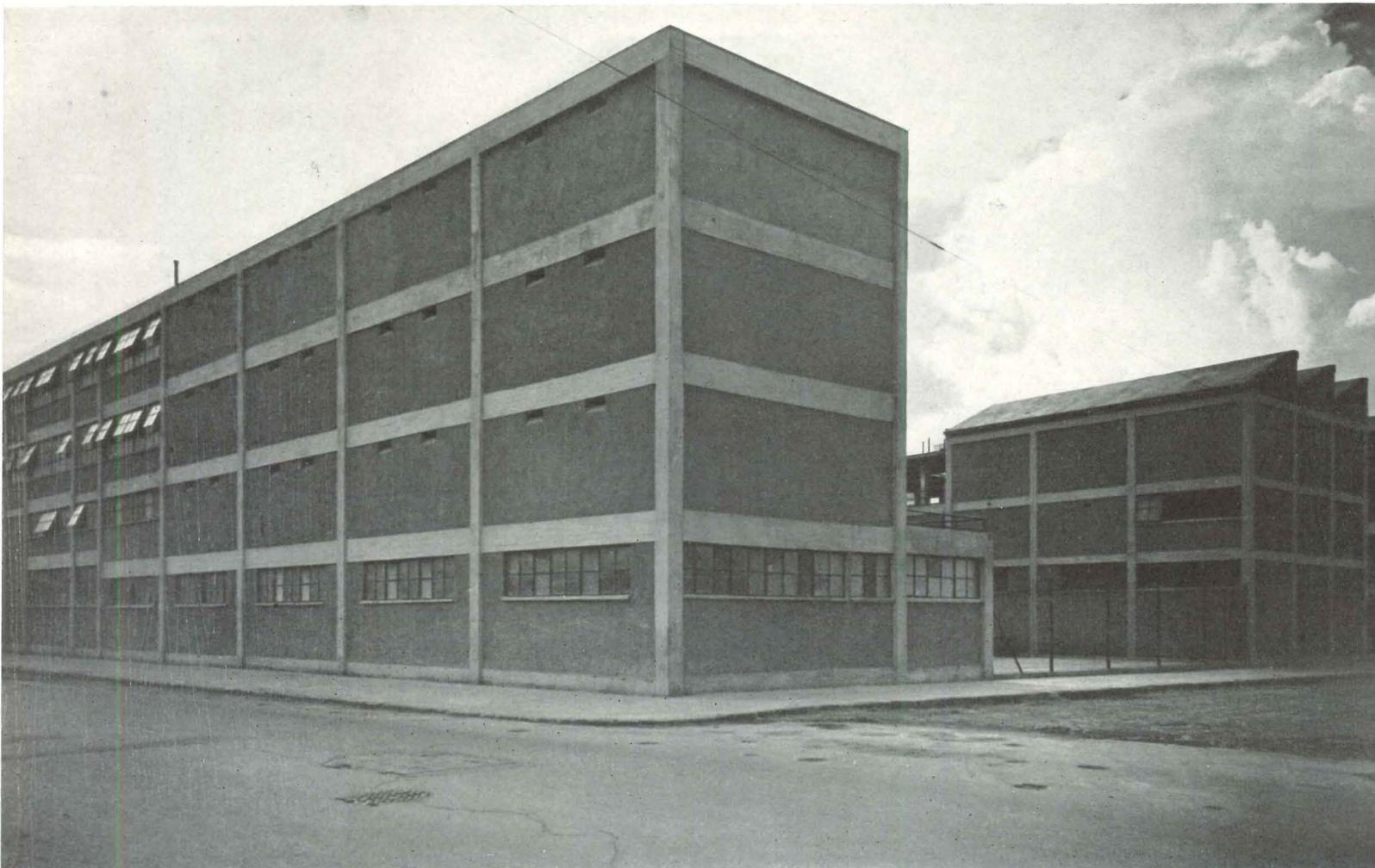
Another possible source of aid and abetment may be that of such recent developments as the Mexican Popular Front. This movement includes groups organized around cultural issues as well as those economic and political, and should be quick to realize that this matter of architecture is a very definite concern of the people. The architects must realize that their ideas need fighting for in these times, as do those of all sincere people interested in progress. They have work to offer that is of tremendous importance to Mexico, work that can afford inspiration and knowledge to the United States as well, and this work is dependent as much on education and propaganda as it is on the soundness and integrity of the building itself. Let us hope that the efforts of Sánchez Fogarty, of Legarreta and O'Gorman will continue on the more solid basis of an organized group of architects with a clear program of their place and purposes in the social growth of Mexico.



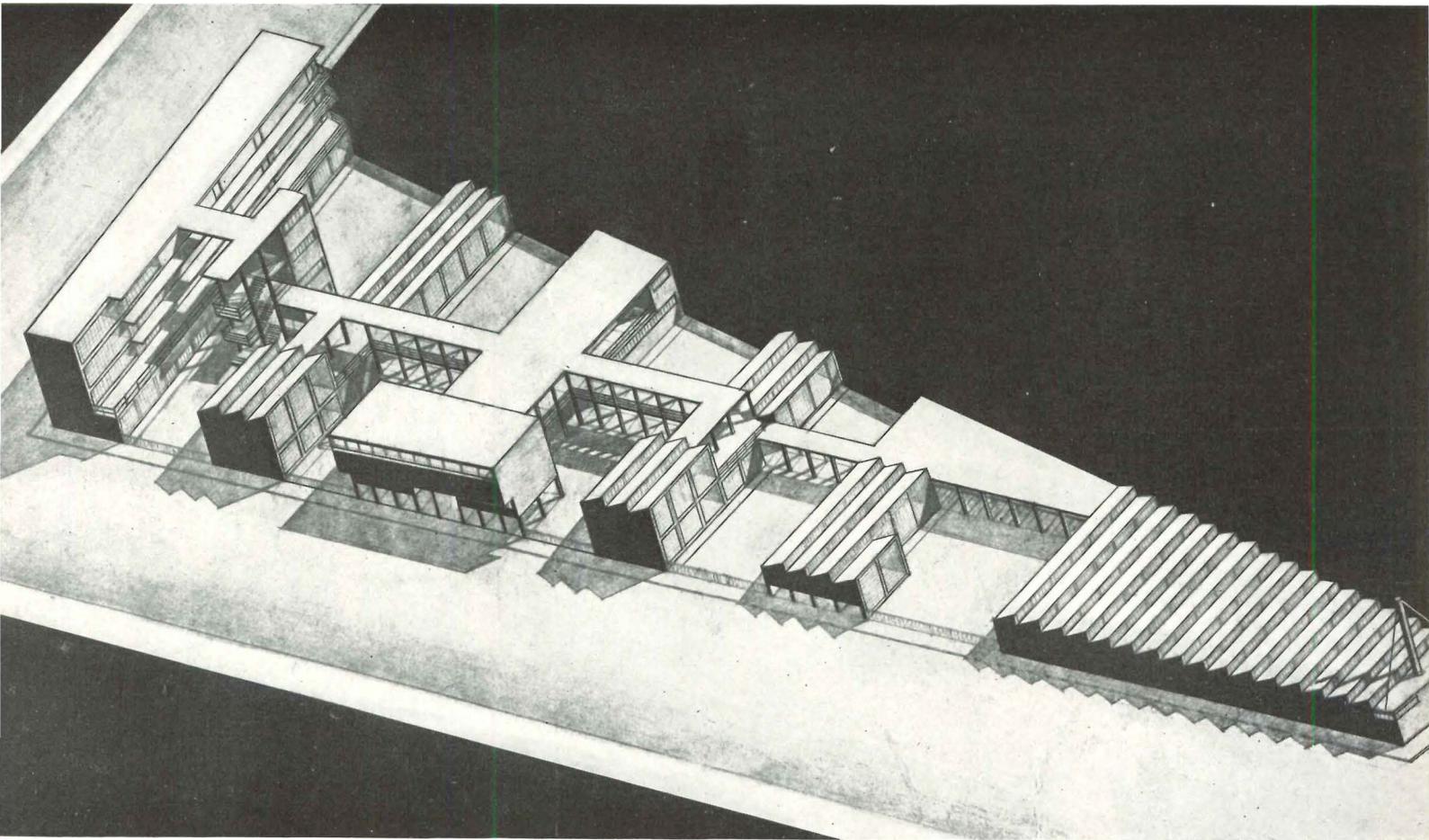
JUAN O'GORMAN

Born in Coyoacan, D. F., in 1905. 1922-1926, studied academy architecture in the University of Mexico. Also worked as draftsman and construction supervisor in various offices including those of Carlos Contreras, Carlos Tarditi, and Villagrán García. 1927, built his first house and was employed in the office of Carlos Santacilia on important government buildings. 1928, worked in the office of Mr. Obregon as chief draftsman. While there he painted frescoes in various pulque saloons. 1929-1931, while working in the same office, built five private dwellings including the house and studio for Diego Rivera. 1932-1935, under the Secretary of Public Education, Marciso Bassols, aided in the establishment of a new technical school of architecture on a strictly functional basic and became one of the instructors there. 1936, formed a group of nine young architects to study the problem of housing for workers.

SCHOOL OF INDUSTRIAL TECHNICS, CALLE TRESGUERRAS



PLAN AT GROUND LEVEL



ISOMETRIC PERSPECTIVE STUDY OF SCHOOL

Education and re-education of the masses is the backbone of any truly* progressive government, as progress is understood in Mexico. This school is a brilliant example of what the best minds in Mexico are working toward in the solution of the educational plant. Juan O'Gorman has been no negligible factor in the development of these ideas. Working closely with educators, he planned and built some hundred and fifty primary schools for the government during the past few years. His theories and practical solutions have largely been adopted by officials, and have become the keynote of the Mexican school building program of today: "Many schools—inexpensive schools—at once, Mexico needs."

The practical part of this solution, so far as O'Gorman is concerned, lies in complete elimination of all nonessentials. Superfluous plaster does not cover the skeleton of the concrete forms, interiors are finished just so far as needed. The resultant structure, stripped for action, brings harmony out of the rigid restriction of economy through excellent organization of the plan as a whole.

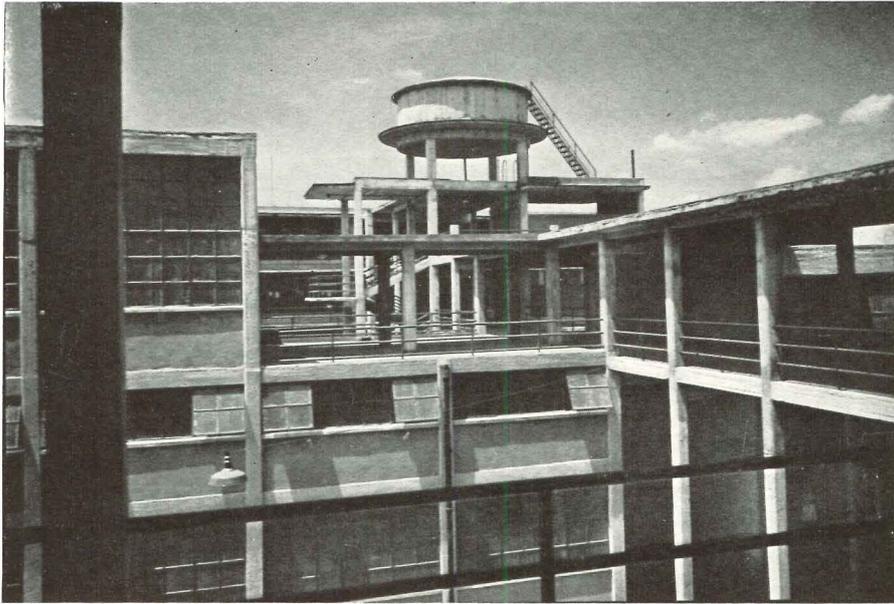
One of the crying needs of a primarily agricultural country developing its industrial resources is the training of technicians. The trade school, here exemplified, is an important factor for this purpose. First of its kind in Mexico, this school will serve as a model for others to be built with government funds throughout the Republic in the future.

*See "Peace by Revolution," by Frank Tannenbaum

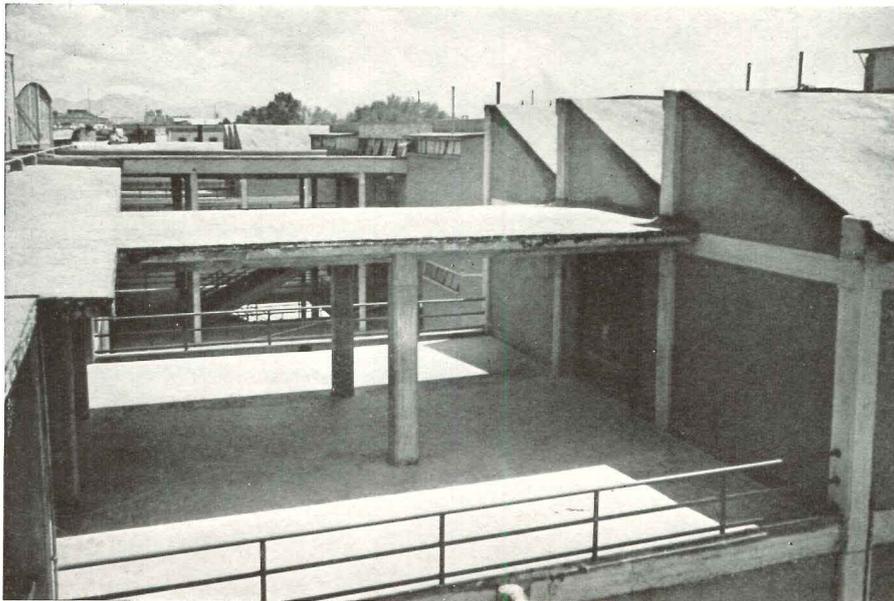
SCHOOL OF INDUSTRIAL TECHNICS, MEXICO CITY



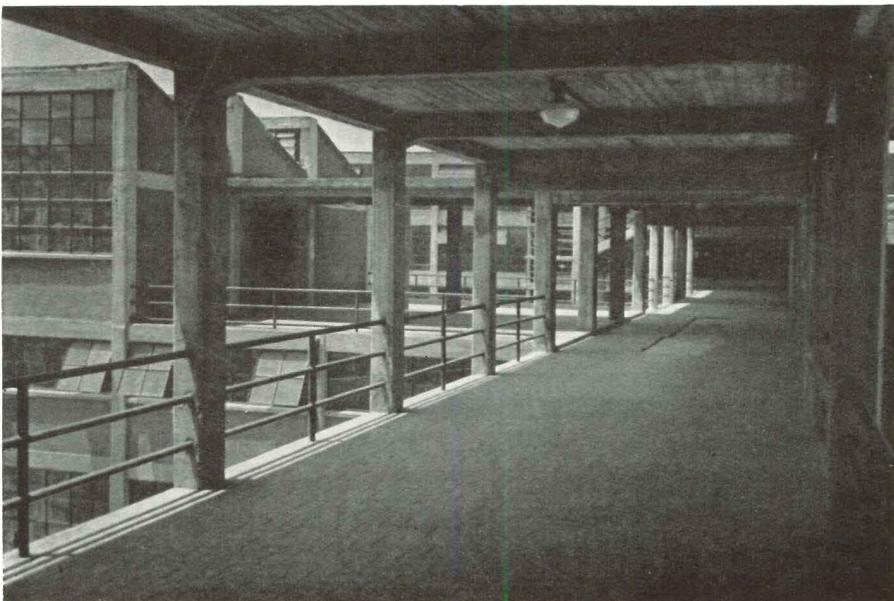
NO FRILLS, NO FUSS, NO FEATHERS



1



2



3

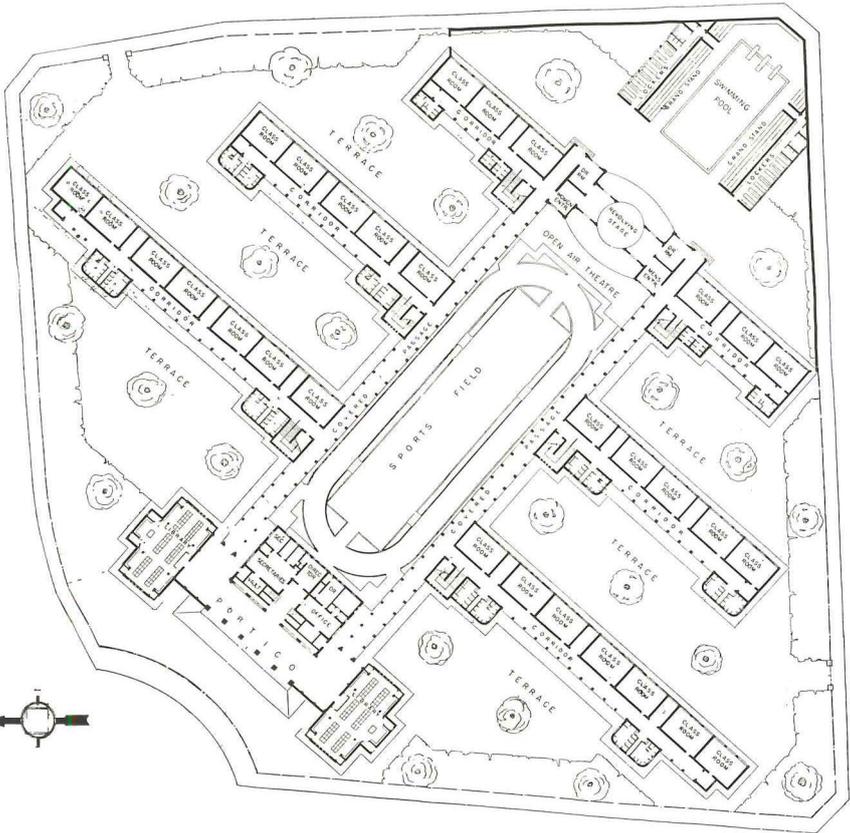
Providing day classes for boys from the age of twelve, and night classes for adults, this school is the first trade school in Mexico. Elementary technology of the more important trades such as plumbing, foundry and machine work, carpentry, and electrical work is given, with mathematics, geometry, drawing and languages. Instruction is free, with many scholarships provided by the government. Teachers in the workshops are master craftsmen, selected by competition. The same method of selection applies to architects, engineers, etc. Students are largely the children of workers.

1 VIEW FROM UPPER COURTYARD

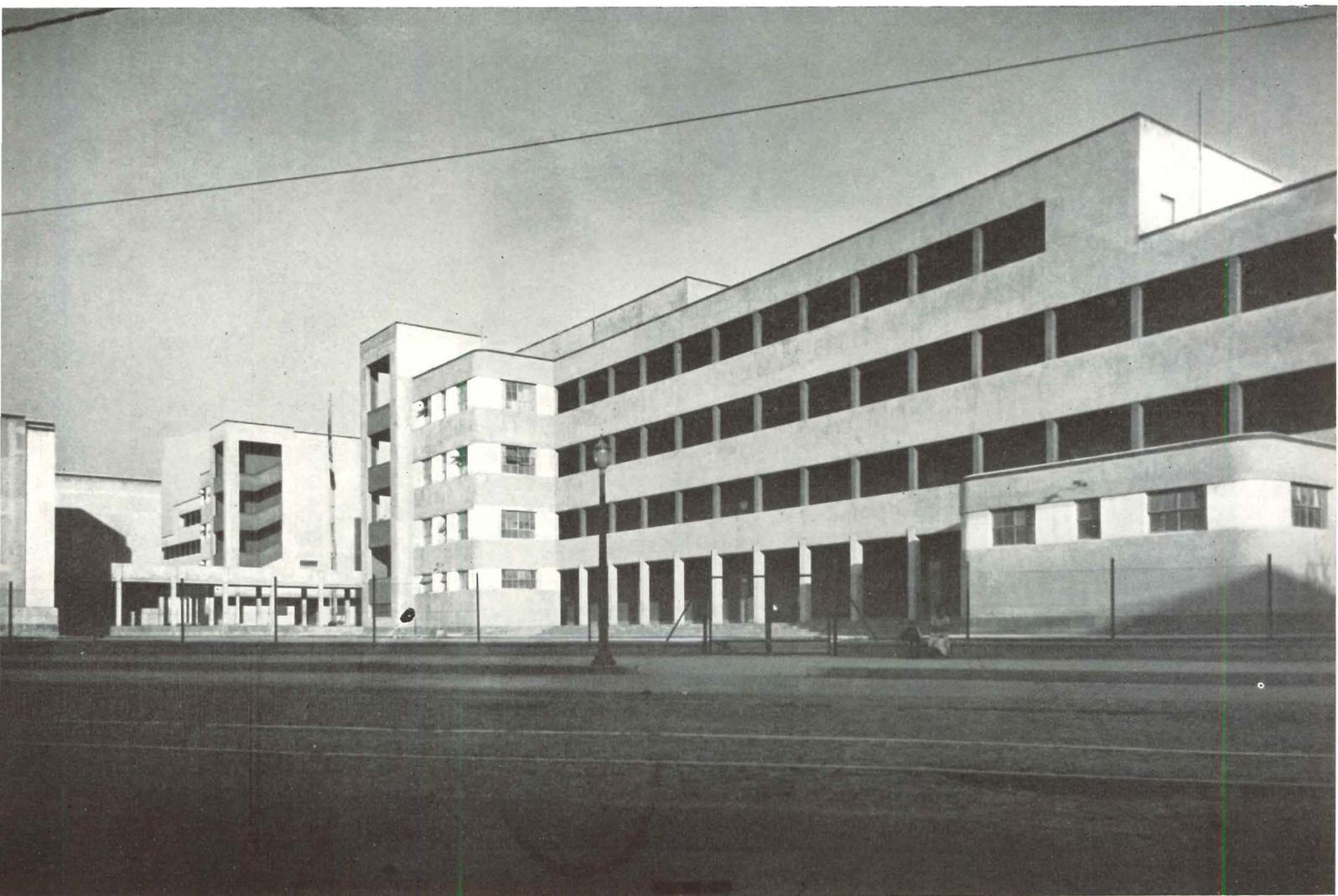
2 VIEW OF UPPER DECK

3 VIEW OF UPPER CORRIDOR

CENTRAL SCHOOL OF THE REVOLUTION, MEXICO CITY



GROUND LEVEL



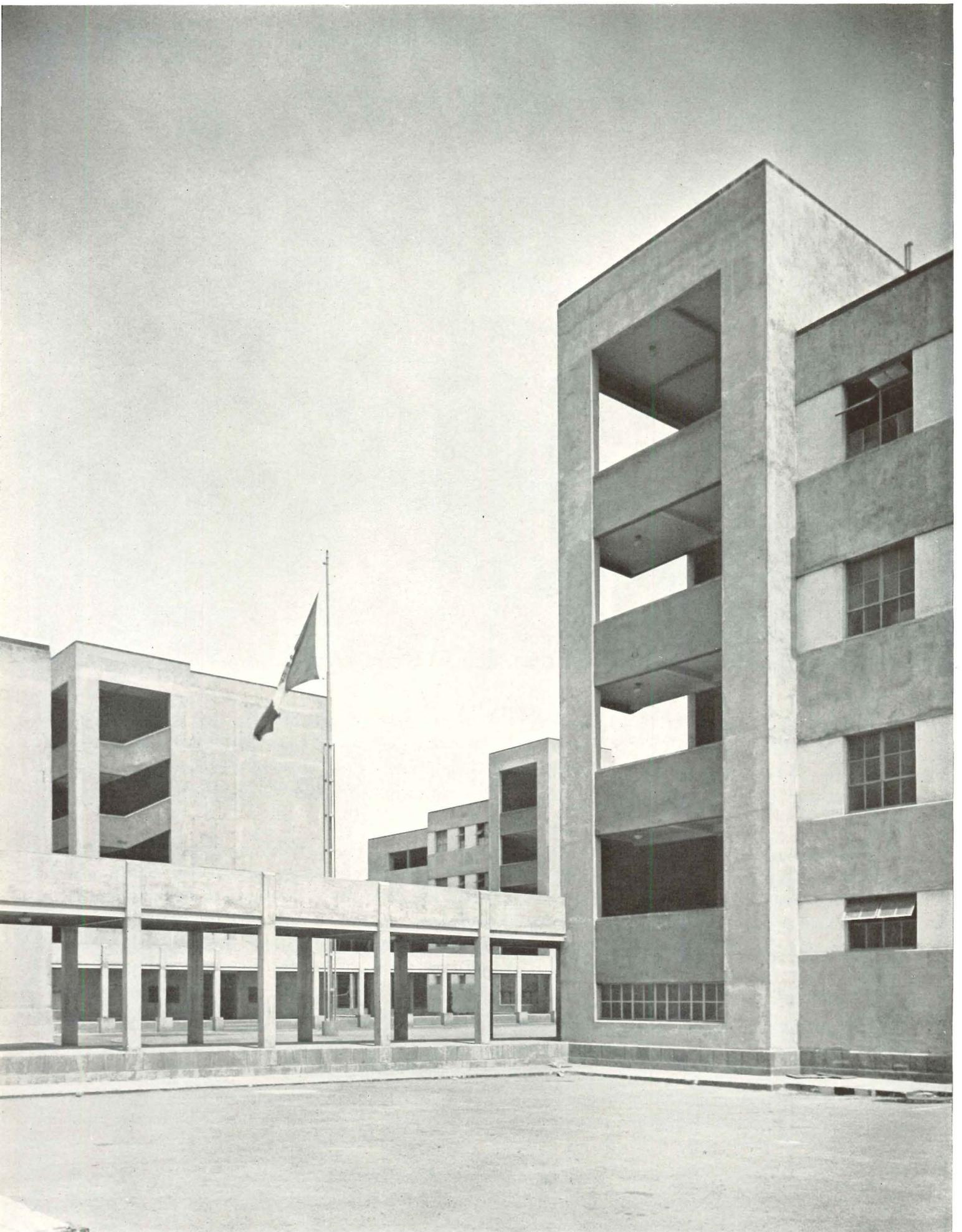
“EDUCAR ES REMEDIR”! Legend carved in stone at the entrance to the School of the Revolution, “TO EDUCATE IS TO REMEDY”—the hope of modern Mexico. Built on the former site of the infamous Carcel de Belem, noxious prison of old Mexico, this clean airy school stands as a symbol of new thought, transforming the whole neighborhood into usefulness and beauty.

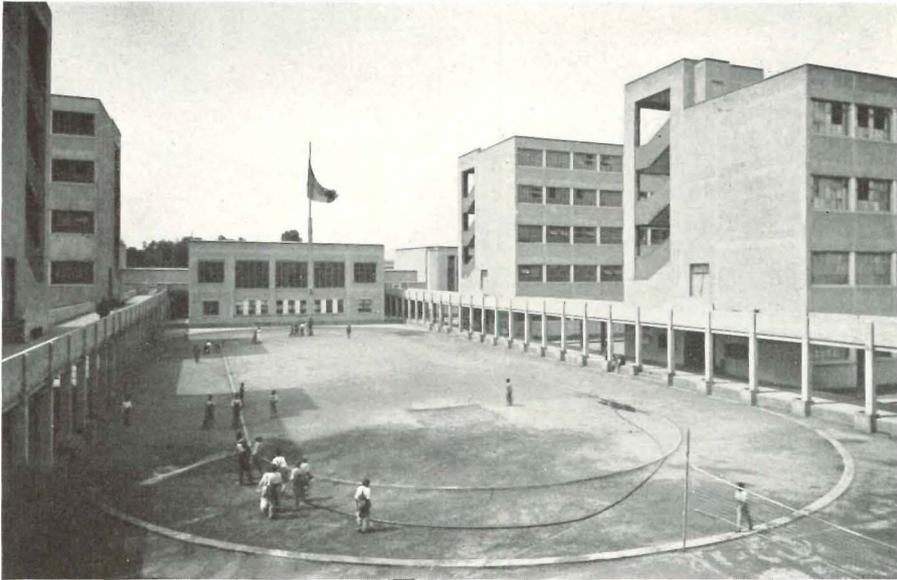
Coeducation was decreed compulsory in all government schools in 1932, precipitating a violent storm of disapproval from all parts of the Republic, and forcing the resignation of the Secretary of Education. But the decree still stands. This school was first of the primary schools built subsequently, and became a battleground of contending forces. Even today, the five thousand students, of which actually half are girls, come entirely from families of the lower and middle classes. Tradition and conservatism guide the wealthy who still send their children to noncoeducational private schools.

Elementary training in manual arts and trades is taught in addition to the usual academic subjects to aid the many children of very poor families who leave school at an early age. Training in sports is developed as an important part of social education. Basketball courts, a running track and swimming pool have been provided; swimming is compulsory for both boys and girls. A revolving stage at one end of the central courtyard forms an open-air theater, where the children are both actors and audience.

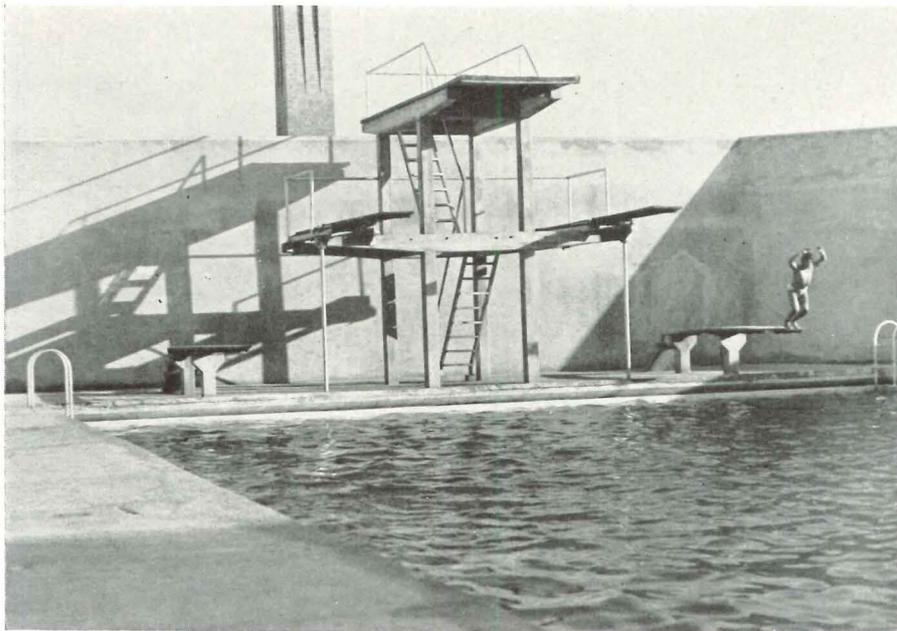
Visitors are invariably impressed with the studious attitude of the Mexican children, many of whom still come to school without shoes, going to and from school carrying mountains of books, obviously delighted with their opportunity to learn.

CENTRAL SCHOOL OF THE REVOLUTION, MEXICO CITY



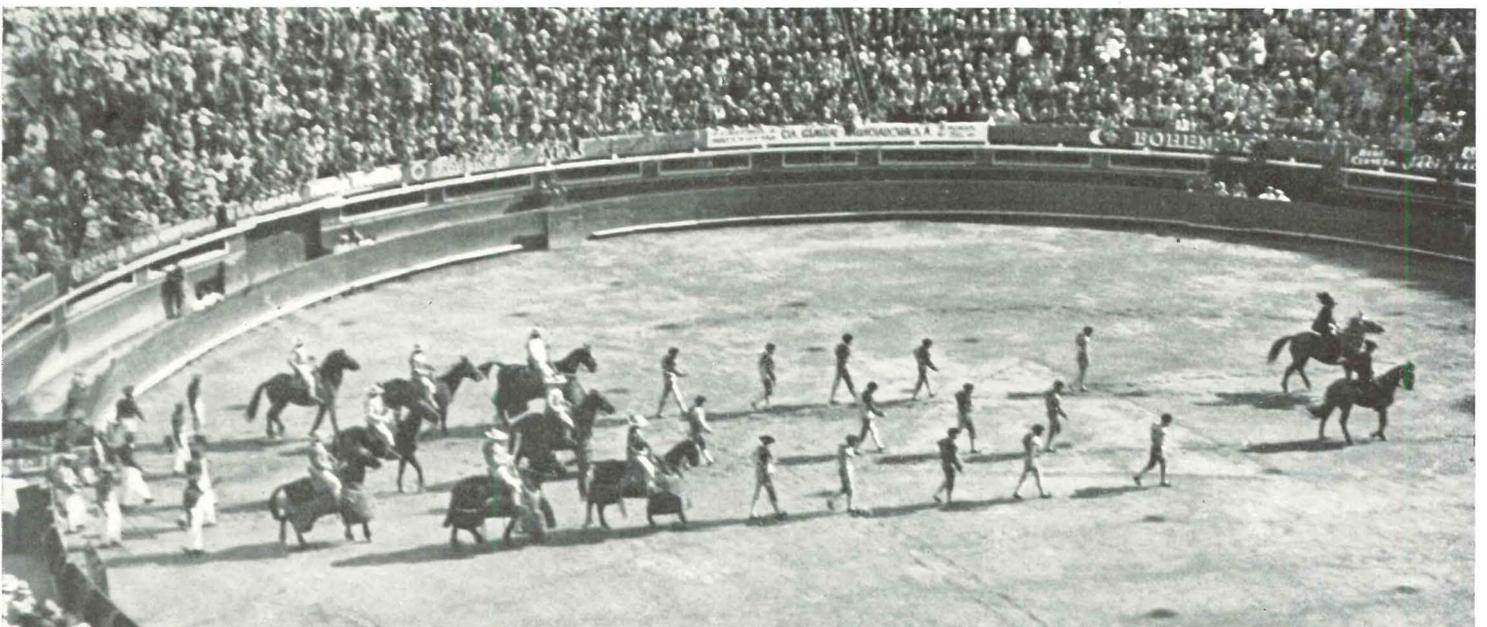


RUNNING TRACK

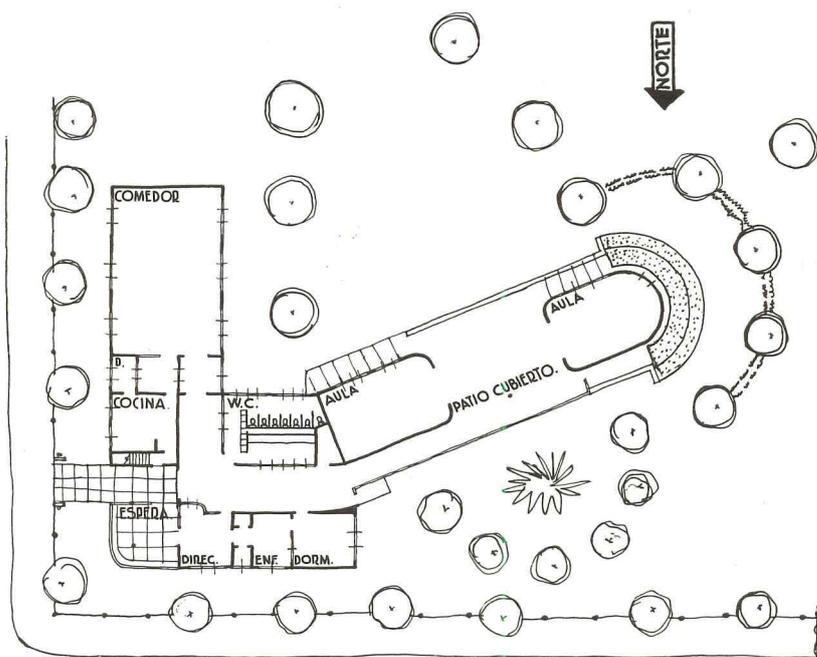
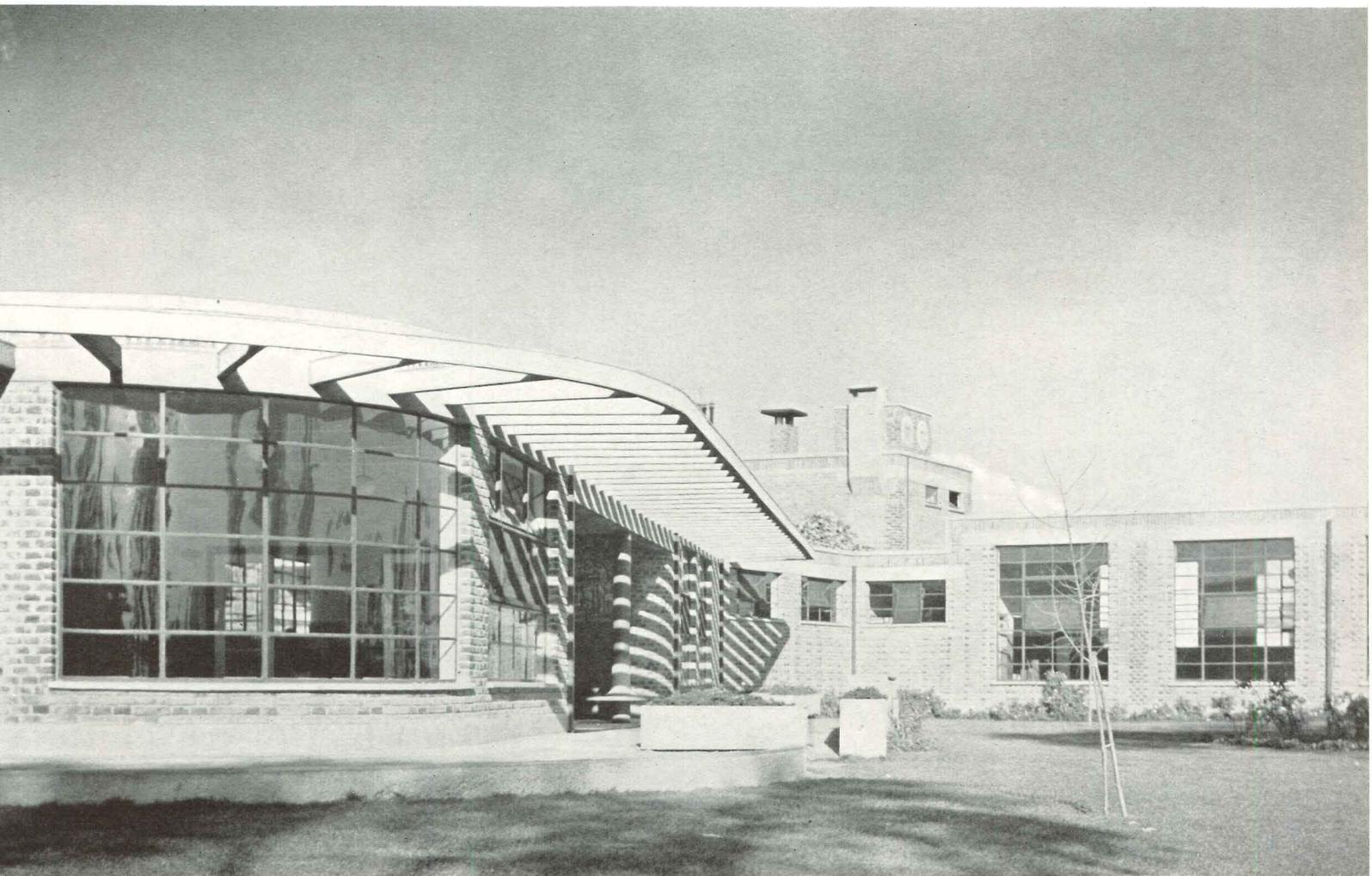


SWIMMING POOL

Contrast of old and new. The bullfight is still popular in Mexico, but it has been noted that most of the bullfighting "fans" are older people. Heroes of football, polo, swimming, baseball, are becoming the gods of the younger generation, and year by year the bullfight loses ground.







GROUND FLOOR PLAN

THE PROBLEM:

1. Type: A day school and nursery for children of working mothers; children from three to six years old. The particular aim of the school is to teach both the children and their parents hygienic habits.
2. Site: A corner fronting on the workers' colony of Balbuena.
3. Requirements: (a) Reception room for the children, dressing rooms, with rows of lockers in which are kept the school uniforms. (b) Office of the director from which every part of the school can be viewed; entrance, where the families of the children can be received without going through the children's part; entrance to the kitchen; circulation of the children in the building. (c) Location of the kitchen under eye of the director, with only one door, to prevent theft of food meant for the children. (d) Covered patio, which can be used as a work or play room, or can be opened into either one of the other two rooms provided.
4. Orientation, specially studied to give maximum sun throughout the year.

CONSTRUCTION:

Reinforced concrete post and slab; brick walls; steel sash.



Architectural Doctrine of Jose Villagran Garcia

THE TWO ROLES OF ARCHITECTURE

1. To set forth reluctantly and to make known the peculiarities of our people. (Unconsciously and without reward, our constructions fulfill this mission.)
2. To take an active and leading part in the evolution of our people. (This is the doctrine of our young architects.)

FACTORS IN THE ARCHITECTURAL PROBLEMS OF MEXICO

1. *Poverty.* It is necessary to construct for our people with utmost economy.
2. *Unknown Programs.* To create buildings for institutions with undetermined programs, or whose function is indefinite or in perpetual evolution.
3. *Lack of Culture.* To fight against the enormous lack of culture and public understanding, accentuated by the great number of "merchants of constructions."
4. *Atavism.* To learn to control our naturally rebellious racial temperament.

For many architects these problems represent insuperable obstacles, but for the young architects they form the basis of our solutions. Furthermore, they explain:

The reason for the inconsistency of our solutions; the influence of exotic forms, which serve to cover up our limited knowledge; the evident struggle which our architecture shows between the vigorous vitality of the architect, and his impotency to solve perfectly our undetermined programs.

THE TEACHING OF ARCHITECTURE

1. Has revealed to our young architects: that as a fact they know what is, and what is not, architecture; that they must be constructors, and not draftsmen; that they must accept their social responsibility, as indispensable elements in the evolution of our people.
2. Has not revealed: that the social and architectural problems of our people be known and studied; that the ordinary technique of construction be perfected.

One of the pioneers of the new architecture in Mexico, José Villagrán García has asserted leadership through his philosophy. He was born in Mexico City in 1901. He received title as architect in 1923. From 1925 on he was architect of the Department of Public Health and in 1932 was elected Director of the National School of Architecture. Works for which he is best known are: Institute of Hygiene, 1925, and Hogar Infantil, 1934.

TUBERCULOSIS SANATORIUM, HUIPULCO, TLALPAM, D. F.



JOSE VILLAGRAN GARCIA, ARCHITECT

The sanatorium (completed in 1936) is just outside Mexico City in the beautiful country at the base of the mountains climbed to go over to Cuernavaca. The site is a perfect one, and has been taken advantage of to the fullest extent by the architect. The building is a part of the program of the Department of Public Health of the Government.

PROBLEM:

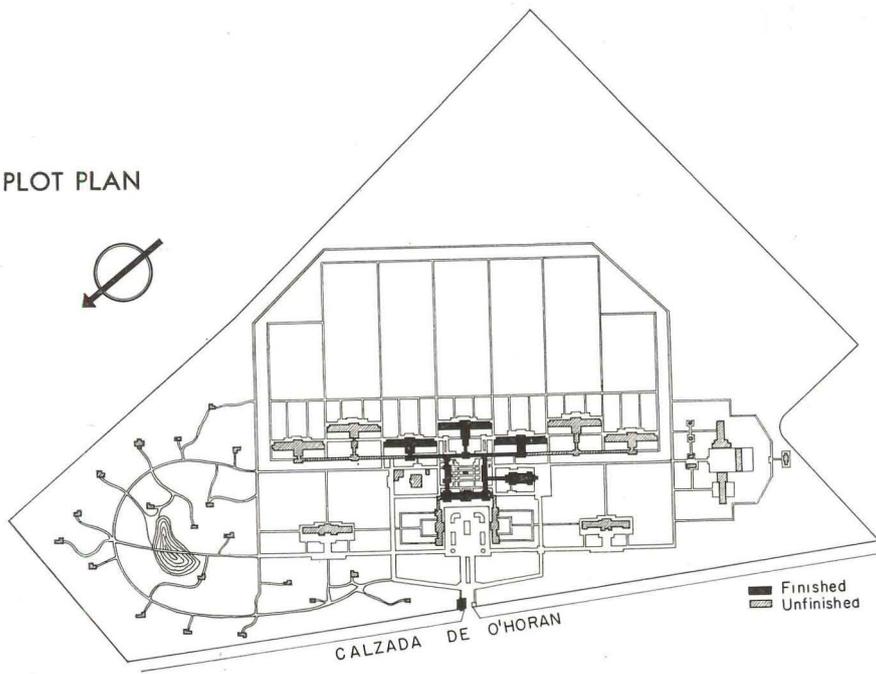
1. Capacity, 1,000 patients (for the present, enlargements planned).
2. Type of sanatorium: For treatment of patients in the first stages of the disease only, those who may return to society, after care. Teaching of the care and prevention of the disease to the patients, how to avoid infecting others. Readjustment of work to that suited to persons affected by the disease.
3. Special treatments which require special architectural arrangements—treatments of a minor surgical nature, cures by rest and repose, work in the fields, at agriculture, etc.
4. Type of patient: From the very poorest classes usually, with a very low standard of hygiene which necessitates constant supervision, as with children. Separation of patients necessary.
5. The small amount of money available, as well as the poor bearing power of the soil, rendered it necessary to build in two stories only, making the building inconvenient.

IMPORTANT POINTS IN THE SOLUTION ADOPTED:

1. Fronting on the street are all those services which have contact with outsiders or visitors. Between this section and the pavilions for patients is a patio-garden, which is the only point where visitors and patients meet. The pavilions for patients are oriented southeast, in units entirely independent, which permits classification of patients by sex, age, or characteristics of treatment, in an elastic way, allowing for necessities of the moment.
2. The disposition and orientation of the pavilions for patients were studied so that:
 - (a) 75 per cent of the annual sunshine is obtained, corresponding to the latitude of Mexico City.
 - (b) The shadows cast by one pavilion do not fall on others.
 - (c) The view of the patients shall be toward the open country, and shall not include other parts of the sanatorium or other patients.
 - (d) Exterior noises are excluded by distance.

TUBERCULOSIS SANATORIUM, HUIPULCO, TLALPAM, D. F.

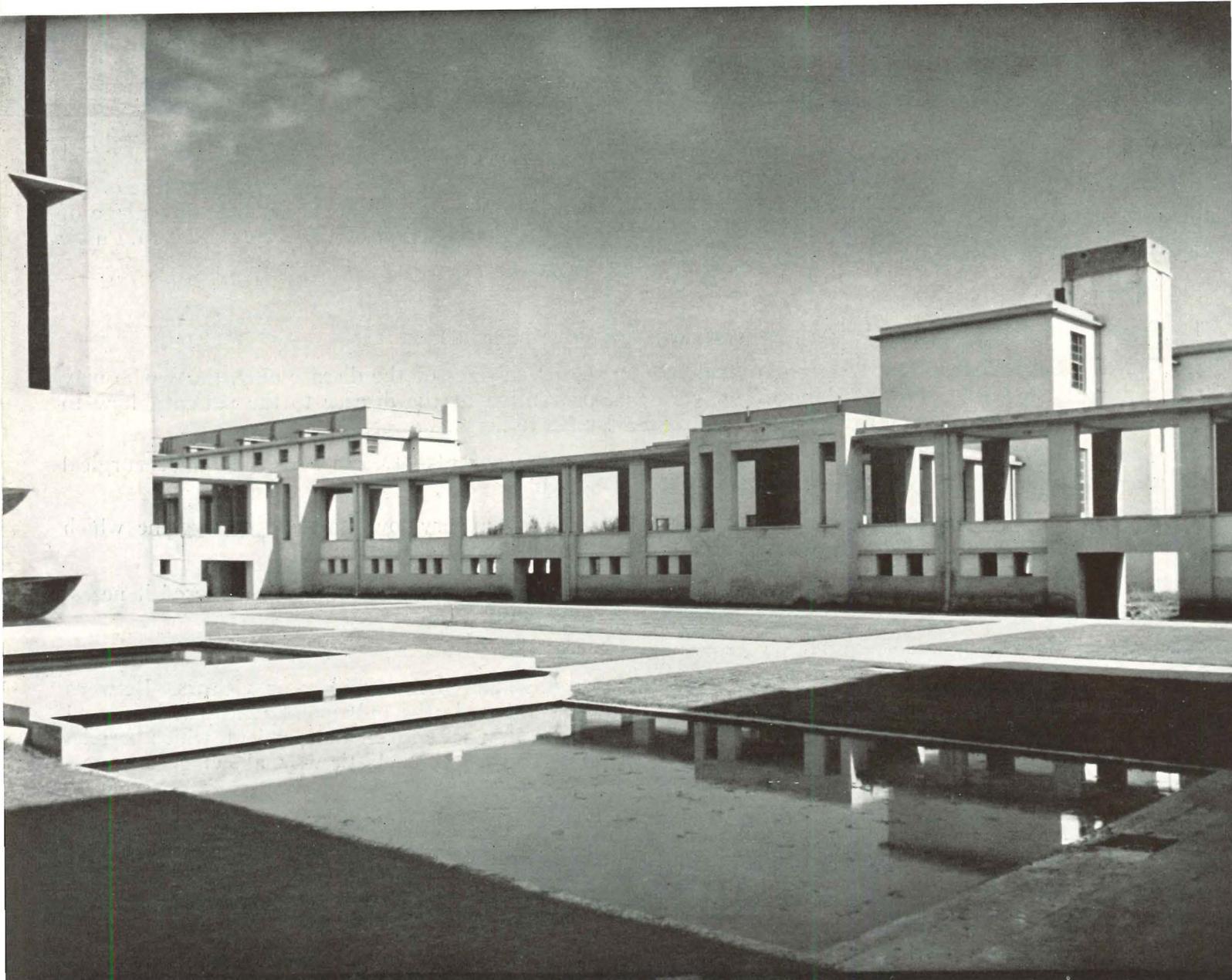
PLOT PLAN

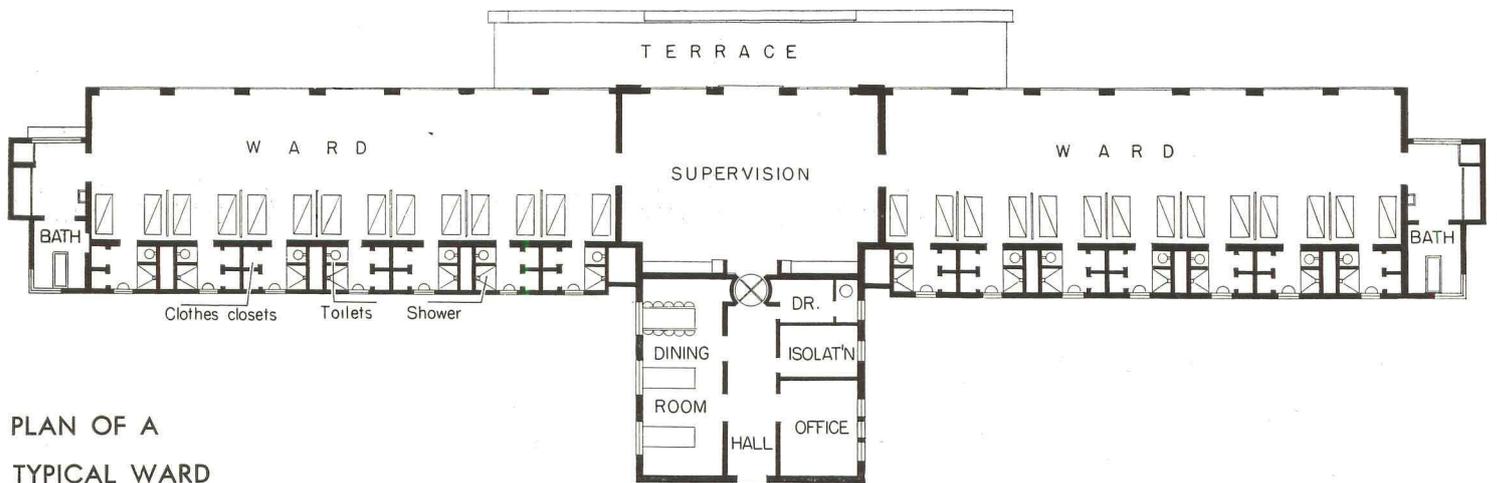
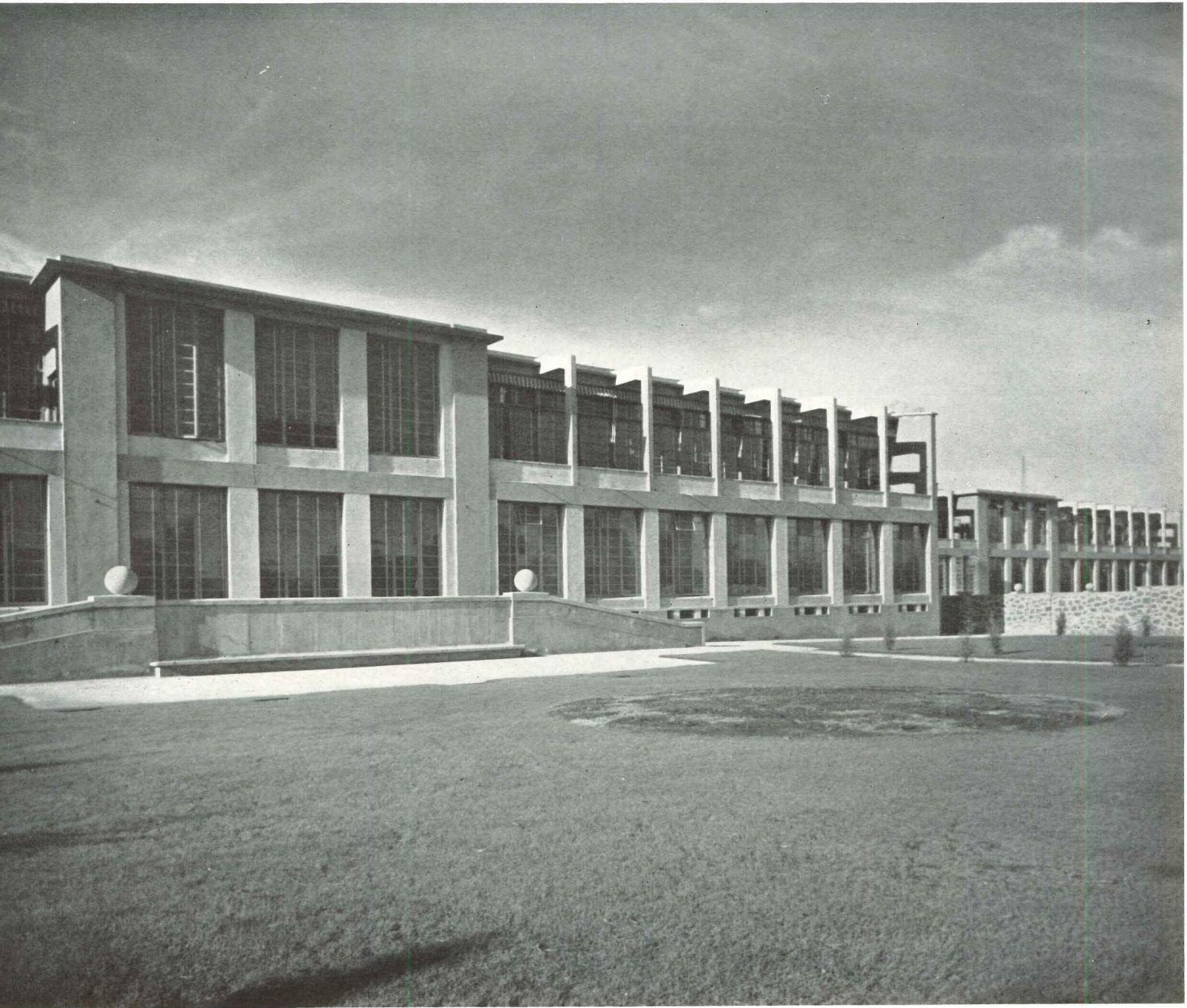


3. Kitchen services, laundries, sterilization, etc., occupy a central position in the plan, as they will be called upon to serve an extended radius of buildings not yet constructed. Central kitchen neither receives nor handles infected utensils, these being taken care of at an intermediate point.

4. At the left of the entrance is planned a future colony of patients who will live with their families.

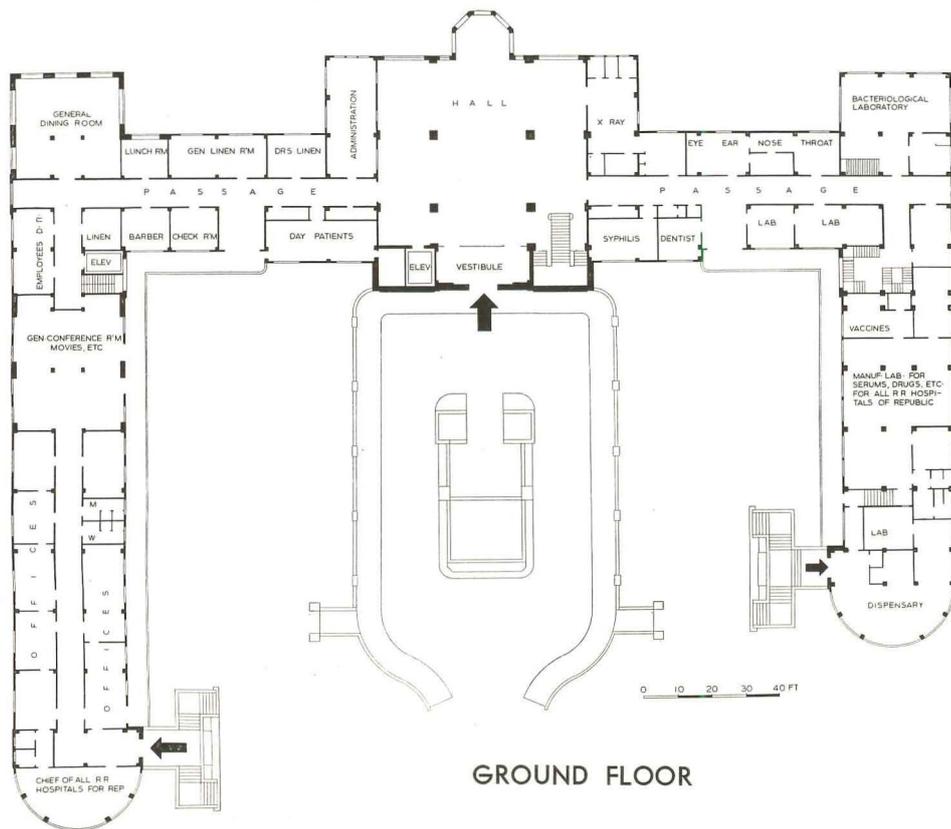
5. The system of construction is reinforced concrete, and brick for walls.





PLAN OF A
TYPICAL WARD

MAIN HOSPITAL OF THE NATIONAL RAILROADS OF MEXICO

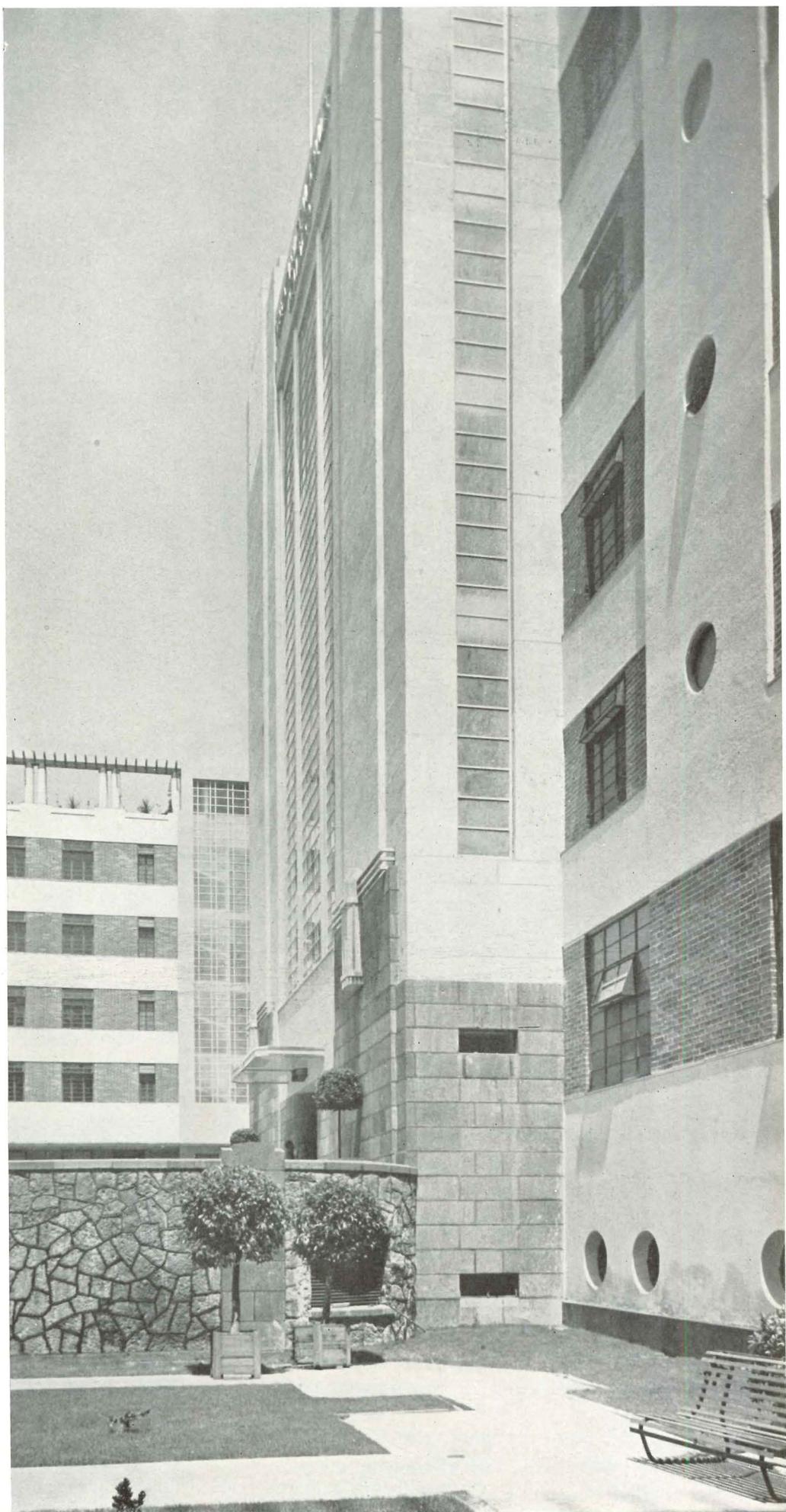


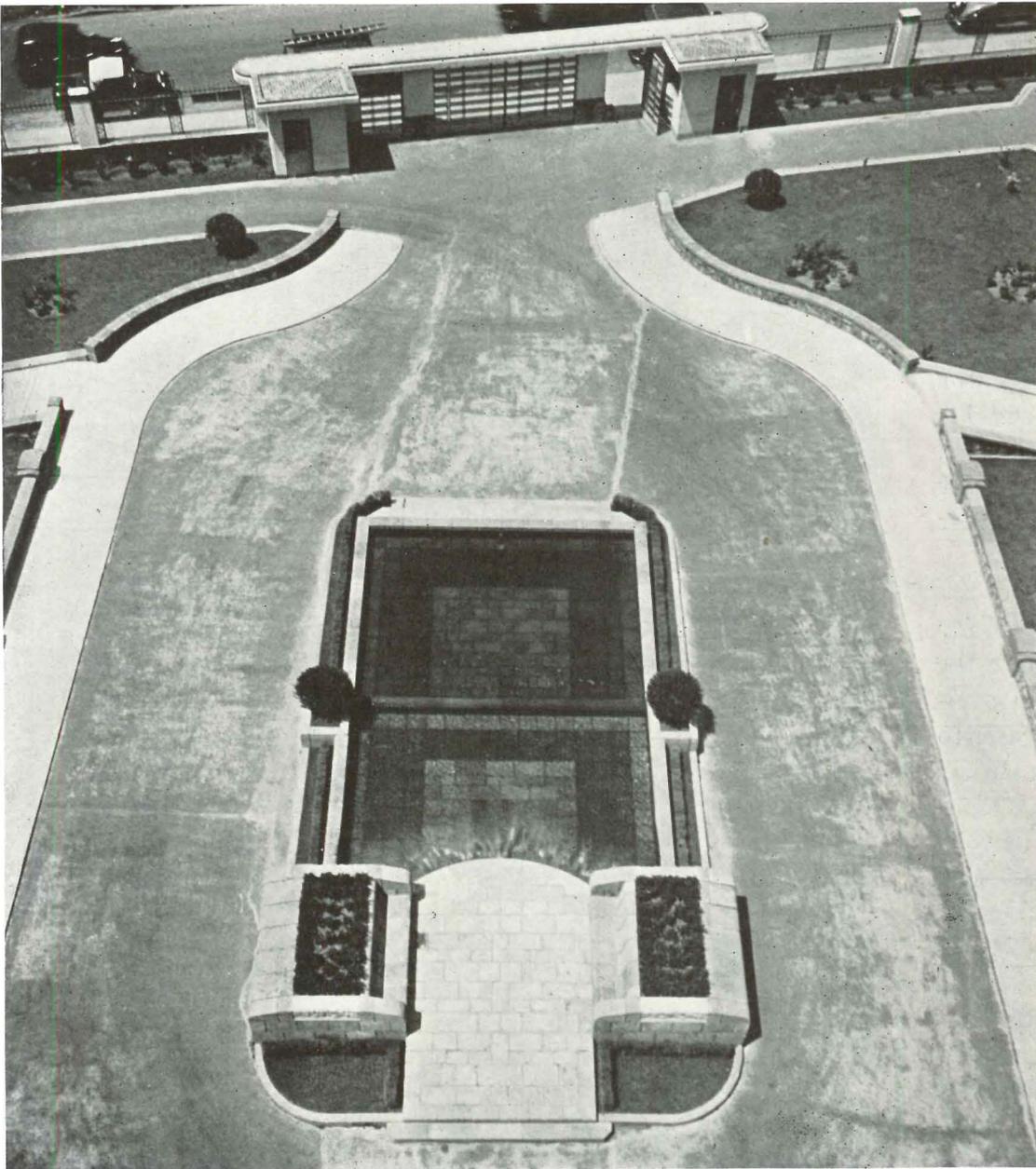
DR. FRANCISCO J. CAMPOS
PROFESSIONAL ADVISER

Carlos Greenham and Dr. Campos are responsible for the most up-to-date hospital in Mexico. The National Railroads of Mexico have long had a program of caring for their employees in a most enlightened manner, with sickness benefits, pensions, and hospitalization for employees and members of their immediate families.

The building proper is used for three functions: (1) To house the hospital, which consists of a complete service for emergency cases to and through rehabilitation work. Provision is made for a large number of "out-patients" who may be coming to the hospital for years to receive treatments of thermal baths, corrective exercises, etc. (2) To house the executive offices of the Director of all hospitals of the National Railroads. (3) To house the general laboratories of the hospital services—which include a pathological, a bacteriological and a pharmaceutical laboratory. The latter is connected with a dispensary, or drug store, where all employees of the railroads may have their prescriptions filled at a fraction of the usual cost. The pharmaceutical laboratory also manufactures drugs for all of the hospitals of the railroad. Emergency supplies of bedding, cots and other hospital supplies are also taken care of in the building.

The hospital is upon land adjoining the present Colonia Station, which is to be removed as soon as the Central Railroad Station of Mexico is completed. This will leave room for expansion of the hospital.





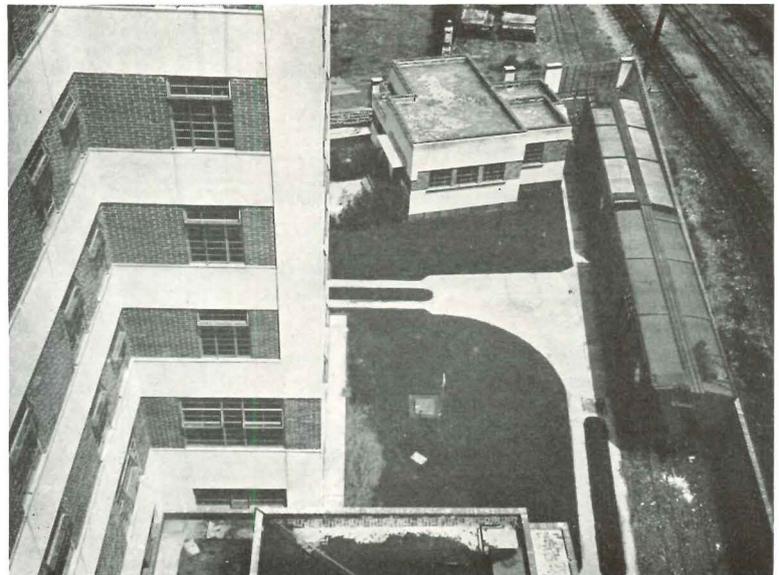
ENTRANCE AND COURT GARDEN

RAILWAY AMBULANCE-CAR ENTRANCE AT REAR

There are no wards in the building, giving greater flexibility in the handling of patients. The entire building is air conditioned, with a special system, separate from the main one, for the operating room stack. All signaling and elevator systems are of the latest improved designs.

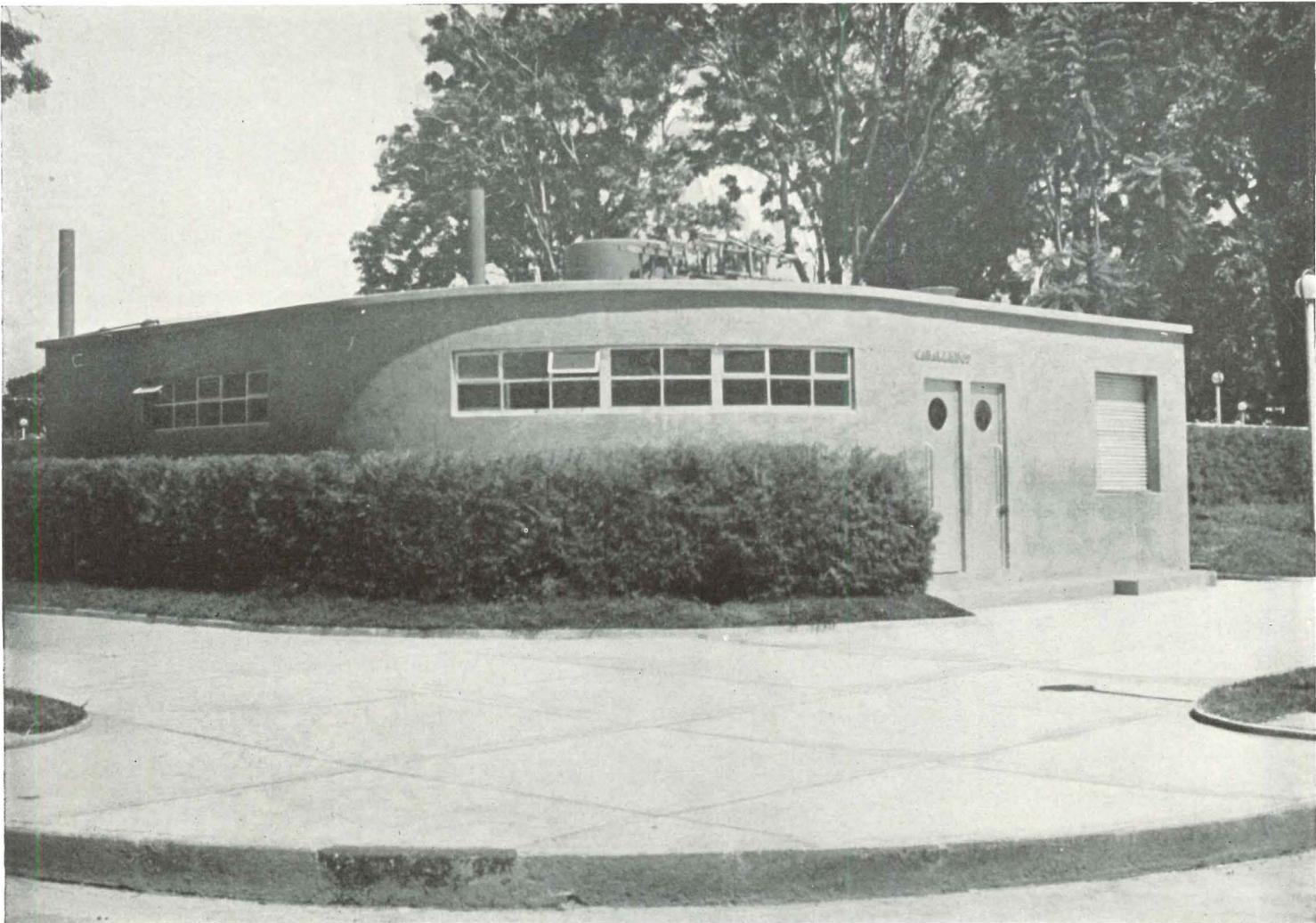
The emergency phase of the hospital is well handled, with a direct track coming in for emergency railroad cars; the automobile emergency entrance is at the same point.

Reinforced concrete post and slab construction, with brick and hollow tile fill for the walls, steel sash, the walls stuccoed.

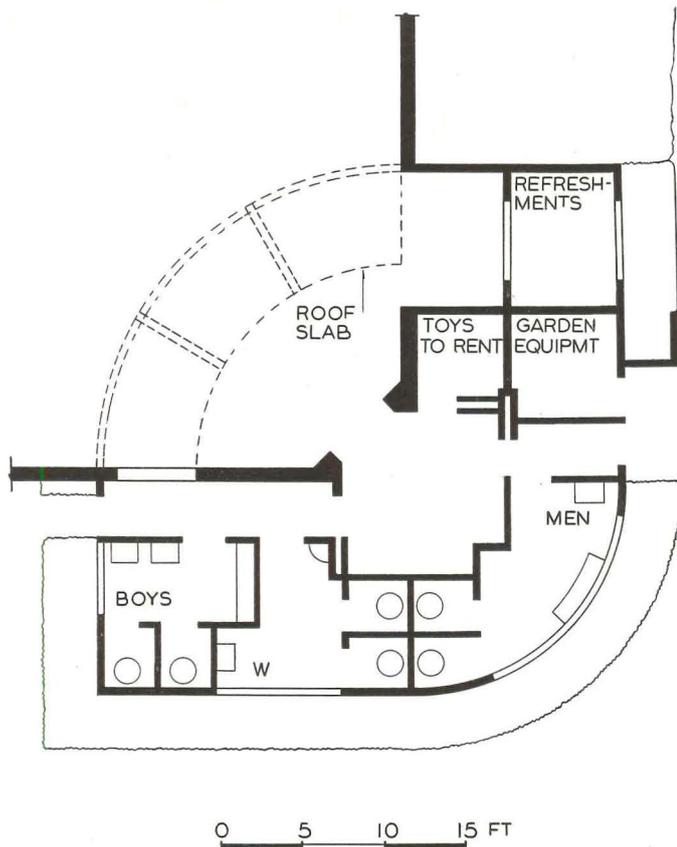




PARK OF THE REVOLUTION, GUADALAJARA, JALISCO

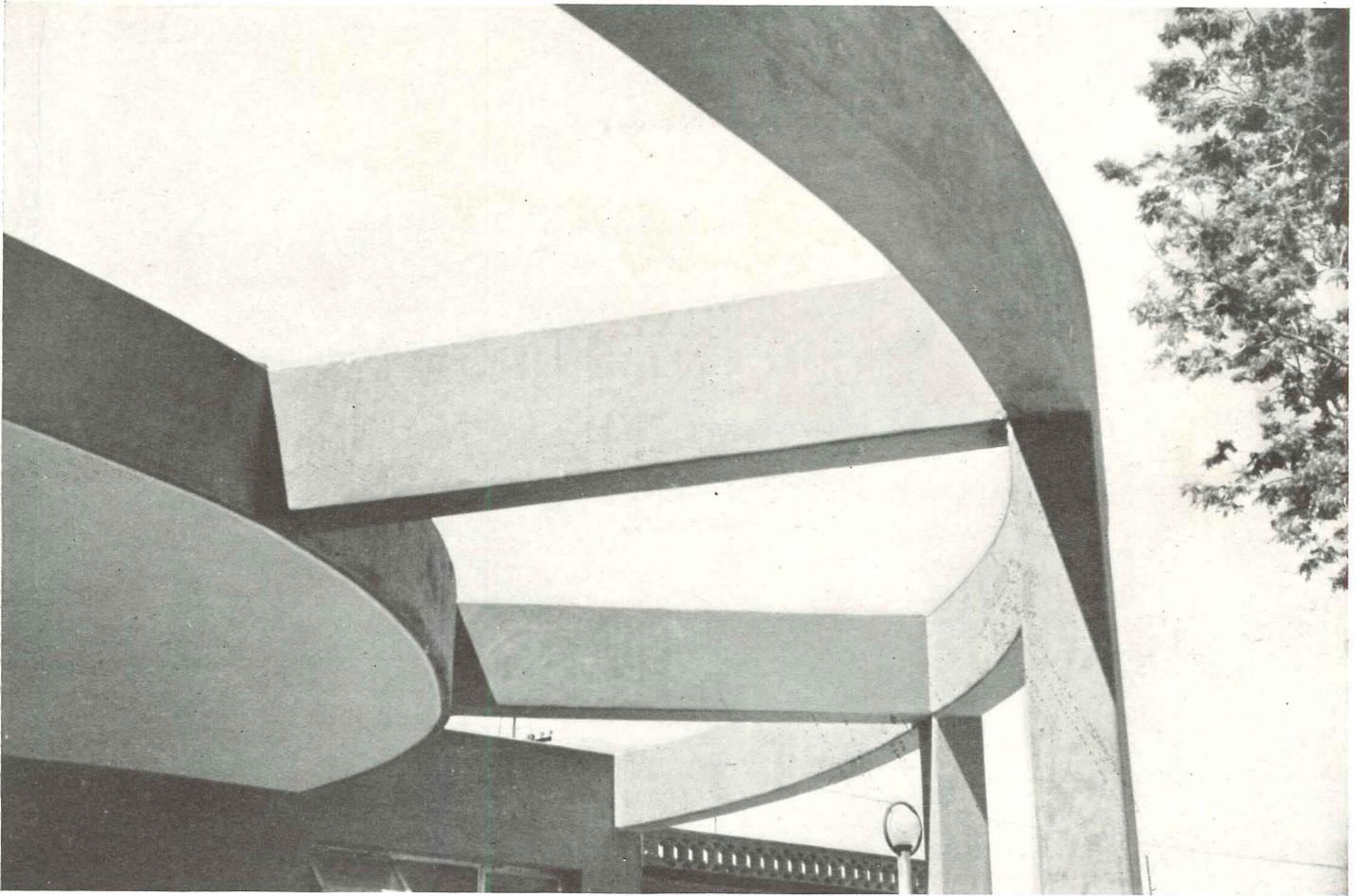


PAVILION



A delightful note of caprice and fun in contrast to the simple architecture has been contributed by the architect's clever use of color throughout the buildings. Luis Barragan, of all the younger group, has been most successful in his imaginative use of color in modern architecture. His naturally sensitive aesthetic perceptions have never found satisfaction in restriction to the palette popularly associated with the "international style."

This children's playground is built on land recently dedicated to public park use. Accommodations and facilities consist of a comfort station, slides, teeters, swings and sandboxes. Toys are available on rental by the hour from the supervisor's office in the small booth beneath the semicircular pergola. Here also is a stand for the sale of refreshments.



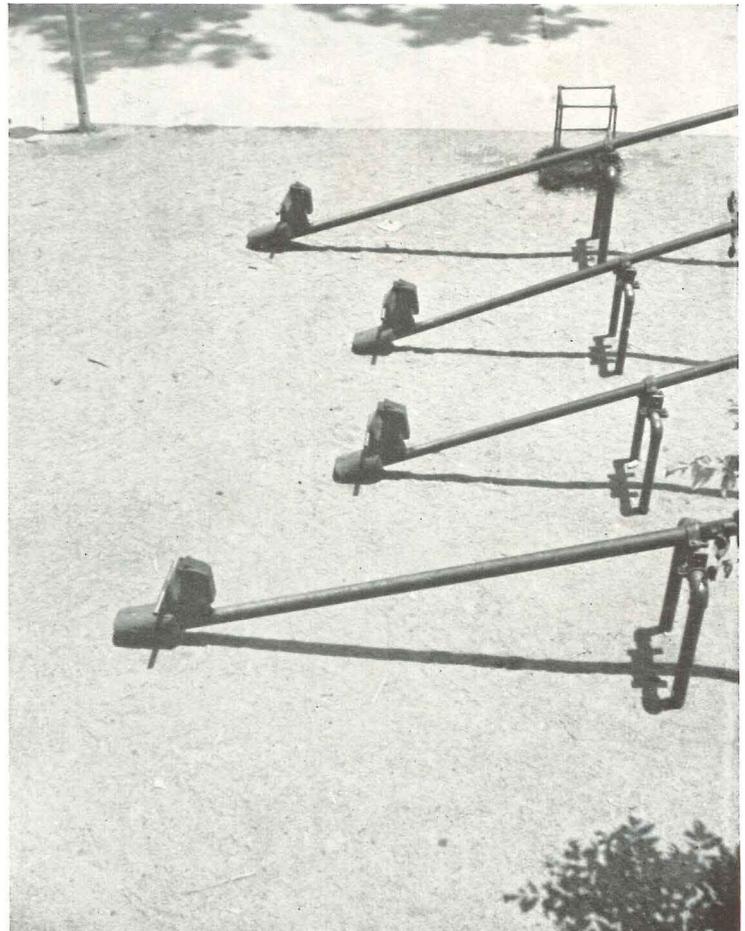
PERGOLA DETAIL, PAVILION



TYPICAL BENCH

R. Salcedo Magana

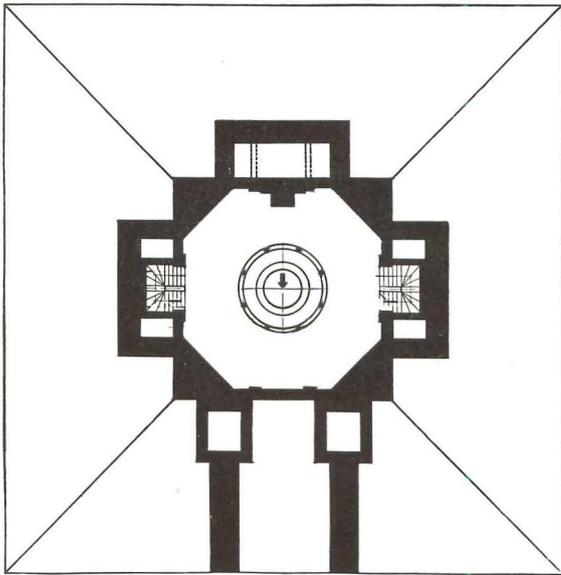
SEE-SAWS



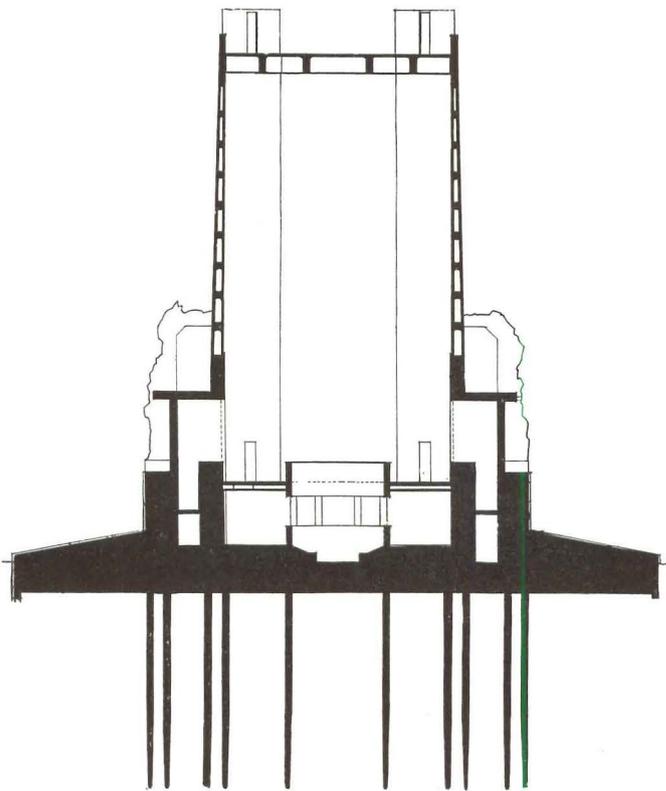
R. Salcedo Magana

MONUMENT TO GENERAL ALVARO OBREGON, MEXICO CITY

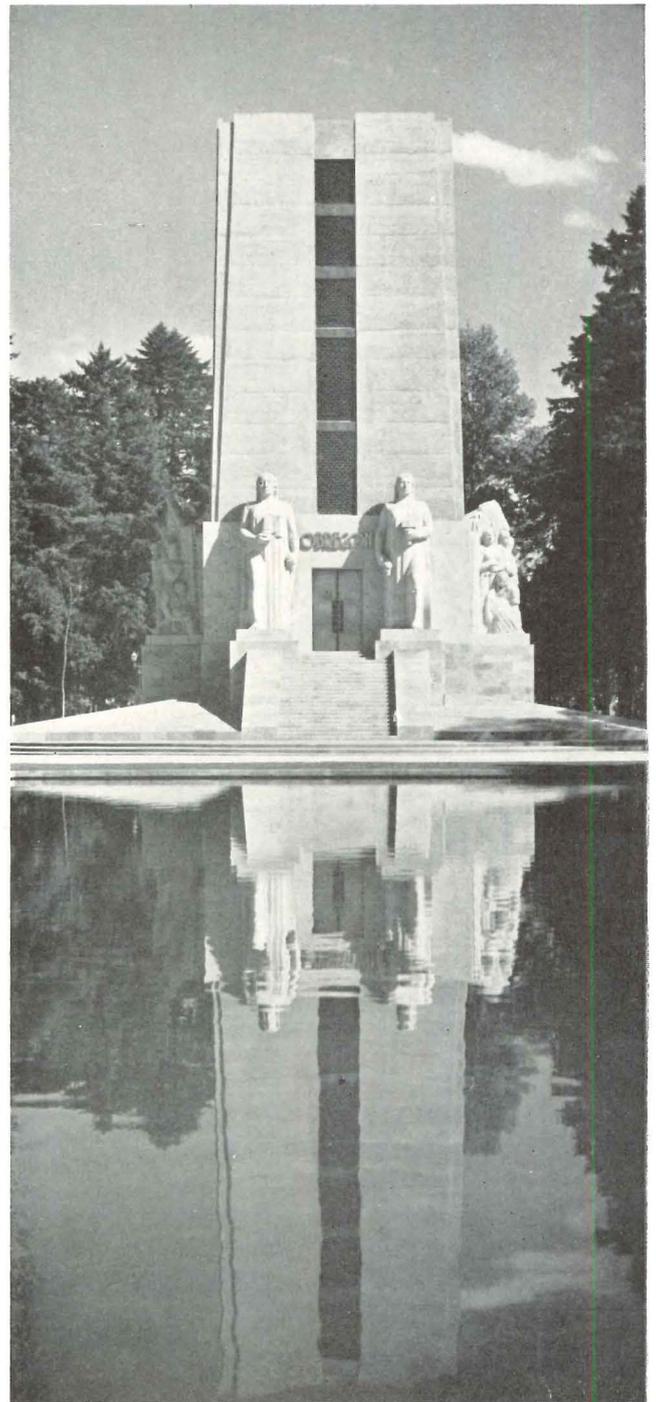




PLAN

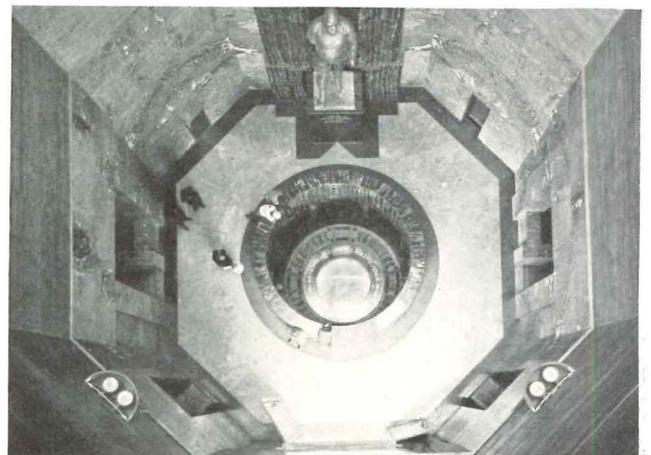


SECTION



GENERAL VIEW

INTERIOR



This monument results from a competition held by the City of Mexico to commemorate the spot where General Alvaro Obregon was murdered. Broad Avenida Insurgentes forms a striking approach, the background is a group of fine old trees. A reflecting pool adds to the result. On nights when the monument is illuminated, a beam of light is thrown heavenward from the roof. Sumptuously finished inside, with rare marbles, the interiors are nevertheless simple and impressive.

The structure is reinforced concrete, built upon piles. It was an engineering problem of considerable difficulty, due to the spongy soil on which the city is built. The lower part and sculptures are in limestone. Granite is used for the base.

OFFICE BUILDING, AVENIDA JUAREZ 60, MEXICO CITY

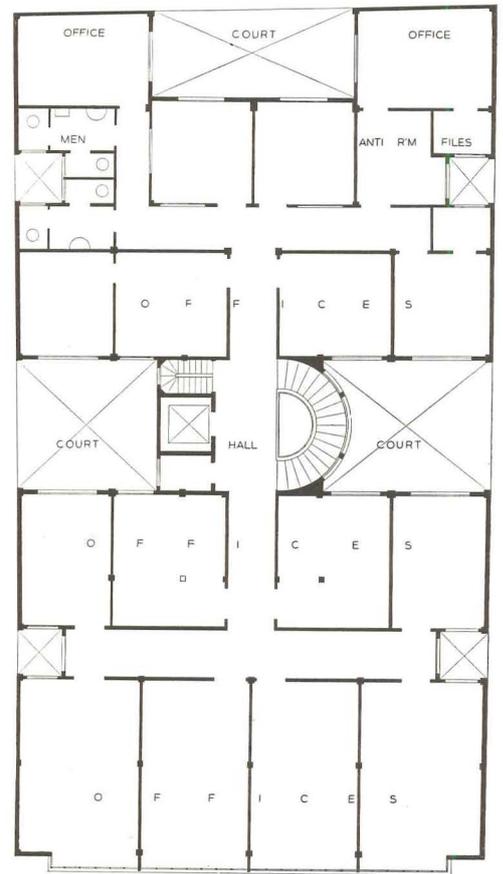




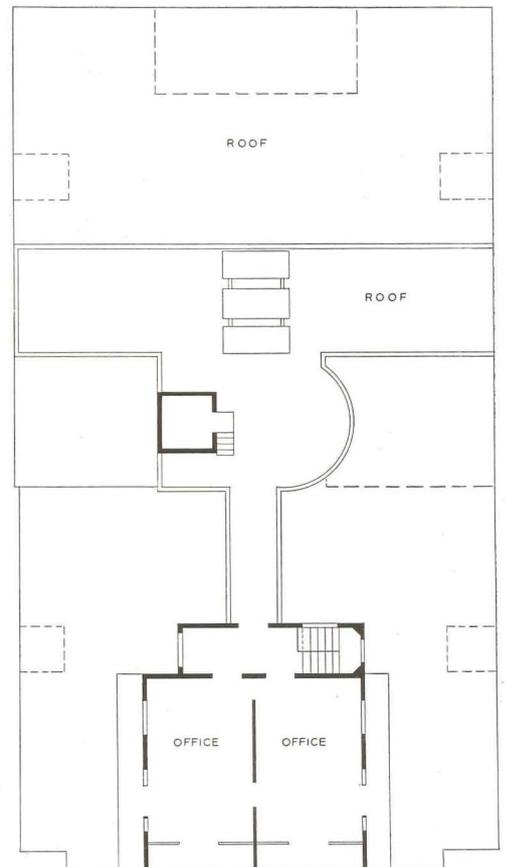
Designed by the late José Arnal in 1932 as an apartment house, this was the first modern building of pretension, erected on a main street, close to the old part of the city. As such, it caused a storm of protest, and although the building was defended by a large number of people, including the building department of the city, it is still extremely unpopular.

During construction the owner died, leaving the building unfinished. Kunhardt and Capilla were engaged by the new owner to convert the design into an office building. Arnal's fundamentally excellent plan made this possible with a minimum loss. A few minor changes were made in the facade to accommodate the penthouse offices of the owner. The structure is steel, with concrete floors, hollow tile partitions.

Mexico City does have laws against unsightly signs, such as the "SERVICIO ECONOMICO," which is so glaringly bad alongside of the particularly fine sign high on the facade designed by architect Carlos Obregon Santacilia (see page 62), but, as in the United States, it is difficult to enforce such regulations.



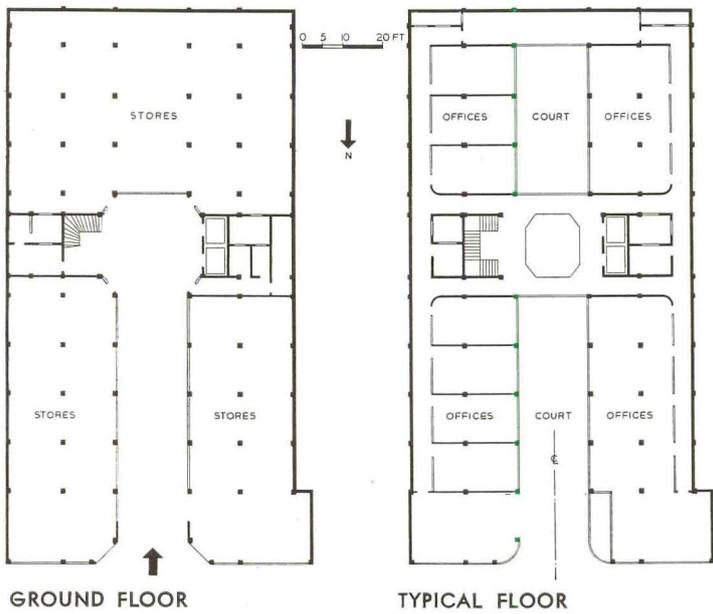
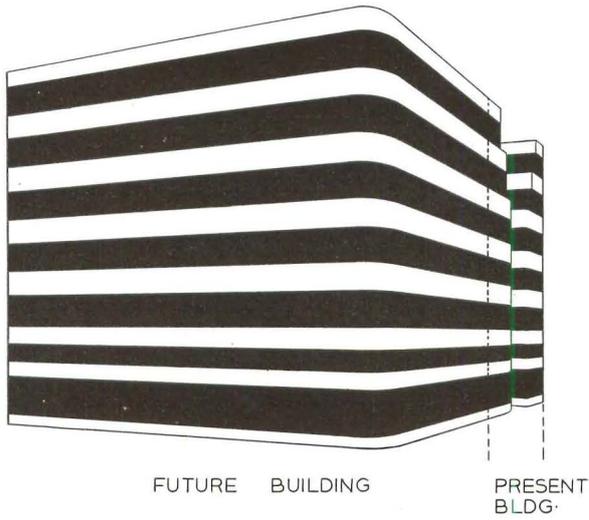
TYPICAL FLOOR



ROOF LEVEL

OFFICE BUILDING, AVENIDA JUAREZ 30, MEXICO CITY



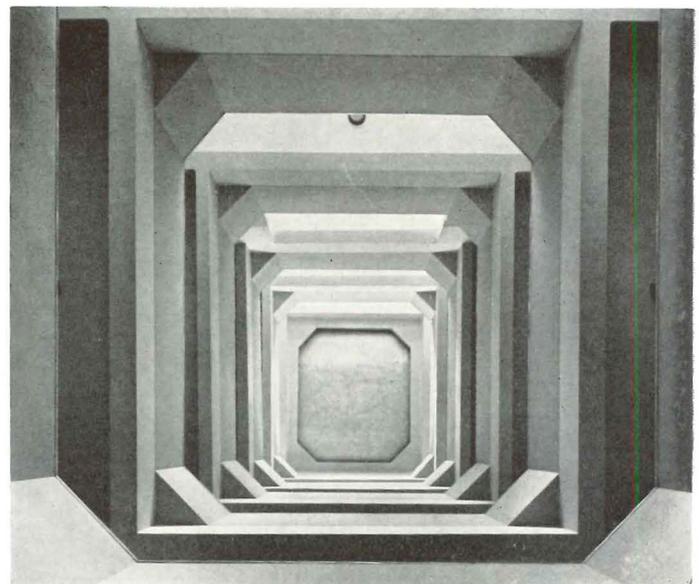


1 Sketch and 2 Plan showing completed building. 3 General view. 4 View into court. 5 Elevator lobby well.



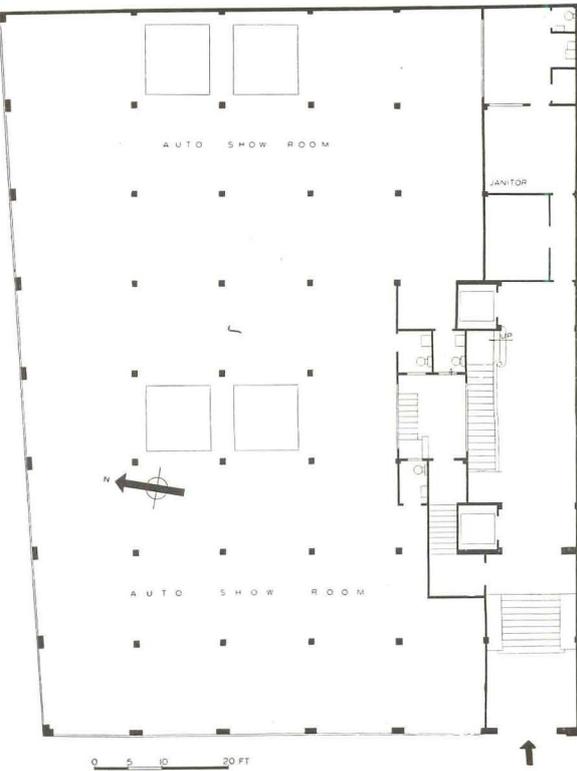
A deep plot with comparatively narrow frontage on the finest part of Mexico City—The Alameda—presented a problem. By the device of rounded corners and setbacks, the disadvantages of the narrow plot were minimized, and a view of the park was gained for more offices.

The elevators, faced by the stairs, open out onto a balcony at each floor—last vestige of the old patio plan. Here it is a pleasant architectural caprice. By careful proportioning of the courts, all offices are extremely pleasant and receive plenty of light. The engineering of the structure is particularly commendable. To take care of the inevitable settling and movement, the building was erected in three sections, free to move past each other so as to minimize strains in the structure.



OFFICE BUILDING "BEAUMONT" BALDERAS 32, MEXICO CITY

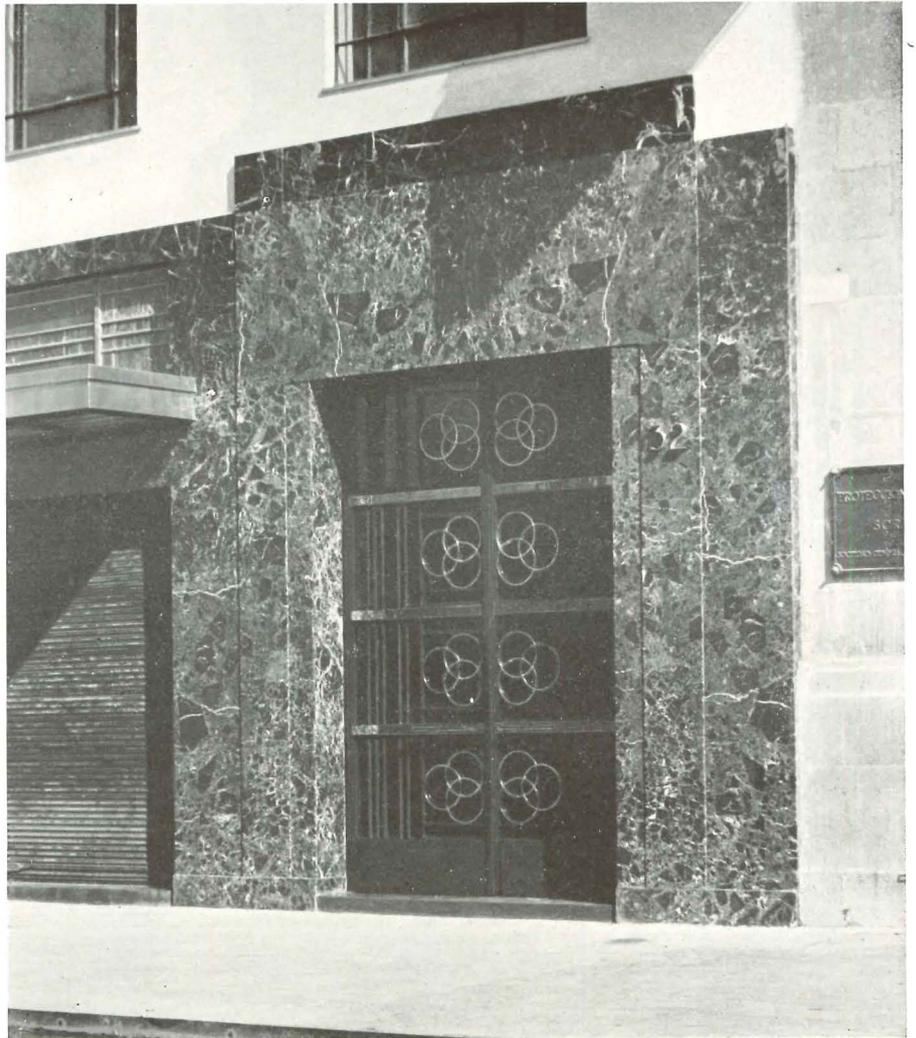




FIRST FLOOR



SECOND AND THIRD OFFICE FLOORS



This office building and automobile showroom, although on the "main street," is many blocks from the business center proper. For that reason it was not thought possible to rent all of it as an office building and, accordingly, the top two floors were designed to be apartments. However, as evidence of how fast Mexico City is growing, before the building was completed all the floors were leased for offices. The apartment idea was abandoned, and the only result of this change is the separation of the two elevators, which were planned for the two uses.

The large interior courts make even the inner offices light and cheerful. The entrance hall receives natural light and is one of the most attractive features of the building.

Construction is reinforced concrete column and slab, brick fill, steel sash, aluminum sills. Stucco exterior walls, marble trim around entrance and in entrance lobby. Engineering difficulties minimized by keeping the building low in height.

A SHOPPING CENTER, MEXICO CITY



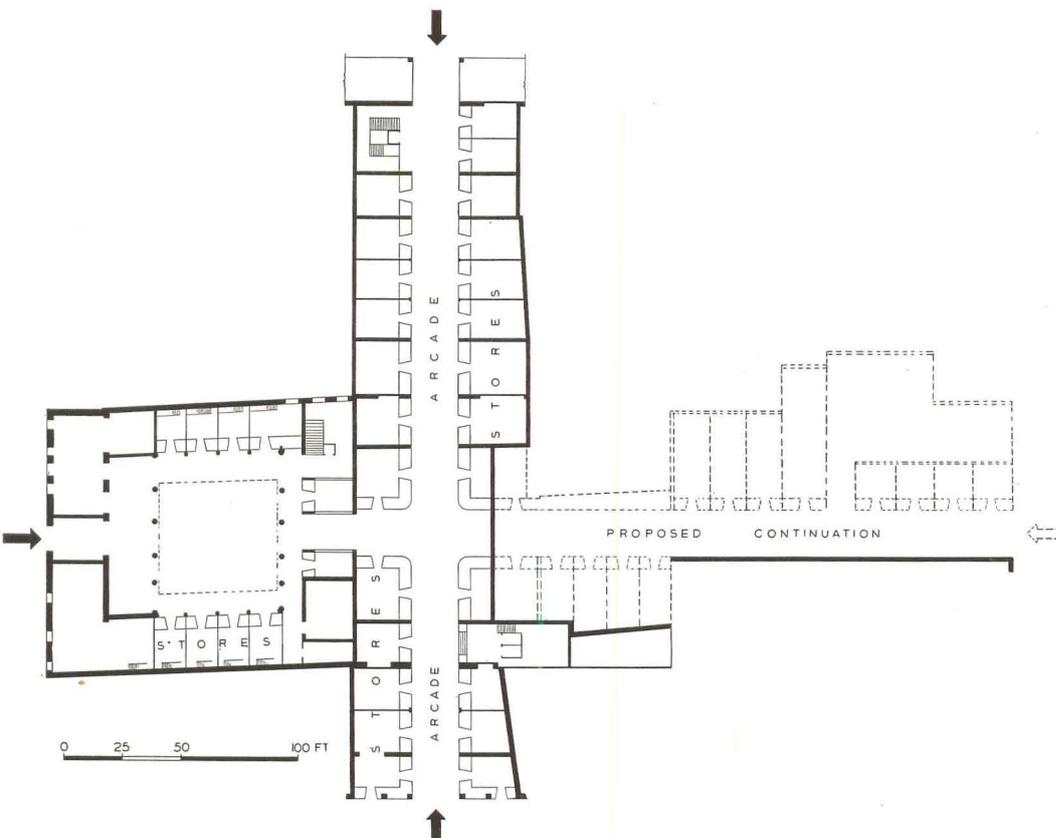
Utilizing former service space adjacent to the splendid historic Iturbide Palace, the architects have created a smart shopping center in an uncompromisingly contemporary manner, designed to carry costs of the older structure. Buildings falling into the "historic monument" class are frequently a source of embarrassment to their owners, who are prohibited from altering them for commercial uses, at the same time that no government subsidy or relief from taxes is forthcoming. Here, a fortunate solution has been found, but not without loud protest from the "nationalists" who would like to have had the shopping center designed in the "Iturbide manner."



DETAIL OF THE SHOPPING CENTER



INTERIOR COURT OF THE ITURBIDE PALACE



MATERIALS

Structure, reinforced concrete. Steel beams where necessary to support large loads, to avoid the necessary depth of concrete beams. Artificial black granite veneer for the walls. Ceiling of reinforced concrete, and structural ceiling lights to obtain the greatest possible amount of light.

THE PROBLEM

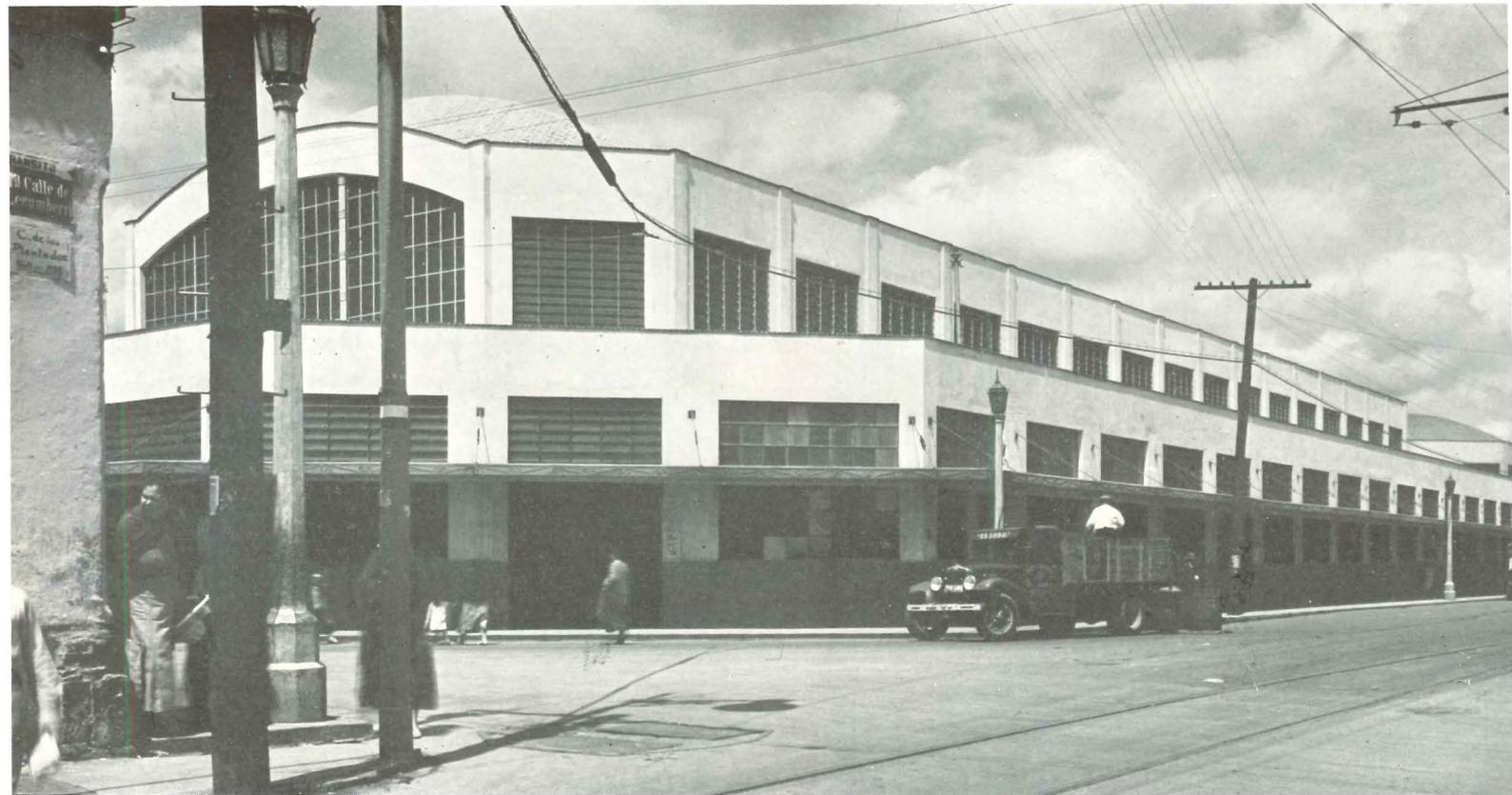
(a) The problem was to make productive an interior property, used for carriages, service courts, etc., which had no appreciable income.

(b) An arcade in the form of a cross was decided upon, with axes from Avenida Madero to Avenida 16 de Septiembre and from Bolivar to Gante street.

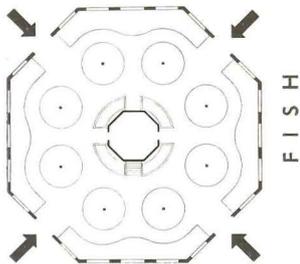
(c) The position of the Bolivar-Gante axis was determined by the entrances of two existing buildings; the Madero-16 de Septiembre axis involved linking the modern arcade with the Colonial patio of the old Hotel Iturbide. In extending the axis of the arcade to 16 de Septiembre a slight change of direction was made with the object of utilizing as much as possible existing construction.

(d) The main engineering problem was not to weaken the existing very heavy walls.

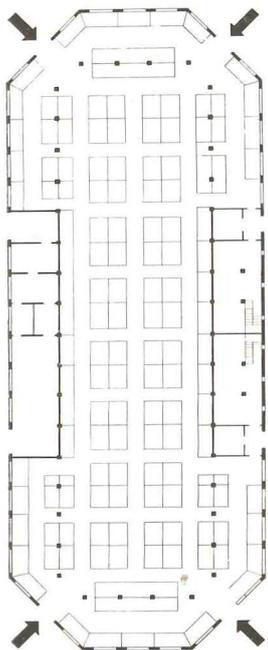
ABELARDO RODRIGUEZ MARKET, MEXICO CITY



POULTRY MARKET

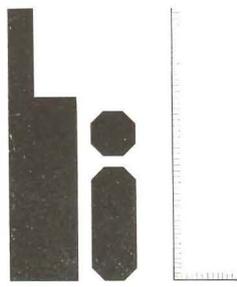


FISH



POULTRY

0 10 20 30 40 50 FT



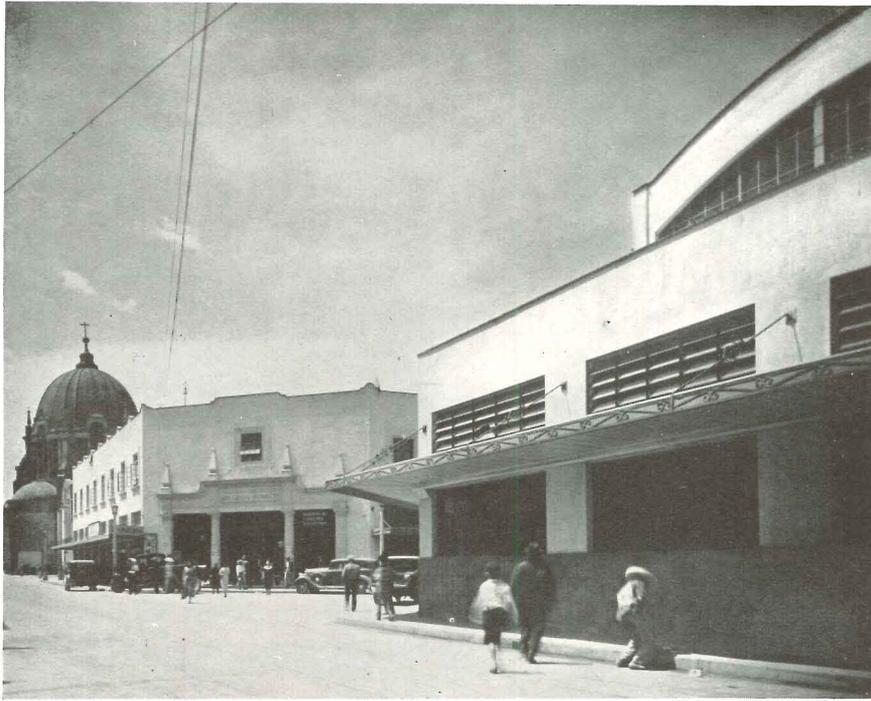
TYPICAL OPEN - AIR MARKET

From pre-Cortésian times the public market has been, next to the church, perhaps the most important social and economic institution in Mexico. Provincial markets still show that amazing characteristic of the Indian—a sense of order-design deeply rooted in his background, which accounts for the artistic displaying of wares that have made Mexican markets famous throughout the world. With the breakdown of the older order, the markets, particularly in the cities, have become disintegrated and confused, with attending insanitary conditions.

Since the market assumes an important place as a social force, it is natural that the government should seriously interest itself in promoting improvement. This market, built by the City of Mexico, is the first attempt to construct a modern sanitary, public market.

There are three parts to the market: a general market (shown only in plot plan) built adjoining the old Convent of Carmel, and two free-standing pavilions, one for the sale of fish and one for poultry. These two pavilions have been freed both in interior and exterior design of any preconceived style. Isolation of the two special pavilions from the general market is a commendable feature. All the markets are lighted by skylights or clerestory windows, the stalls are constructed of concrete and terrazzo

ANTONIO MUÑOZ GARCIA, ARCHITECT

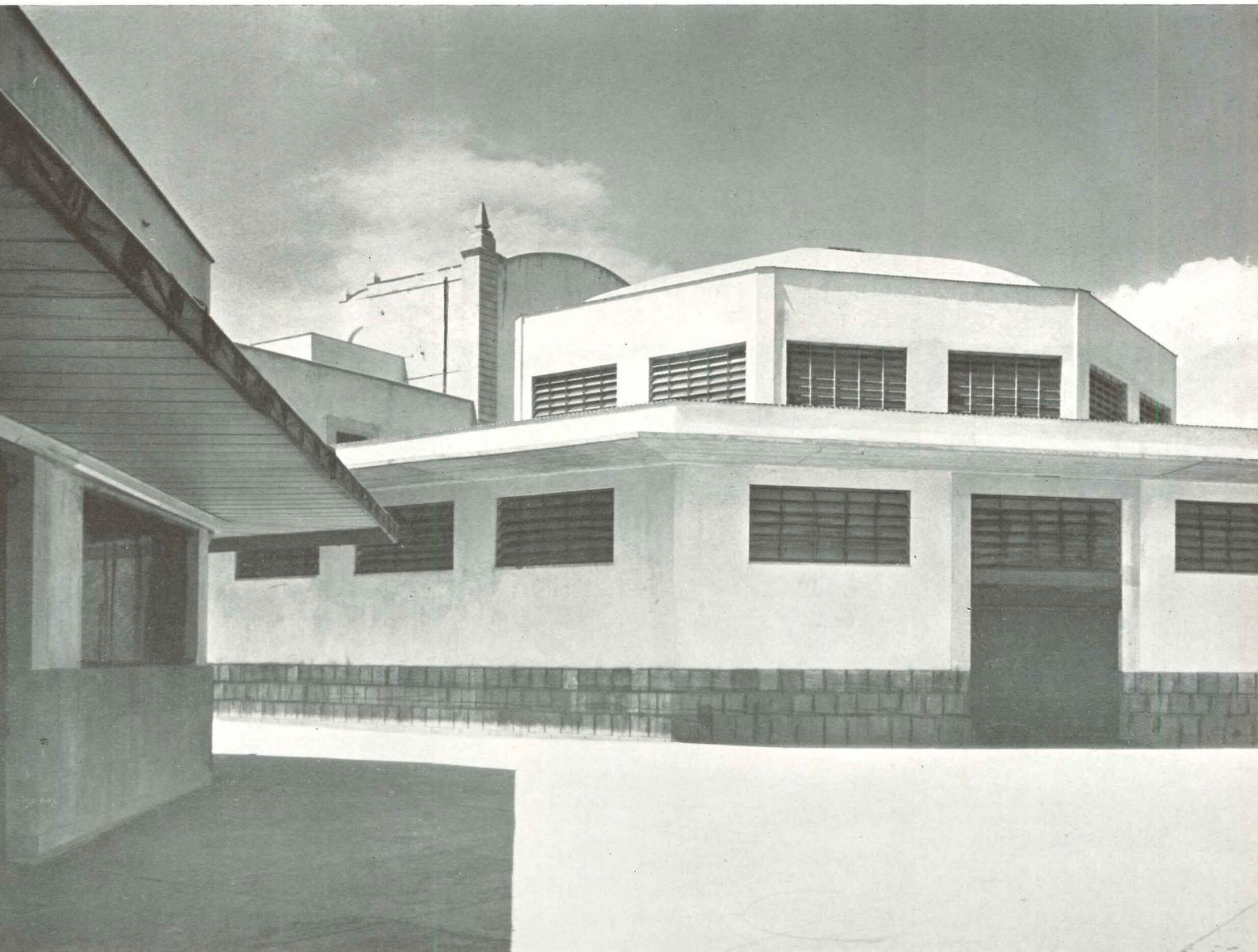


LEFT, EXTENSION OF OLD CARMELITE NUNNERY • RIGHT, POULTRY MARKET

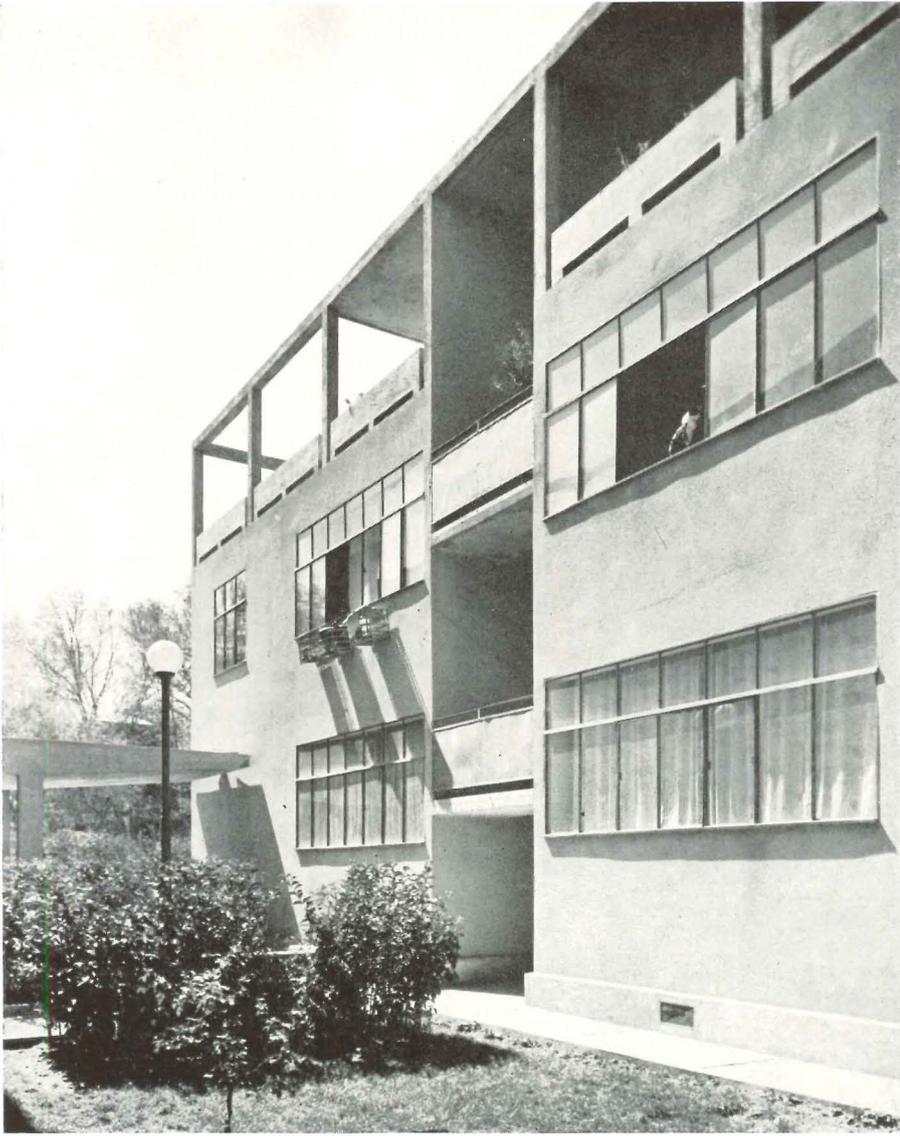
and, with concrete floors, make it possible to wash the whole market down like a ship every day.

Large wall spaces in the general market made possible some notable fresco painting by younger members of the now famous Mexican school of propaganda-by-mural-painting, including some American pupils of Diego Rivera.

FISH MARKET



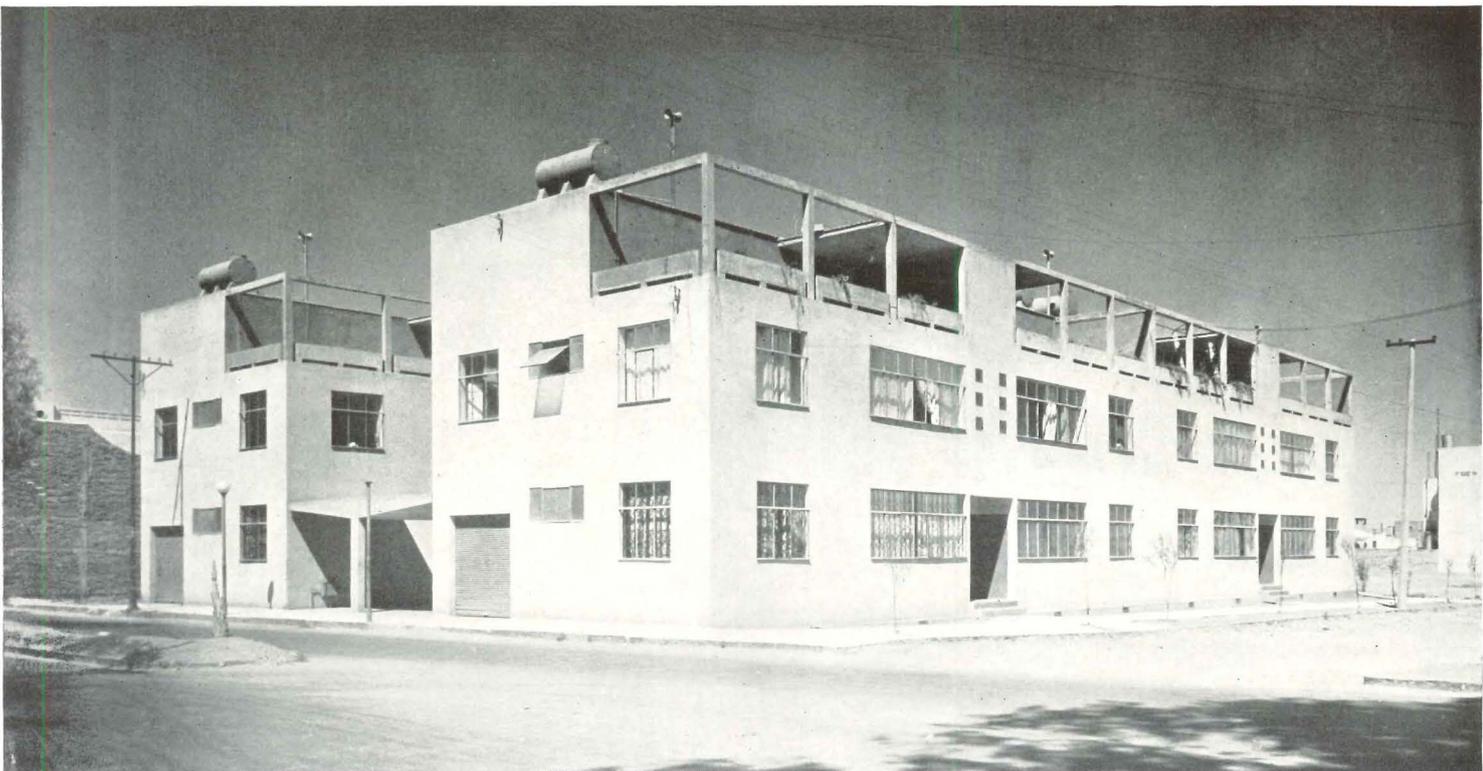
APARTMENT HOUSE, AVENIDA MARTI 251, MEXICO CITY



Profound changes in the social structure of Mexico have altered the manner of living of all classes. Most noticeable has been the rise of a new middle class, educated, but of moderate means.

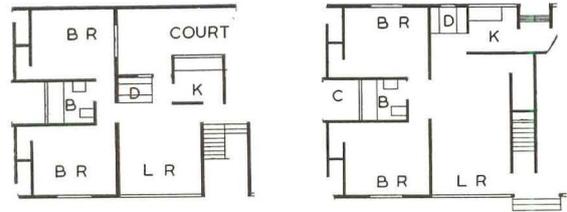
Living definitely in the present, these people have little interest in, and feel no kinship for, the trappings of a former Diaz regime. Indeed, their slender means would make it impossible to carry on in that manner even if they were so inclined. Mexico City is consequently full of great old houses which people cannot afford to live in or remodel economically for modern life.

This apartment house fills exactly the needs and desires of an average middle-class family. Leaving time and energy for greater interest in community life, sports and amusements, the compact, convenient, efficient small house or apartment with plenty of light and air, with perhaps a small garden or roof garden, meets the demand in Mexico today.

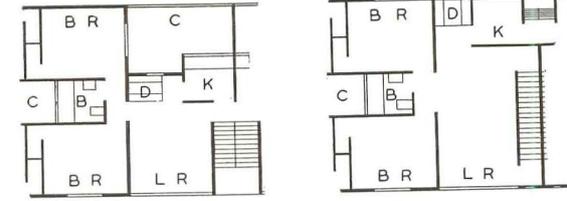


ENRIQUE YAÑEZ, ARCHITECT

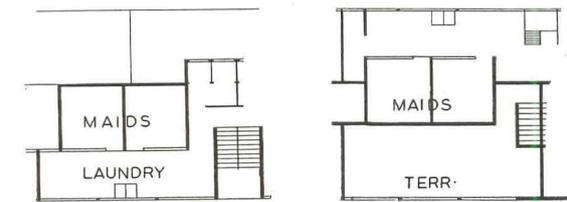
PEDRO BUSTAMANTE, ENGINEER



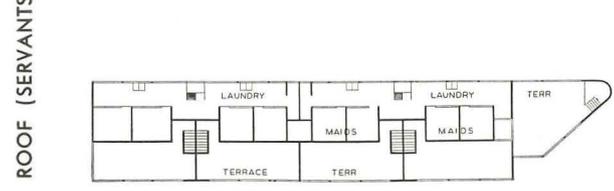
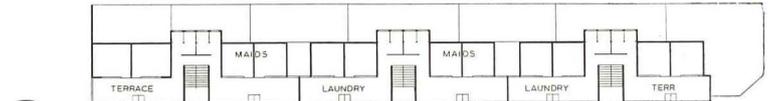
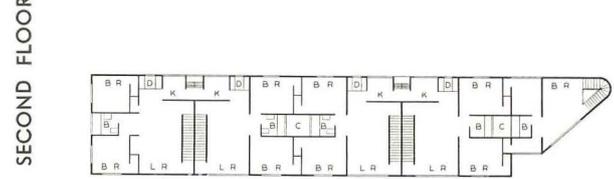
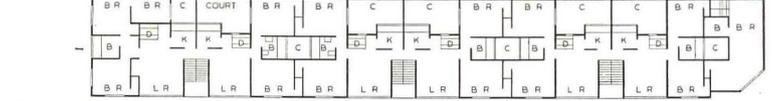
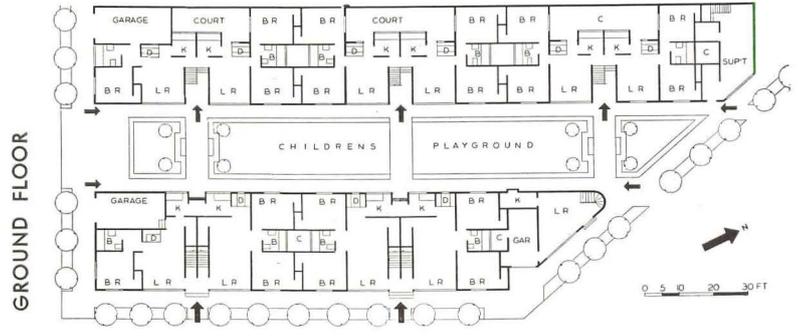
TYPICAL APARTMENTS AT GROUND FLOOR LEVEL



TYPICAL APARTMENTS ON SECOND FLOOR

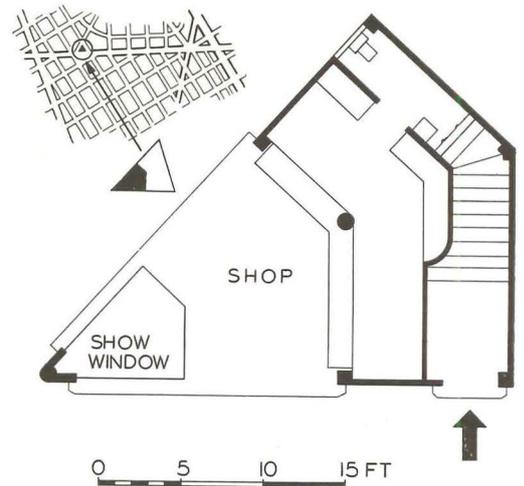


SERVANTS' AND SERVICE ROOMS AT ROOF LEVEL

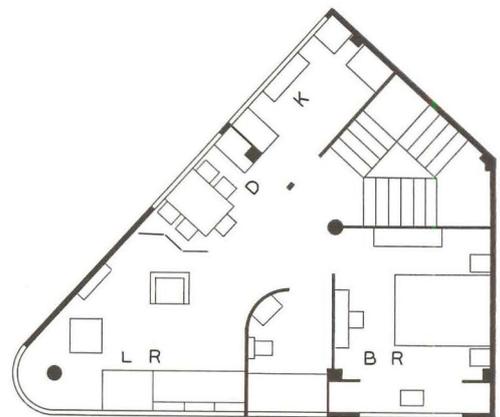


APARTMENT HOUSE, AVENIDA INSURGENTES 411, MEXICO CITY

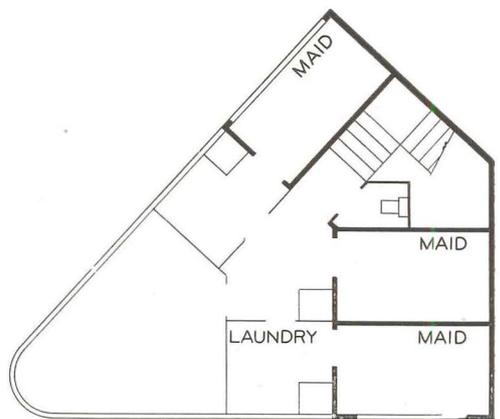




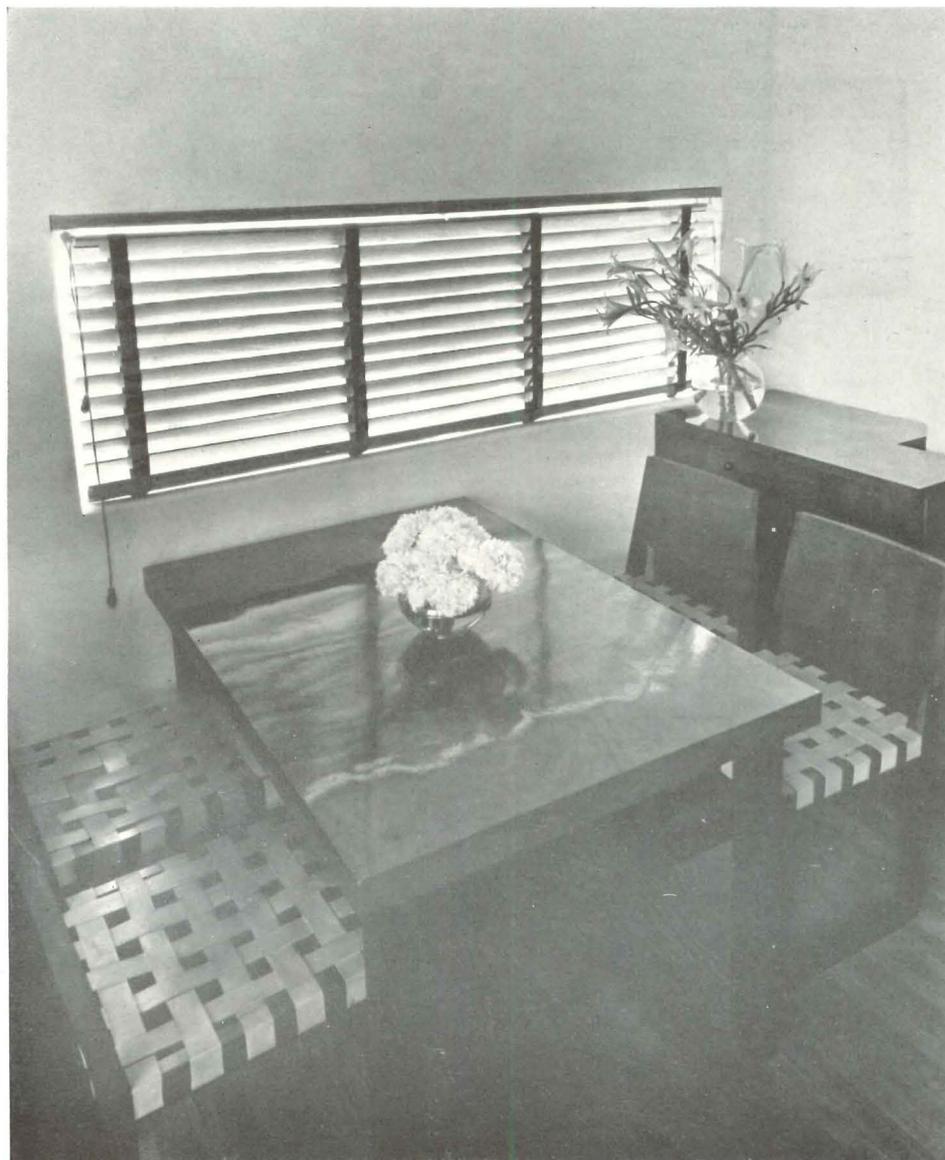
GROUND FLOOR



SECOND FLOOR



ROOF

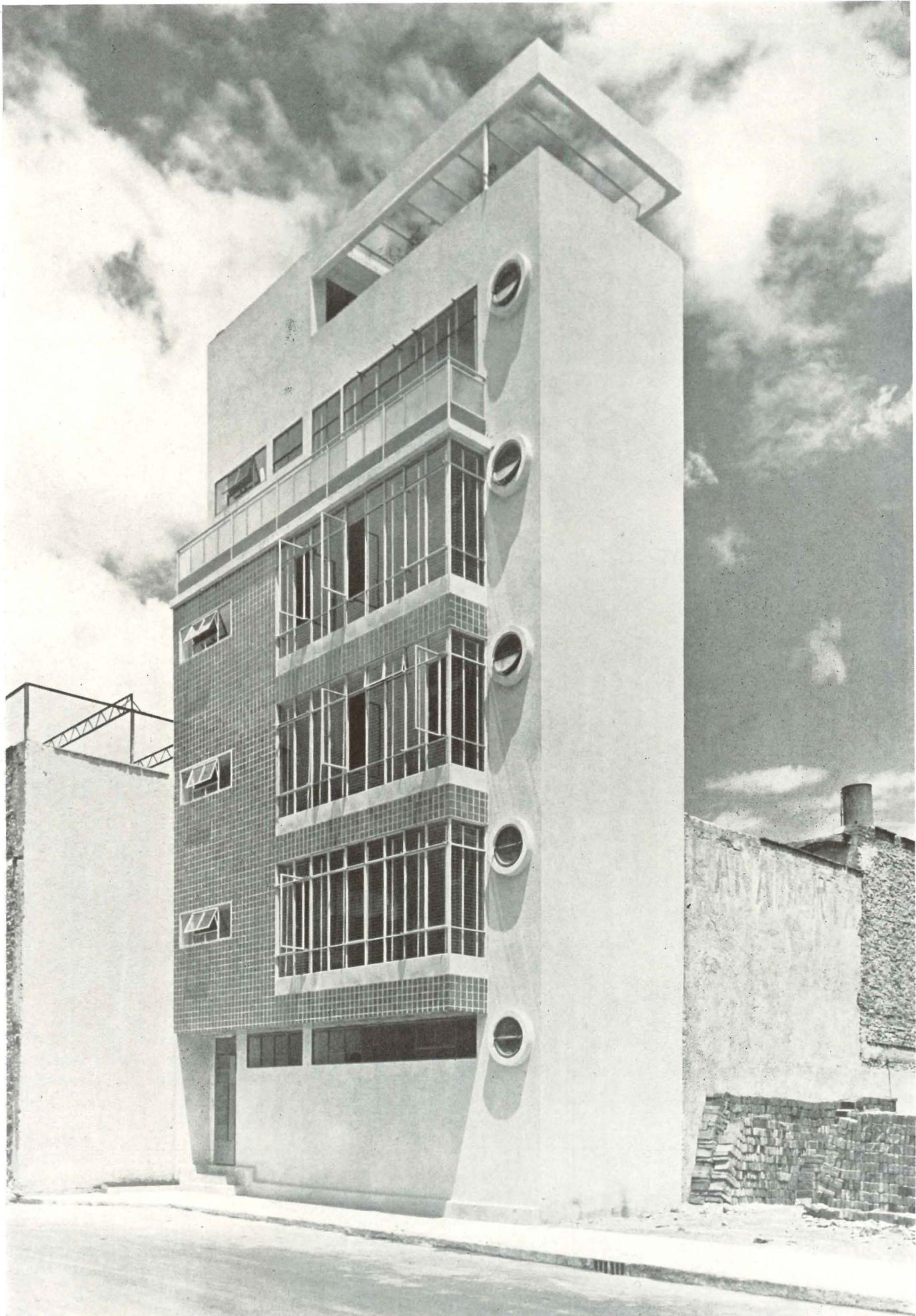


An ingenious use of a very restricted site, combining a small shop on the ground floor with three modern and compact apartments above, each with a servant's room on the roof.

The interiors, including furniture, were designed by Sra. Carol B. de Navarro.

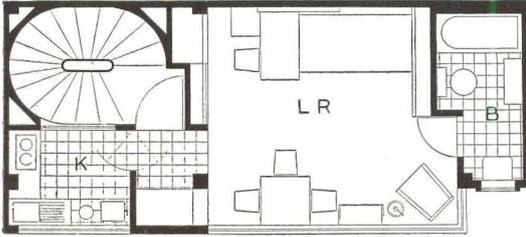
Construction, the usual reinforced concrete, with brick filled walls. The tile on the first floor is a bright vermilion, set in white cement. Sash are steel. Stairway is terrazzo.

APARTMENT HOUSE, CALLE ESTRASBURGO 20, MEXICO CITY



ENRIQUE DE LA MORA AND JOSE CREIXELL, ARCHITECTS

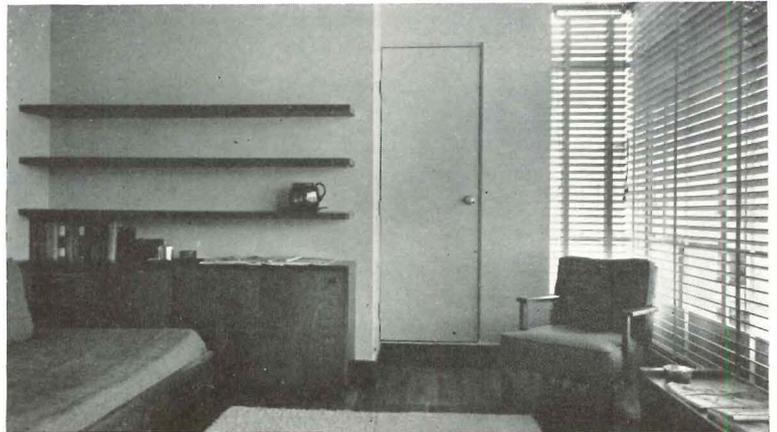
INTERIORS BY SRA. CAROL B. DE NAVARRO



ROOF

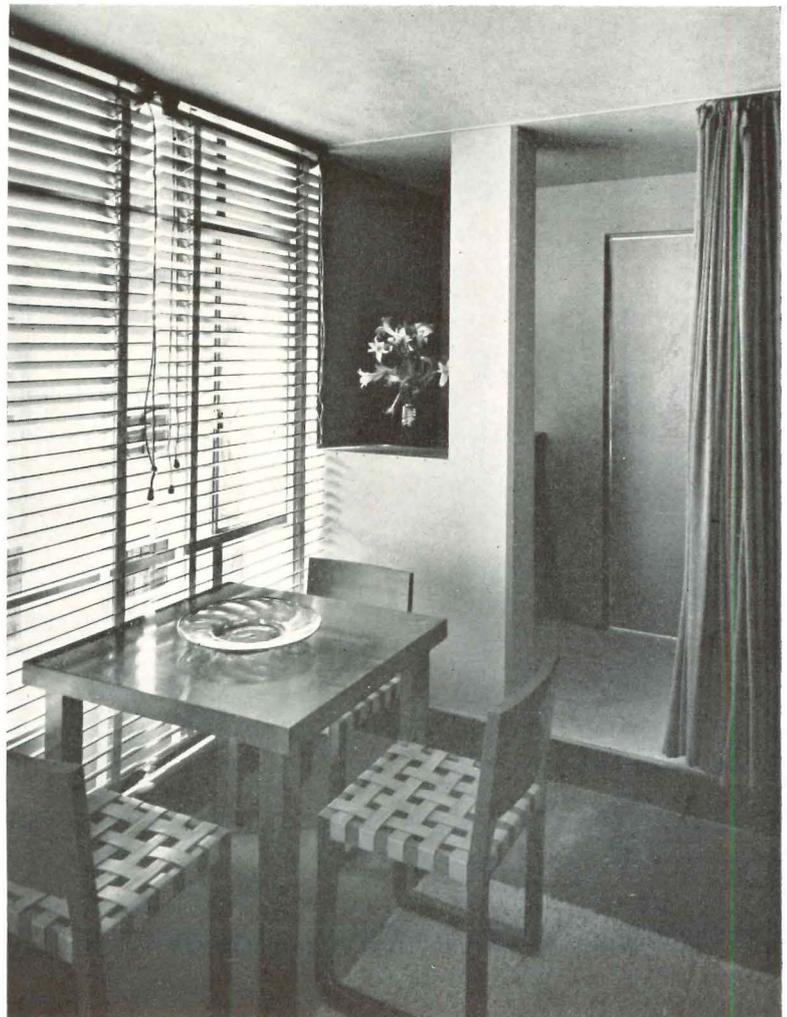
With an absurdly small plot, in a smart section of the residential district, the architects set out to fill a very special need—that of providing attractive, compact, furnished apartments, with semi-hotel service, for visitors and tourists to Mexico City. So eminently did they succeed that with its clean lines, white walls, yellow steel sash, vermilion tile set in white mortar, it is unquestionably the most *chic* piece of modern design in the city. Each floor forms a complete living unit of kitchen, bath and living-dining room. The interiors have been carefully studied in relation to the architecture to create a degree of smartness and sophistication that will hold its own anywhere.

Executed in Mexico City, the furniture was designed to be partially built-in. The white lamb's wool rug, and the brown and yellow basket-weave material used for the draperies and upholstery were woven on hand looms in Guadalajara specially for the job. Walls and ceilings are a light lemon yellow, the Venetian blind is coral. Blue hand-blown Mexican glass is used for dining service. The roof garden, which commands a superb view over the city, is accessible to all apartments. Maid and valet service is available from the first floor. Construction is reinforced concrete frame and floors, brick walls, steel sash.



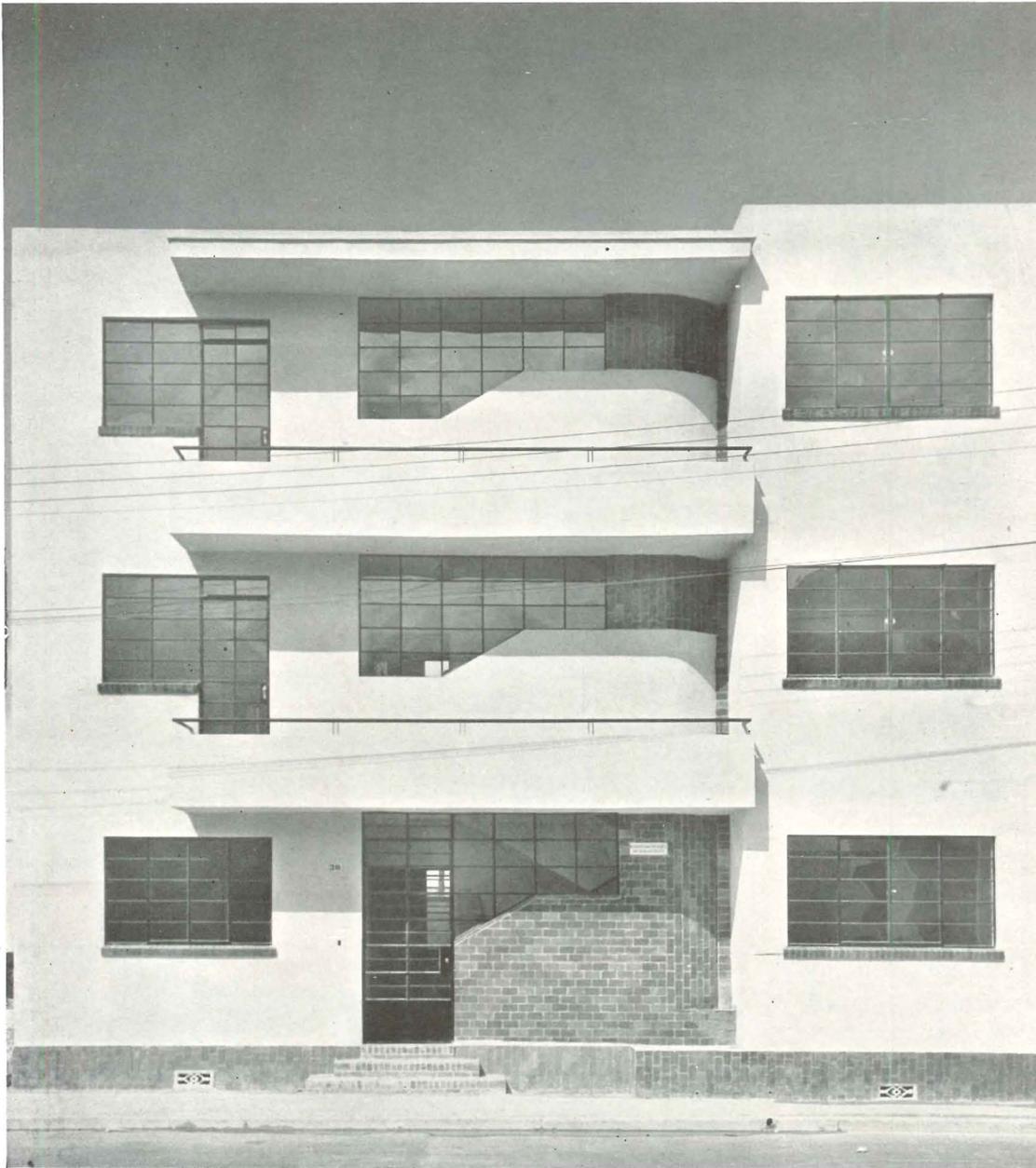
LIVING ROOM TOWARD BATHROOM

TOWARD KITCHEN



APARTMENT HOUSE, CALLE STOKOLMO, MEXICO, D. F.

LUIS MARTINEZ
 NEGRETE, ARCHITECT
 FRANCISCO MARTINEZ
 NEGRETE, ENGINEER

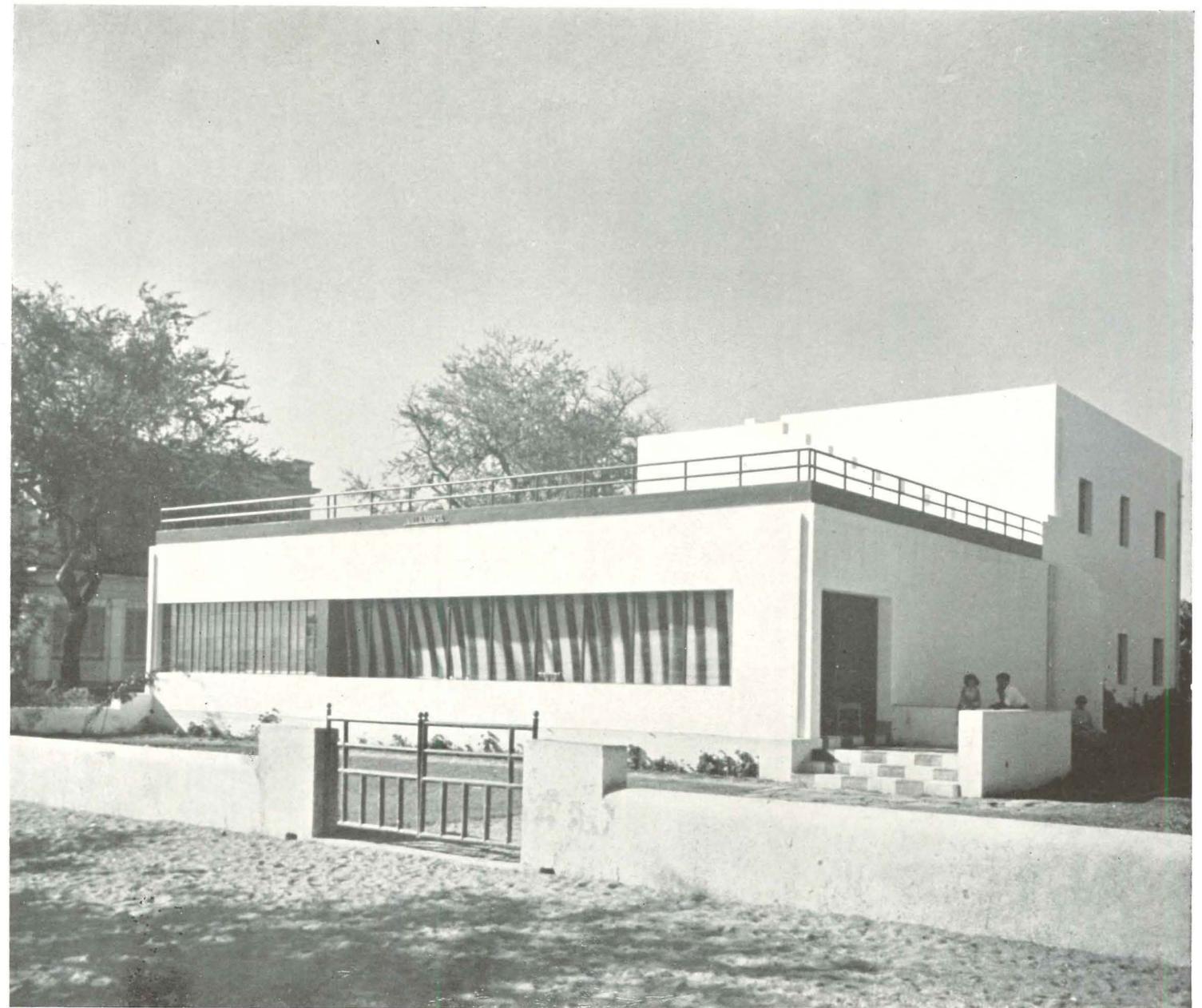


FIRST FLOOR

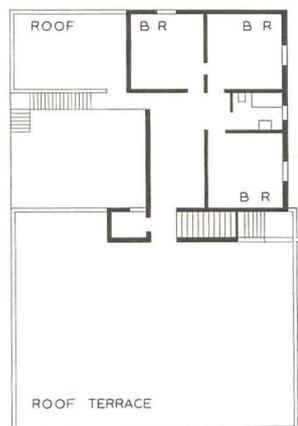
A one apartment to a floor solution for a city lot. Typical requirements of a family of modest means—two maids, do not indicate, in Mexico, a lavish scale of living.

Construction: reinforced concrete floor slabs and frame, brick trim, steel sash.

Second floor duplicate of ground floor except for balcony and maid's room at left, otherwise she would have to climb a ladder to get in.



GROUND FLOOR



SECOND FLOOR

Week-ending at Lake Chapala is the chief recreation of those who live in Guadalajara. The house is designed to take care of more than one family, several brothers and sisters with their families often sharing the week-end house. Life is informal, swimming the main sport.

The house must be cool, and for that reason the living room without outside windows is recessed, cave-like, from the wide sweeping front porch. This arrangement is common in the Guadalajara region. Construction is adobe.

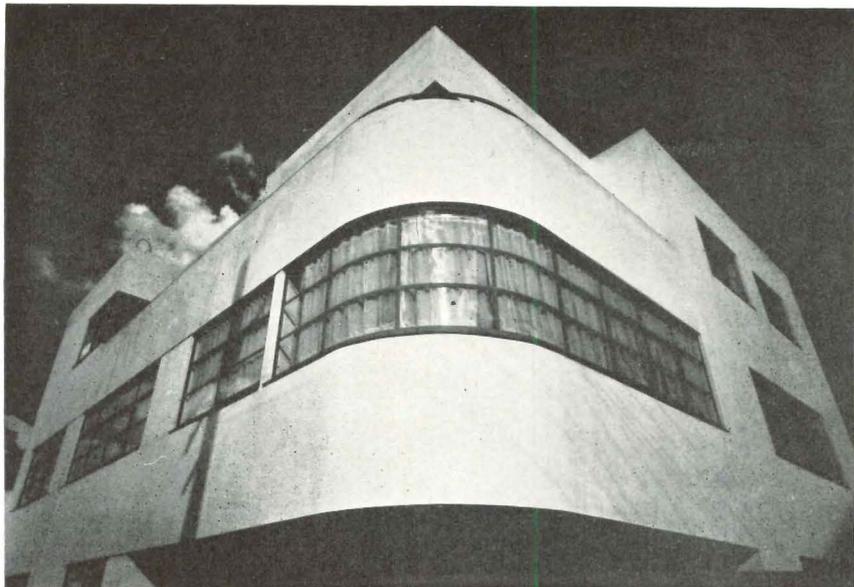
HOUSE FOR SRA. C. MORIN VDA. DE GOMEZ, MEXICO CITY



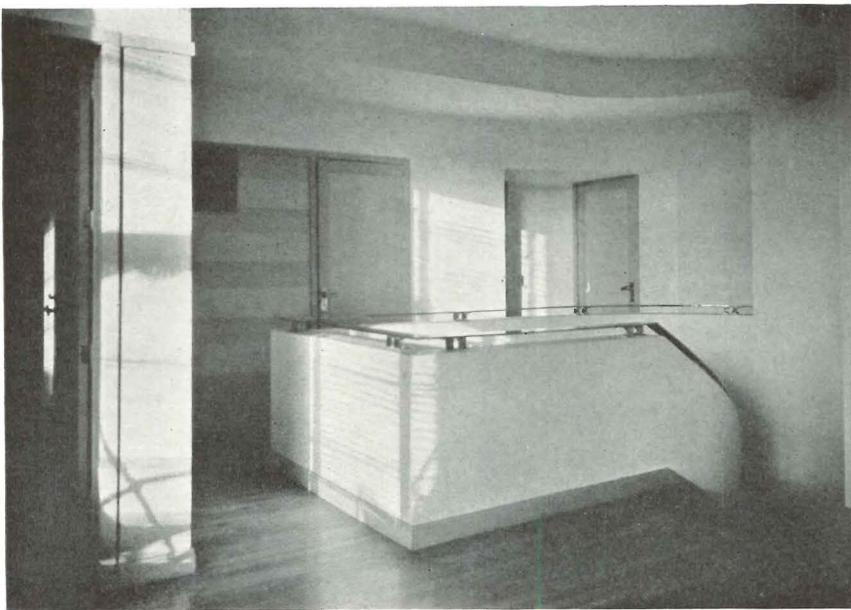
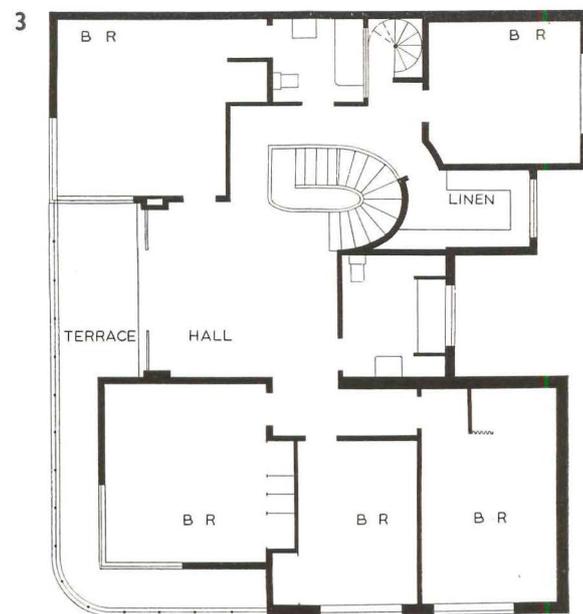
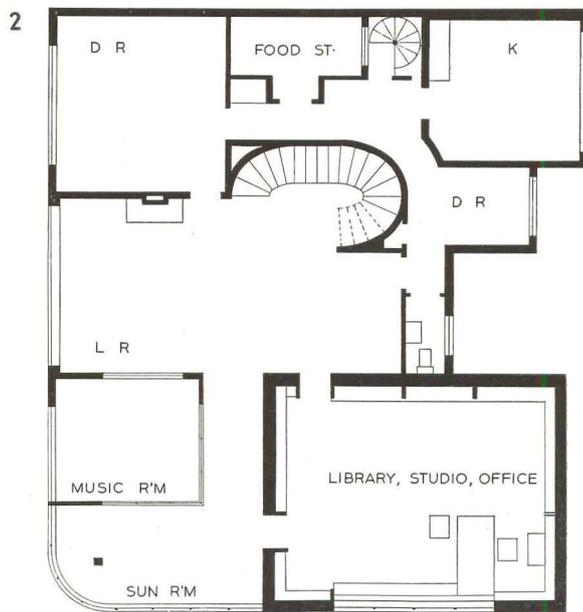
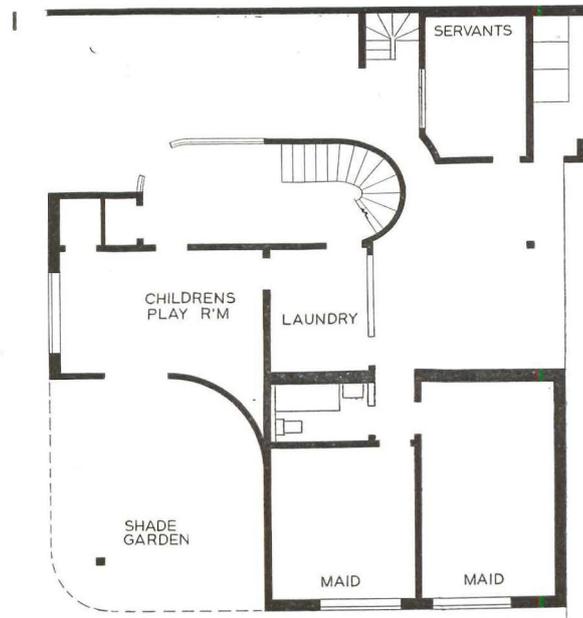
Photographs by Augustin Jimenez

Built in 1930, this is the first house in Mexico designed with conscious pretensions to a modern style. Orientation generally unfavorable for the climate of the city. With a restricted plot, and the extensive requirements of a large house, the solution is notably successful. The plan suffers, however, from complication while the exterior achieves a considerable freedom. Situated on a street between a lengthy succession of Hollywood Spanish, "late Diaz-after-the-storm," and "modernistic" houses, this house with its white walls, ultramarine blue steel sash, arrests the eye, and is easily the most distinguished piece of architecture in that part of the city.

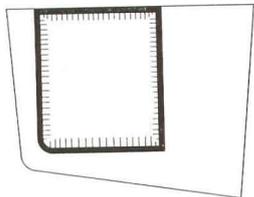
Reinforced concrete construction was adopted and walls of brick.



CORNER DETAIL



STAIR, SECOND FLOOR

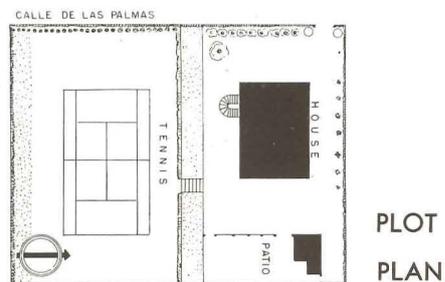
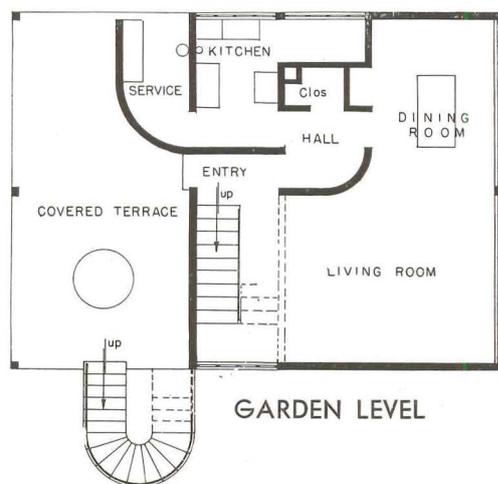
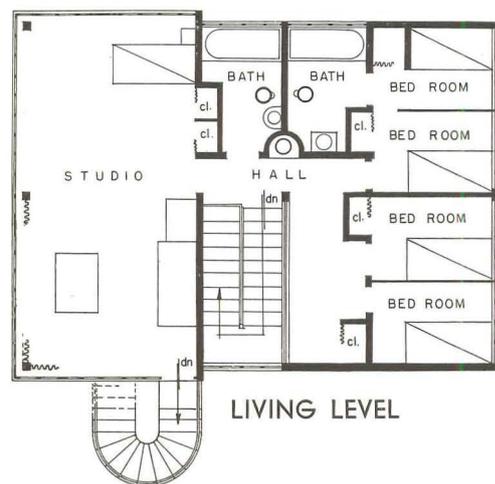
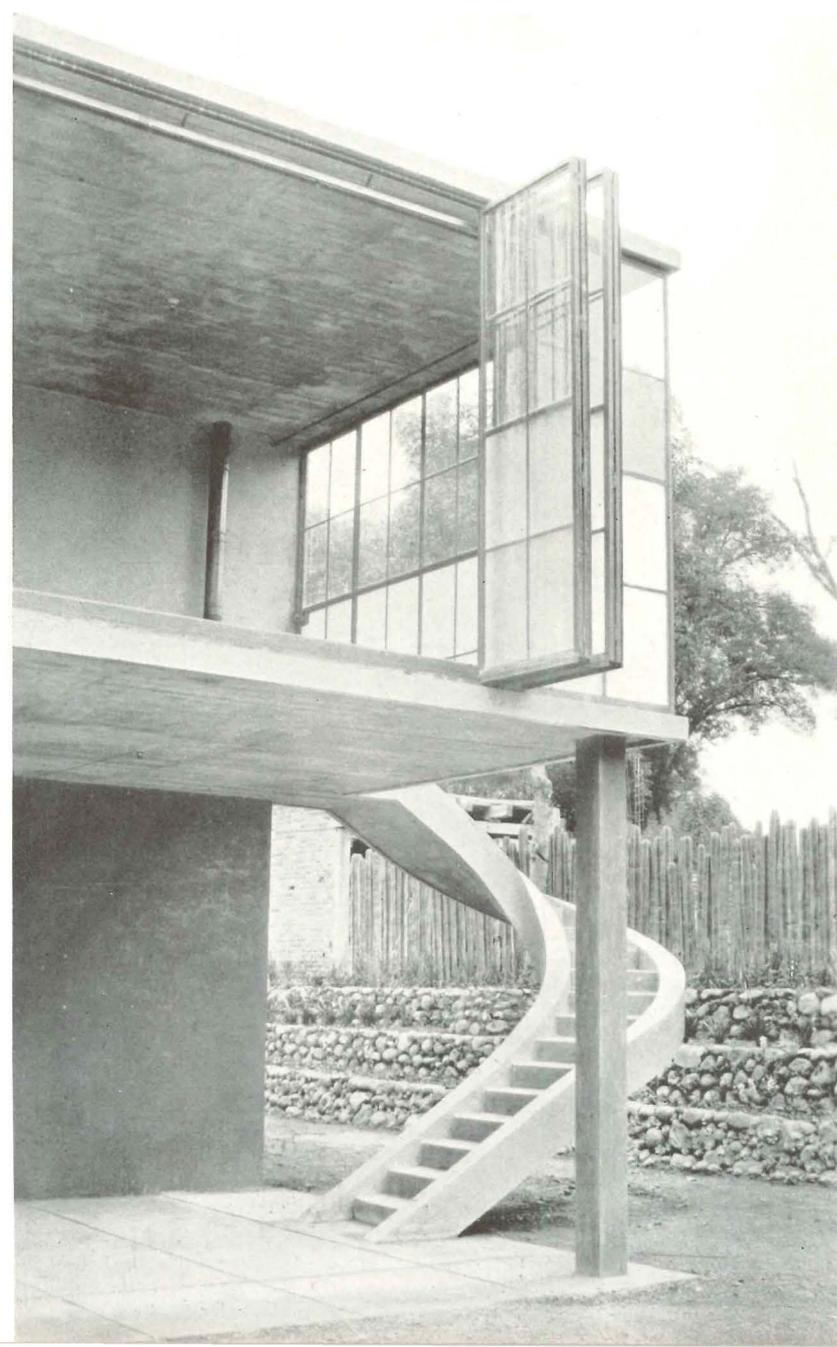


PLOT PLAN

- 1. GROUND FLOOR
- 2. FIRST FLOOR
- 3. SECOND FLOOR

HOUSE FOR CECIL O'GORMAN, SAN ANGELO, D. F.



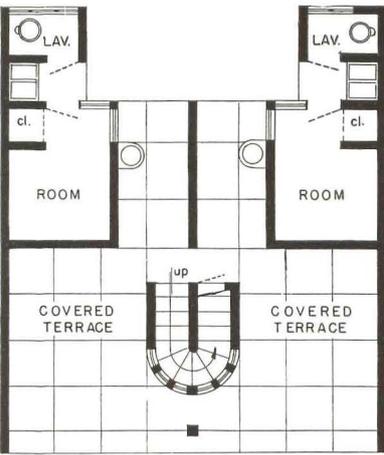
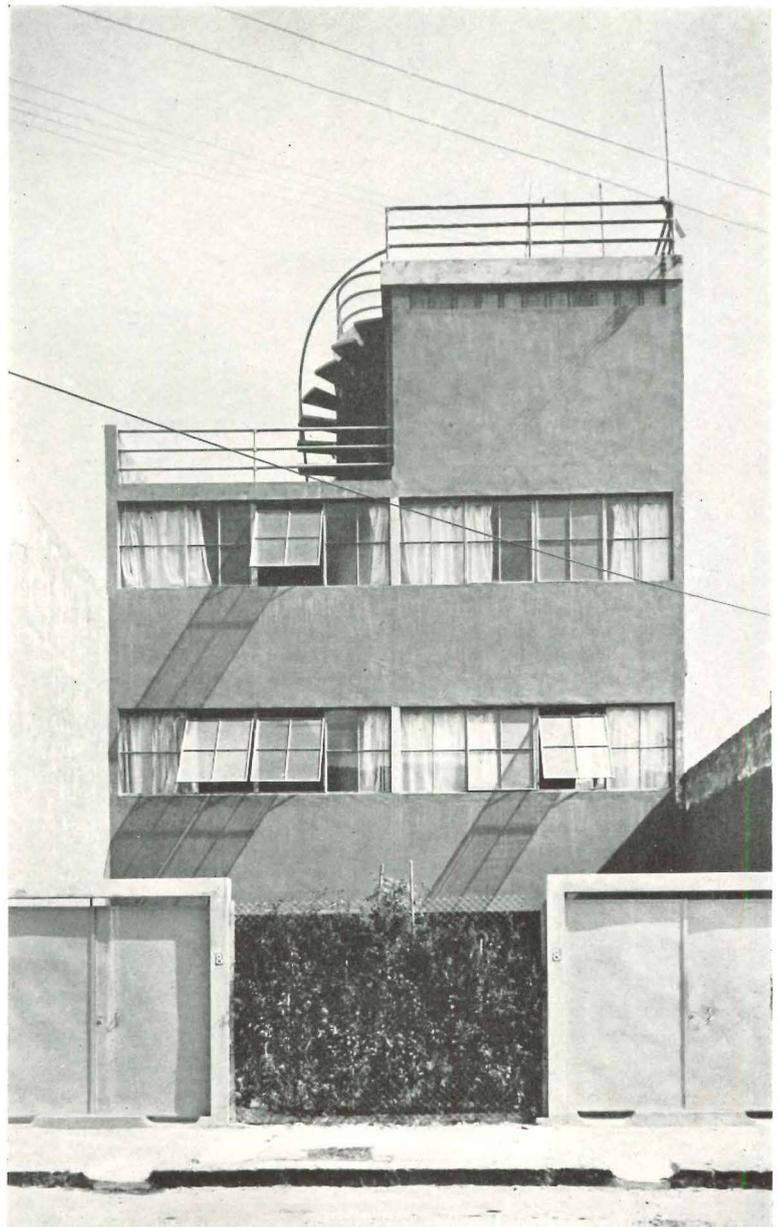


Noted as the first "purely functional" house in Mexico, it is large enough to accommodate five people. Living room, kitchen, pantry and dining room on first floor. Large studio with two beds and separate entrance on second floor. Two bedrooms and two bathrooms on second floor. Servants' quarters and garage for one motorcar. Studio can be turned into two bedrooms, each with an independent entrance.

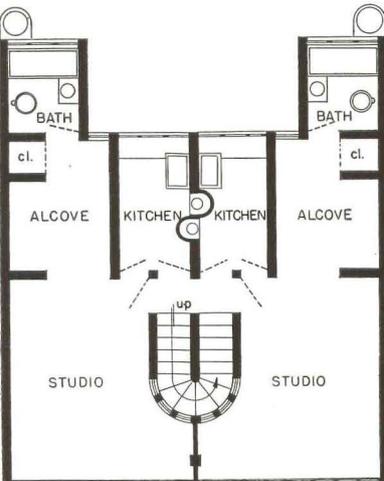
Exterior walls painted in rose, cement gray, red brown and yellow brown. Located next to house of Diego Rivera.

HOUSE AND STUDIO OF FRANCES TOOR, MEXICO CITY

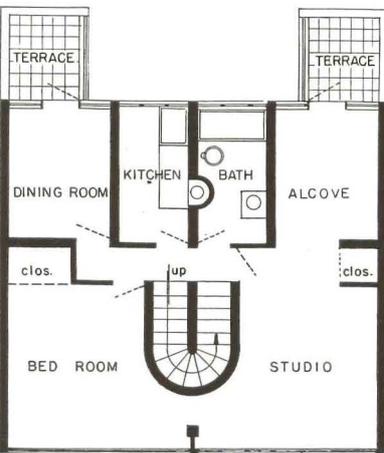




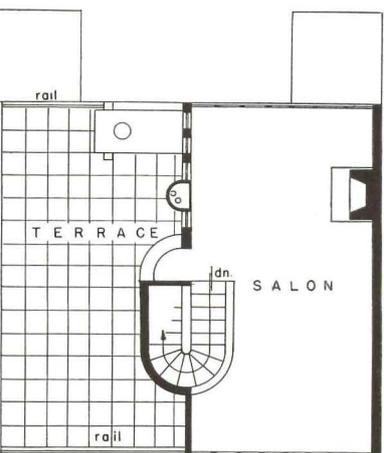
GROUND FLOOR



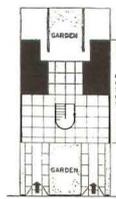
FIRST FLOOR



SECOND FLOOR



THIRD FLOOR



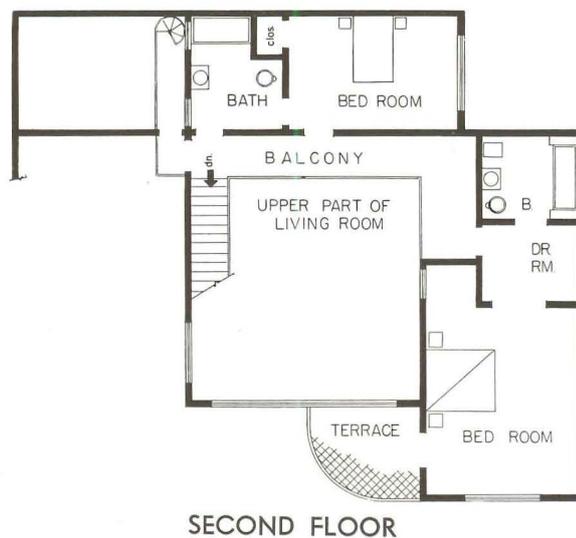
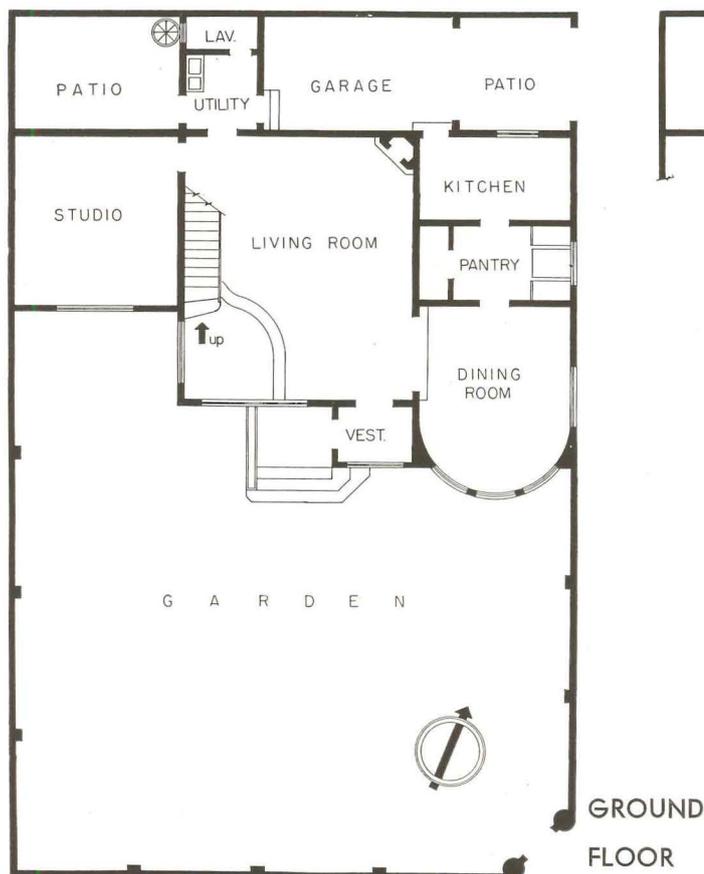
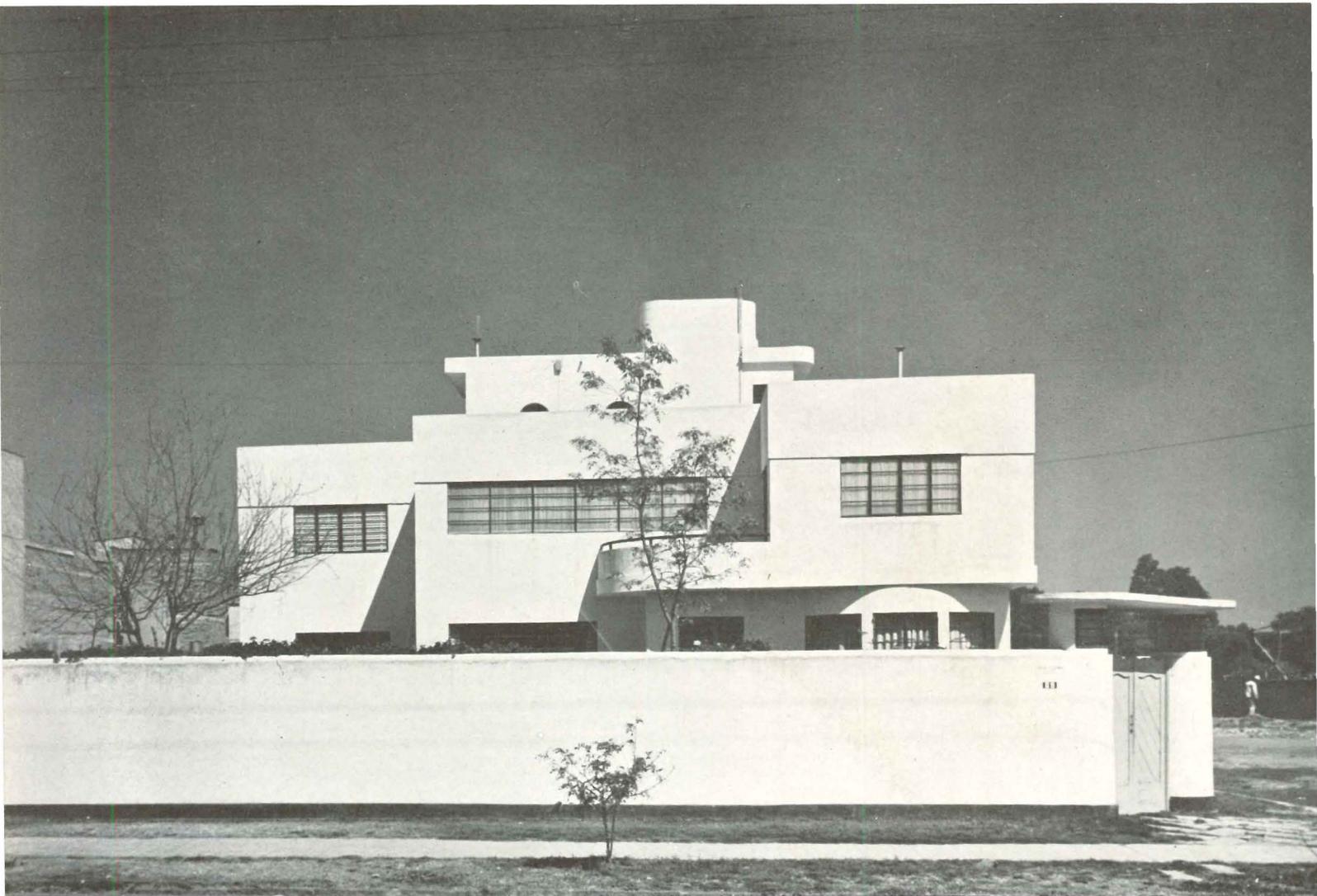
Author of a well-known guide to Mexico, editor of "Mexican Folkways," collector of the work of the younger Mexican painters, Frances Toor required a business place at once adequate and informal.

Two small studio apartments for rent, each consisting of a living and bedroom, bathroom and kitchen. One larger apartment with living and bedroom, studio office, bathroom, kitchen and one small bedroom. One large room for exhibiting pictures, books and pamphlets.

Under the house a shade garden with capacity for two motorcars. A small garden and two servants' rooms, laundry and a small patio for service.

Exterior walls are painted deep blue and Venetian red. All steel painted in vermilion.

HOUSE OF CARLOS PALOMINO, MEXICO CITY



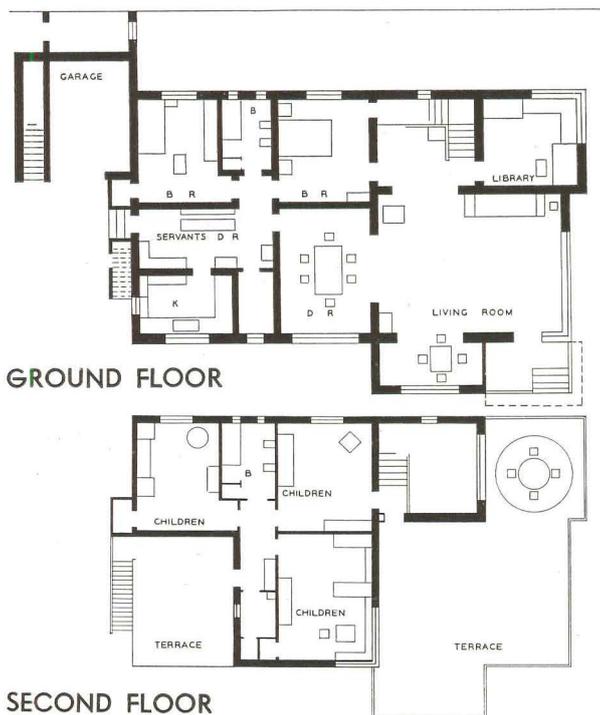
In a new section of town, but close in, this is a wealthy man's house. The large walled garden in front and the orientation of the house take advantage of the sun to the fullest extent.

Servants' rooms on the roof. Construction, reinforced concrete, brick fill walls, stuccoed, steel sash.



Photograph by Lorenzo Valles

HOUSE OF JUAN JOSE BARRAGAN, GUADALAJARA, JALISCO



A remodeled house, in which the sense of spaciousness and coolness essential for living in the warm climate of Guadalajara has been happily achieved. The rooms have high ceilings and flow into one another, the whole being held together by the soft gray-green mat finish tile floor.

The living quarters for adults are on the lower floor; the children's rooms are on the upper floor, with the sun terrace adjacent. The servants' rooms, not shown, are in a separate building at the back of the house.

The rugs and furniture were made in Mexico, with the exception of a few decorative elements.

Even modern houses are still built in Guadalajara of the traditional adobe construction, using steel or concrete beams to span the larger openings.

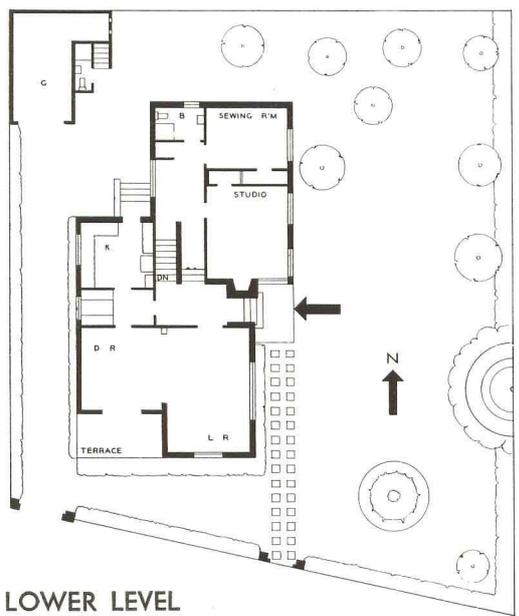
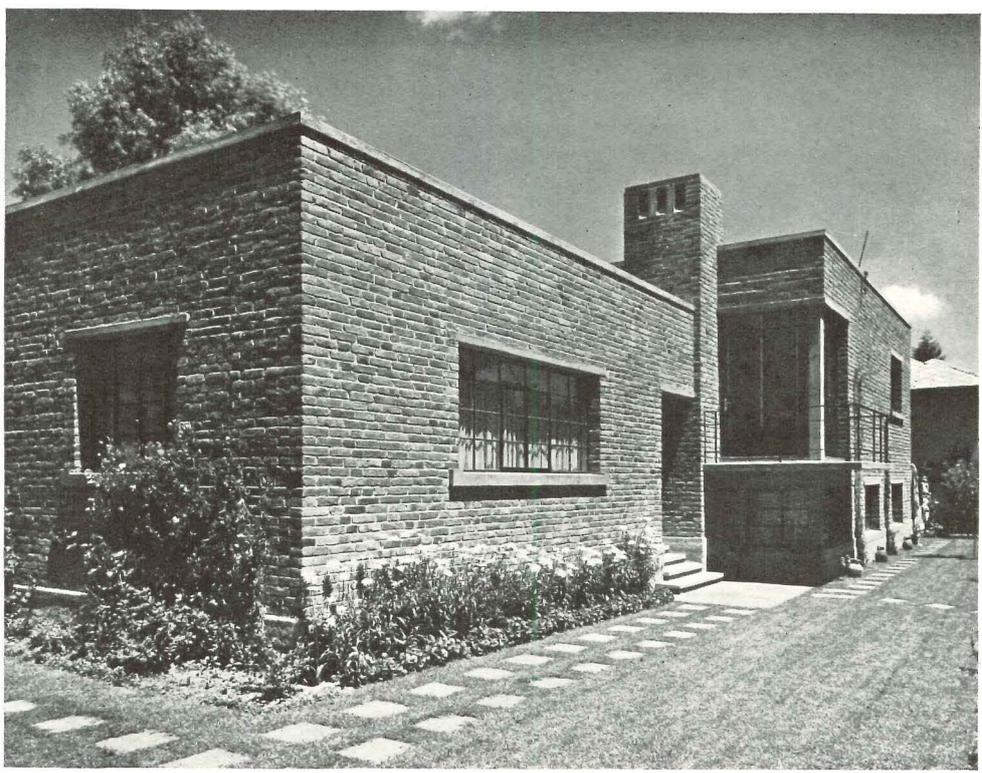


LIVING ROOM

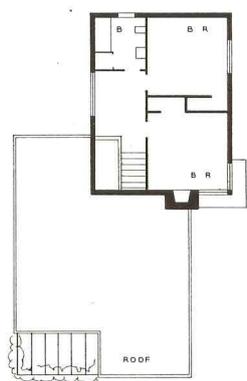
DINING ROOM







LOWER LEVEL



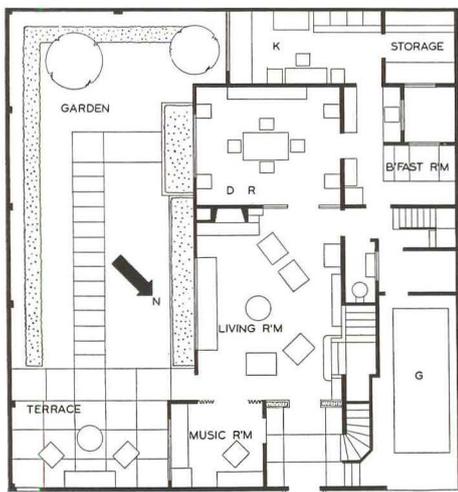
UPPER LEVEL

Formerly of the Department of Public Works of the City of Mexico, Carlos Tarditi has made that kind of anonymous contribution to the city's welfare that will profoundly affect its future. With architect José López Moctezuma he is the author of an interesting series of studies of farmhouse types, commissioned by Rudolfo Calles, former governor of Sonora.

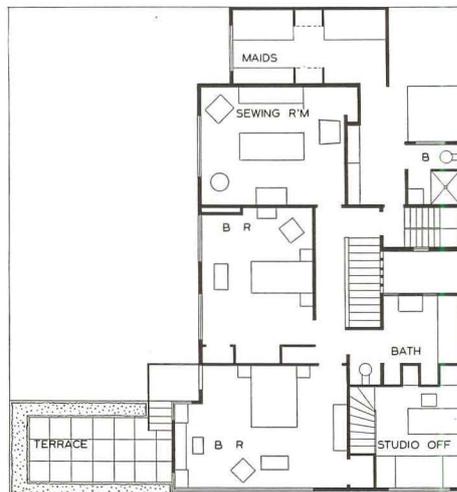
One of the older group of architects with young ideas, Tarditi has been of great help and encouragement to the younger men in the fight for recognition of newer concepts of architecture.

Known mostly for executive and administrative work, he is also an intelligent and sensitive designer. This is the architect's own house, built in 1935. Compact and livable, the house takes excellent advantage of the large garden. Separation of the studio from the living quarters makes it possible to use as an office. Servants' quarters are over the garage.

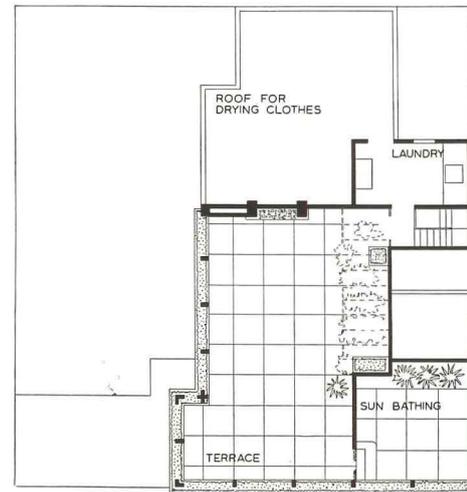
HOUSE OF JOSE VILLAGRAN GARCIA, MEXICO CITY



GROUND FLOOR



SECOND FLOOR



ROOF



LIVING ROOM



GARDEN FACADE

1. Site, 15 meters by 16 meters.
 2. Costs: Land, \$1,580 (U. S. currency); House, \$3,600; Furniture, \$580.
 3. Orientation, southeast; all rooms face on garden to receive maximum sun.
 4. Maximum area for outdoor living on small plot. The garden is 38 per cent of the plot, terrace on bedroom floor equals 10 per cent, and the roof terrace 31 per cent, making 79 per cent of plot area usable for outdoor living.
- RECEPTION: living room with alcove for music and reading, dining room, covered terrace, and garden. SEMI-PRIVATE: library-studio with access directly from vestibule without going through any part of the house. LIVING: two large bedrooms, a sewing room which can serve as a bedroom, bath, breakfast room, terraces and solarium. SERVICES: kitchen and storage room, laundry, with roof to dry clothes, sleeping rooms for servants, bath. ADDITIONS: provision made to enlarge the house by two bedrooms and a bath without altering the house circulation.
- CONSTRUCTION:
Reinforced concrete and brick. Oak floors, tile and cement.

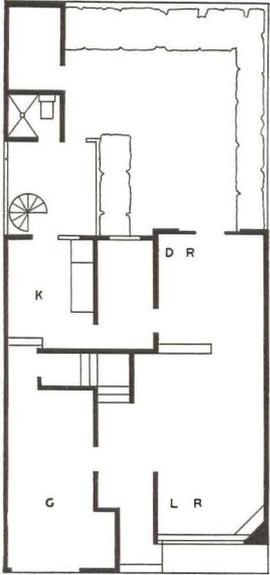
SPECULATION HOUSE, MEXICO CITY



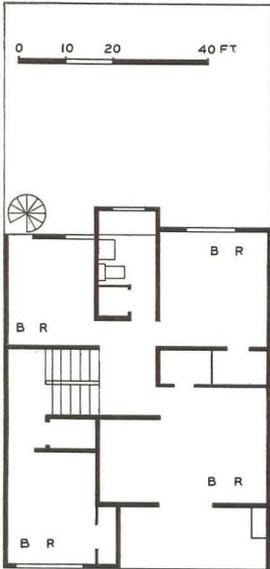
This is a house typical of the activity of many architects in Mexico, where there are no legal or professional restrictions to prevent an architect from being his own contractor or engaging in speculative building.

The house represents, moreover, the better class of speculative dwellings being built in Mexico. Construction is commonly reinforced concrete frame, brick walls, and stucco exterior walls. No method of heating is provided except a fireplace. The kitchens always have a simple built-in charcoal stove, and usually in addition an electric stove (there being no gas in Mexico City). An electric refrigerator is standard equipment in all new houses. A maid's room or possibly two are always provided, and a laundry, usually on the roof, where the clothes are dried in the sun. A small garden and a garage are thought to be essential in this type of house.

LUIS BARRAGAN, ARCHITECT



GROUND FLOOR



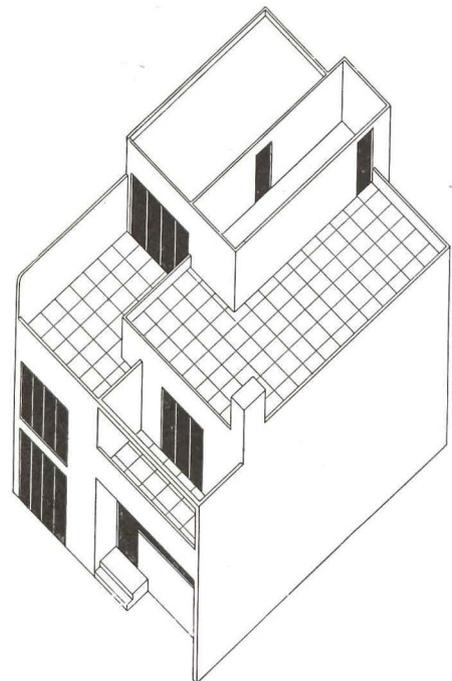
SECOND FLOOR



ROOF



INTERIOR



SKETCH ILLUSTRATING RELATION OF LAUNDRY AND "LIVING" PARTS OF ROOF AREAS

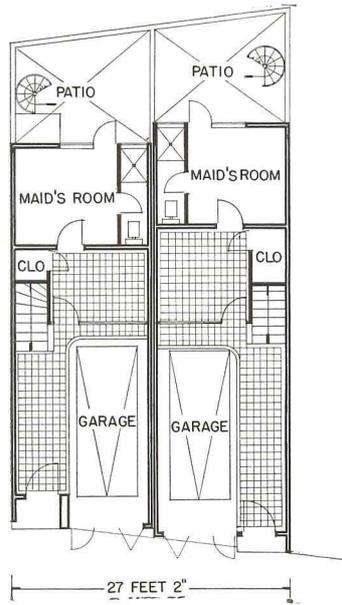
TWO-FAMILY HOUSE IN MEXICO CITY



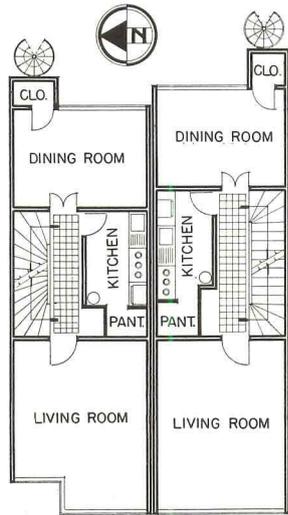
Photographs by Alvarez Bravo

Built upon a very restricted plot, with a view over fashionable Parque Hippodromo, these speculative houses are indicative of the high-class work being done in this field in Mexico. In the vanguard of taste, these houses also represent the trend of interest in simplified living, characteristic of modern life in every city of the world today.

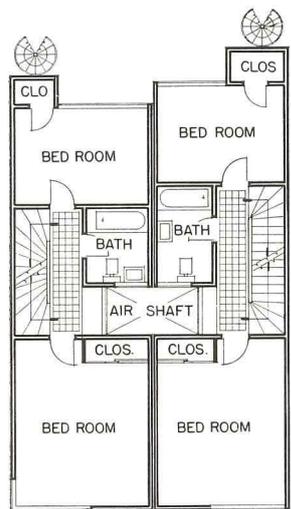
LUIS BARRAGAN, ARCHITECT



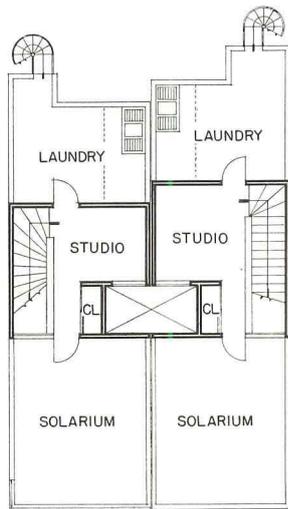
GROUND FLOOR



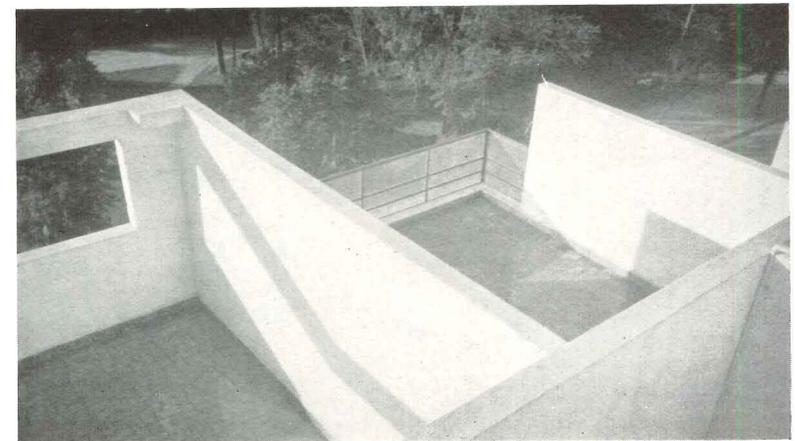
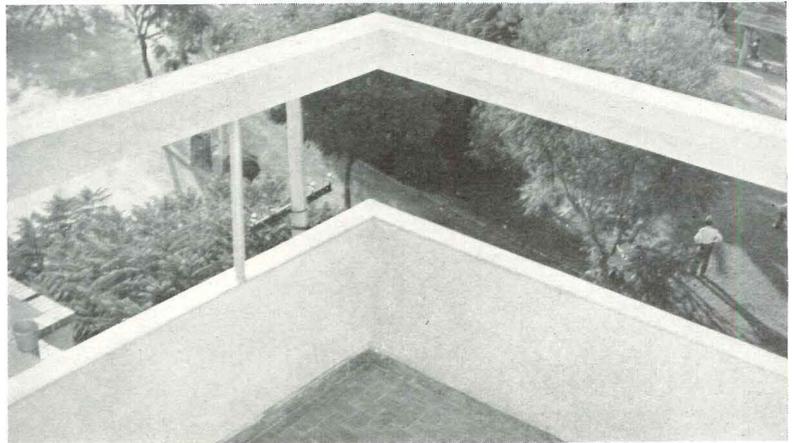
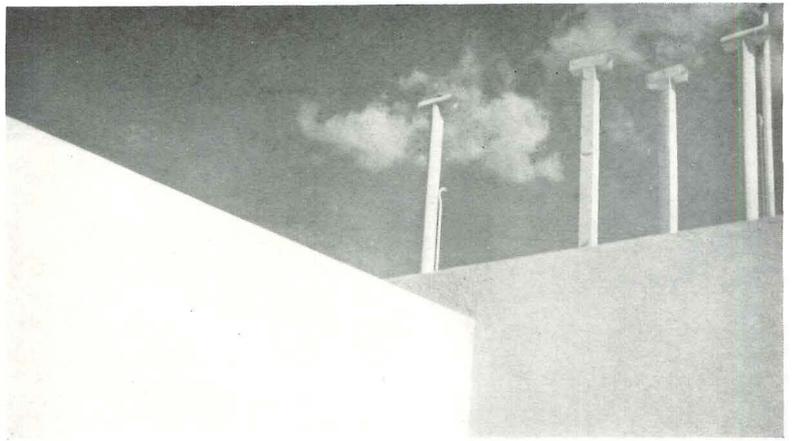
FIRST FLOOR



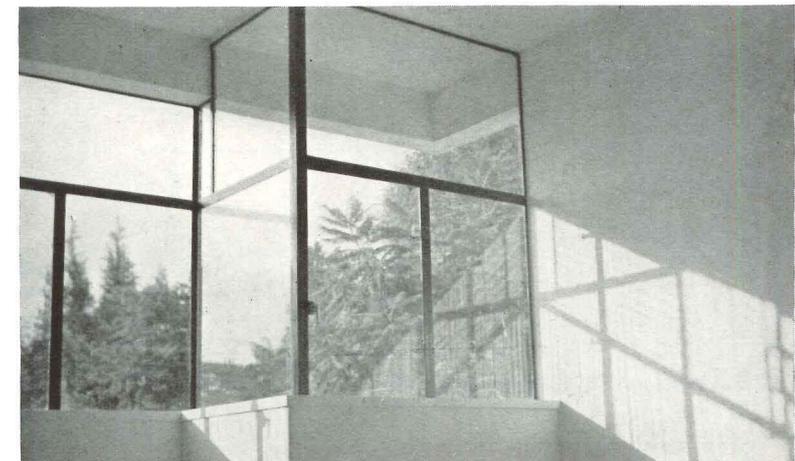
SECOND FLOOR



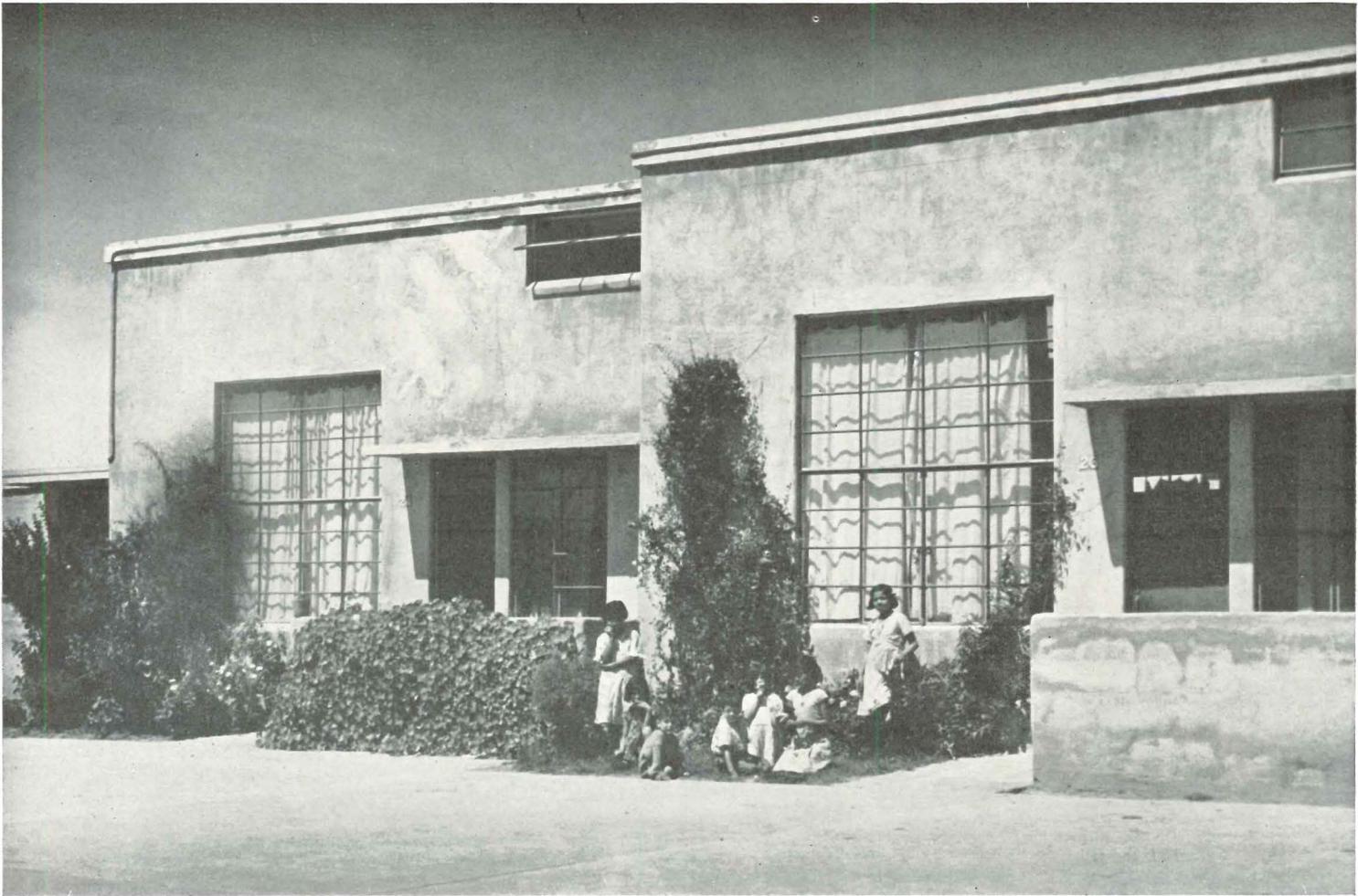
ROOF



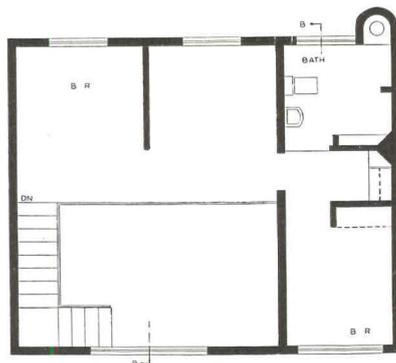
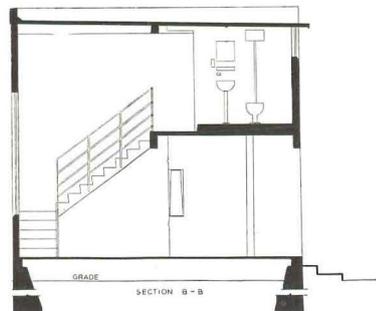
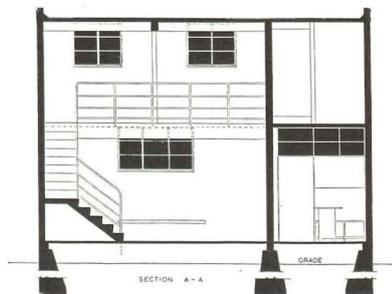
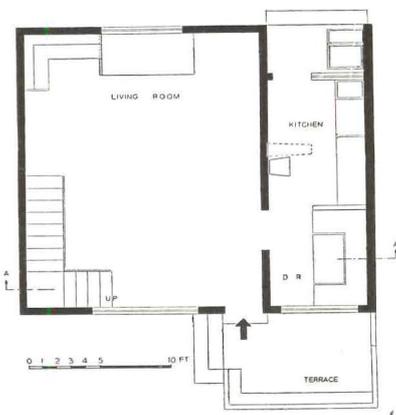
PERSPECTIVE



WORKERS' HOUSES, MEXICO CITY



TYPE 2 SET AT ANGLE



These plans and sections illustrate first and second floors of a housing development for workers. The living rooms of TYPE 2 extend through two stories at one end. Bedroom alcoves are on a balcony. Separating partitions are reduced to a minimum.

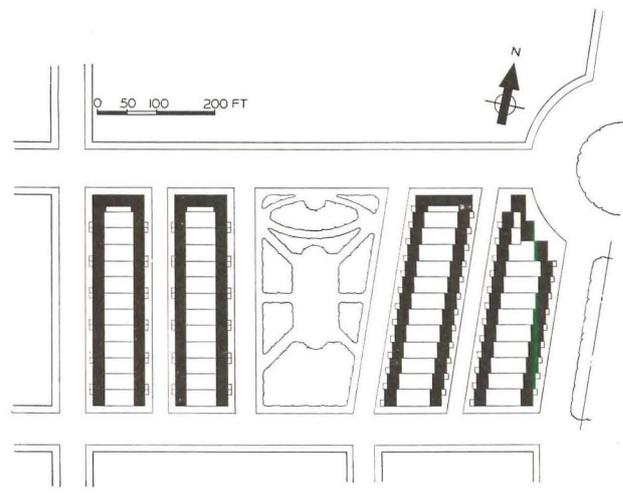
Interested in the solution of a type of homes for workers, a young architect, Juan Legarreta, built a house according to his theories in Calle Elorduy No. 8, Colonia de Peralvillo, Mexico, D. F., and presented it as the thesis for his degree in architecture (1930).

Later on (1932) the City of Mexico (Departamento Central) held a competition for the best solution of the problem of workers' houses. Juan Legarreta won first prize and was put in charge of the design of the first 120 houses built at Balbuena. In 1934 he projected two other colonies that the city planned to build, at San Jacinto and La Vaquita. He was not destined to complete these projects himself (Legarreta was run over and killed by an automobile in April 1934), although they were built after his plans.

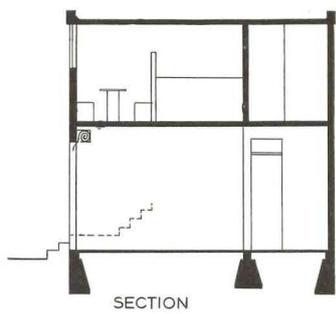
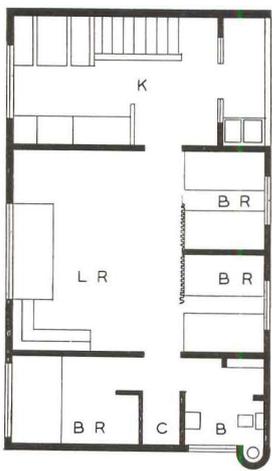
TYPE 2



TYPE 3



PLOT PLAN OF BALBUENA DEVELOPMENT

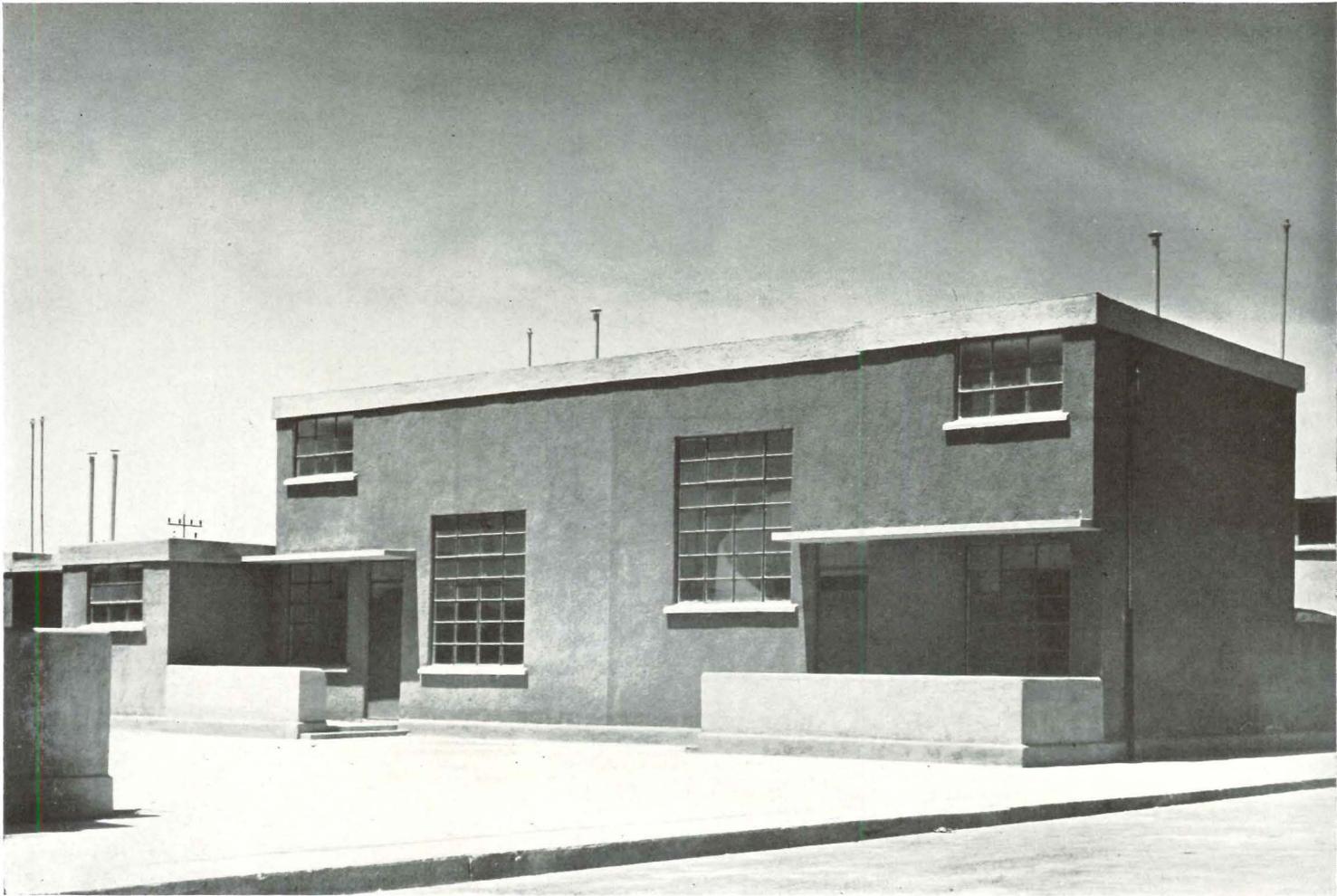


TYPE 3

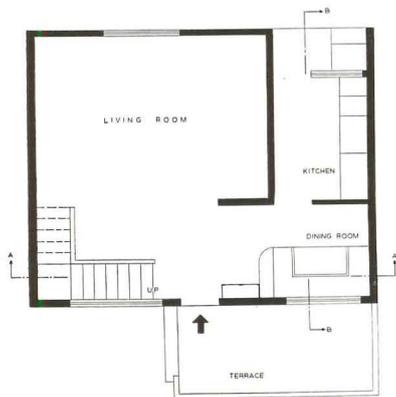
One unit of this plan shows the possibility of a store on the ground floor. Other unit shows the grouping of bedrooms, bath and kitchen around living room space on the second floor.

Built by the City of Mexico with Federal funds, these three workers' colonies serve as an excellent example of the kind of social thinking that government agencies have been trying to do in Mexico.

WORKERS' HOUSES, MEXICO CITY

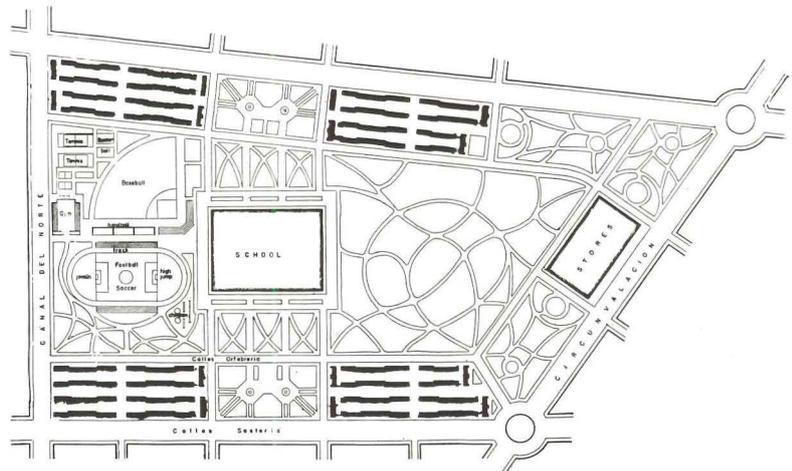


TYPE 2 (left) TYPE 4 (right)



TYPE 4

Plans for workers' houses (detached or row) showing a desirable emphasis on living room space, which extends through two stories. The kitchen constitutes a separating unit between houses in row developments.



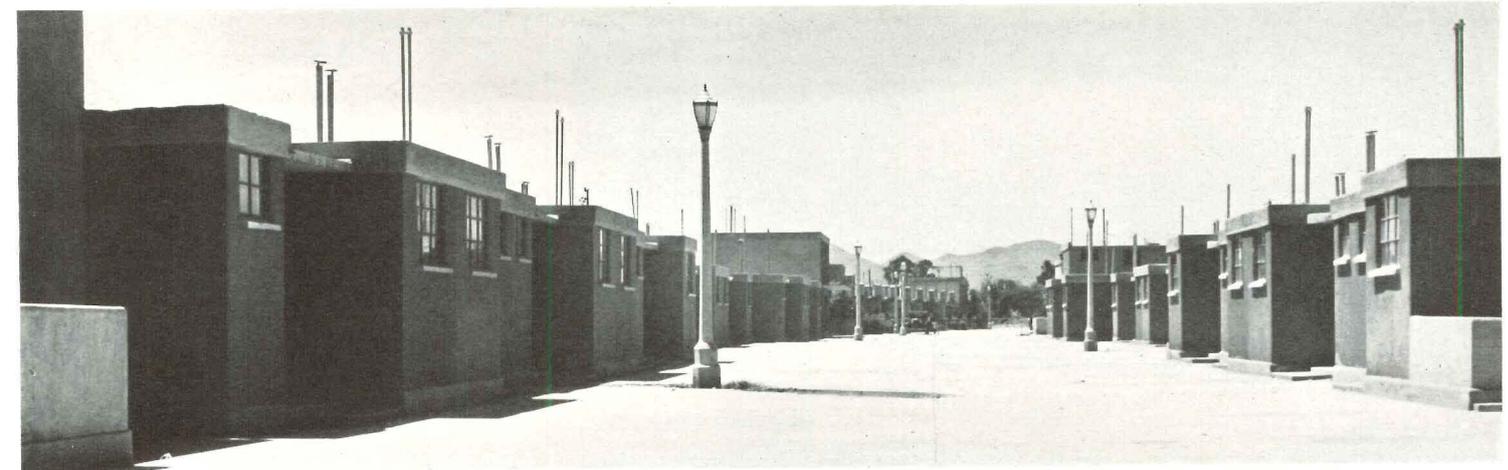
PLOT PLAN OF LA VAQUITA DEVELOPMENT

The houses are of both one- and two-story types. Rooms are cut down to a minimum, alcoves being used instead, and a conscious effort has been made to arrive at a feeling of space and light. The workers who live here are skilled artisans.

JUAN LEGARRETA, ARCHITECT



FRONT TYPE 2 IN ROWS AT ANGLES



REAR TYPE Z



PLOT PLAN OF SAN JACINTO DEVELOPMENT



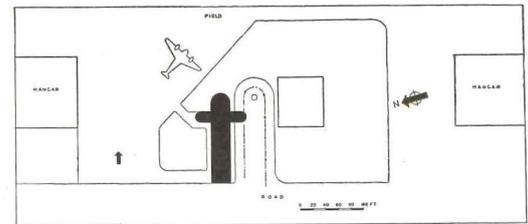
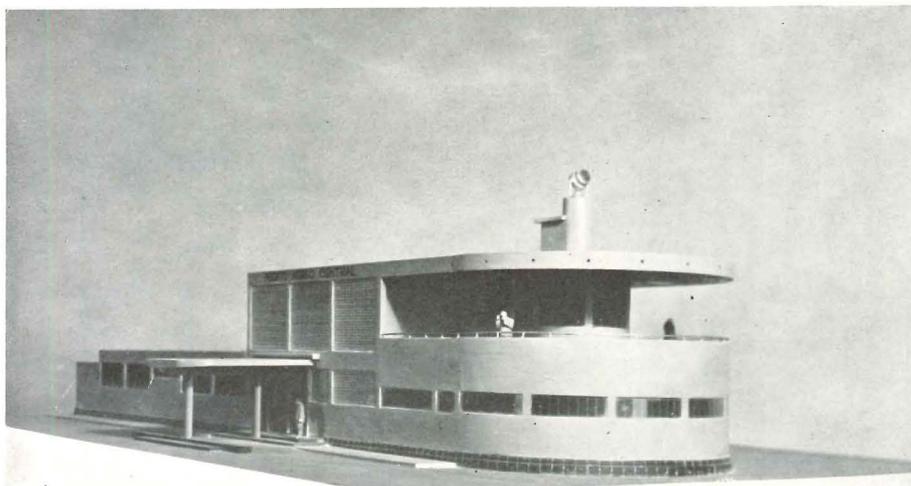
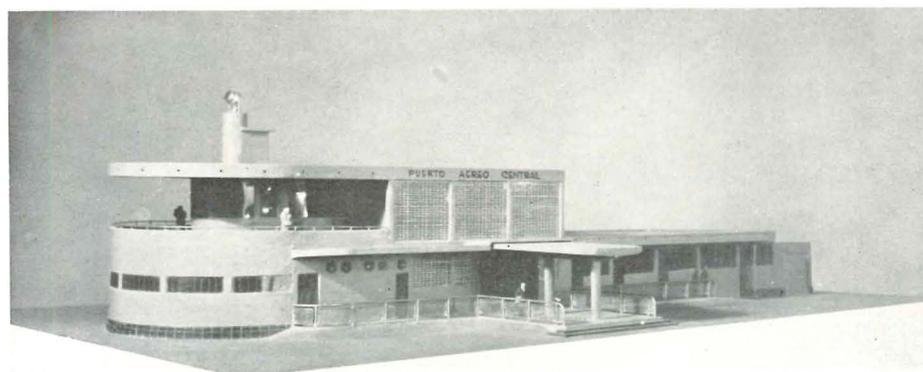
Floor plan and section for typical detached houses for workers intended for location on a planned subdivision.

TYPE Z

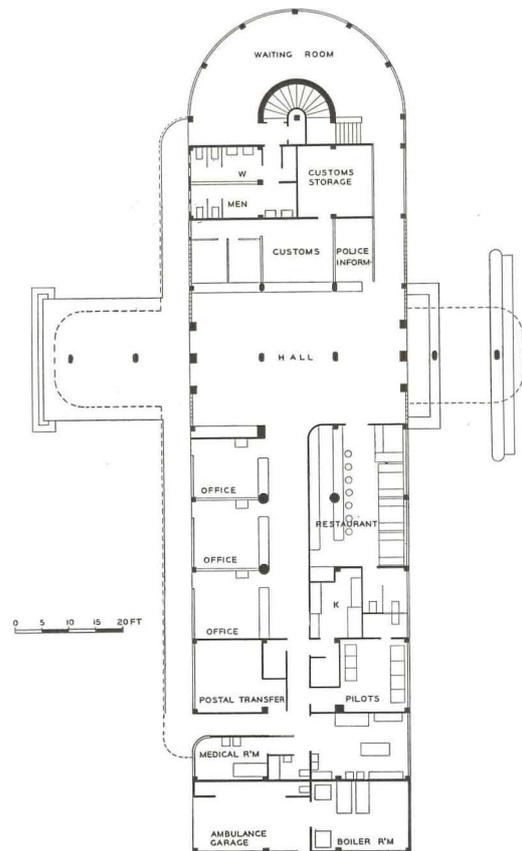
Features common to the three colonies are parks and playgrounds, day nurseries for children of working mothers and schools for older children.

Construction, concrete slab and brick fill walls, steel sash, concrete floors.

AIRPORT TERMINAL, MEXICO CITY, FERNANDO B. PUGA, ARCHITECT



PLOT PLAN



PLAN OF GROUND LEVEL

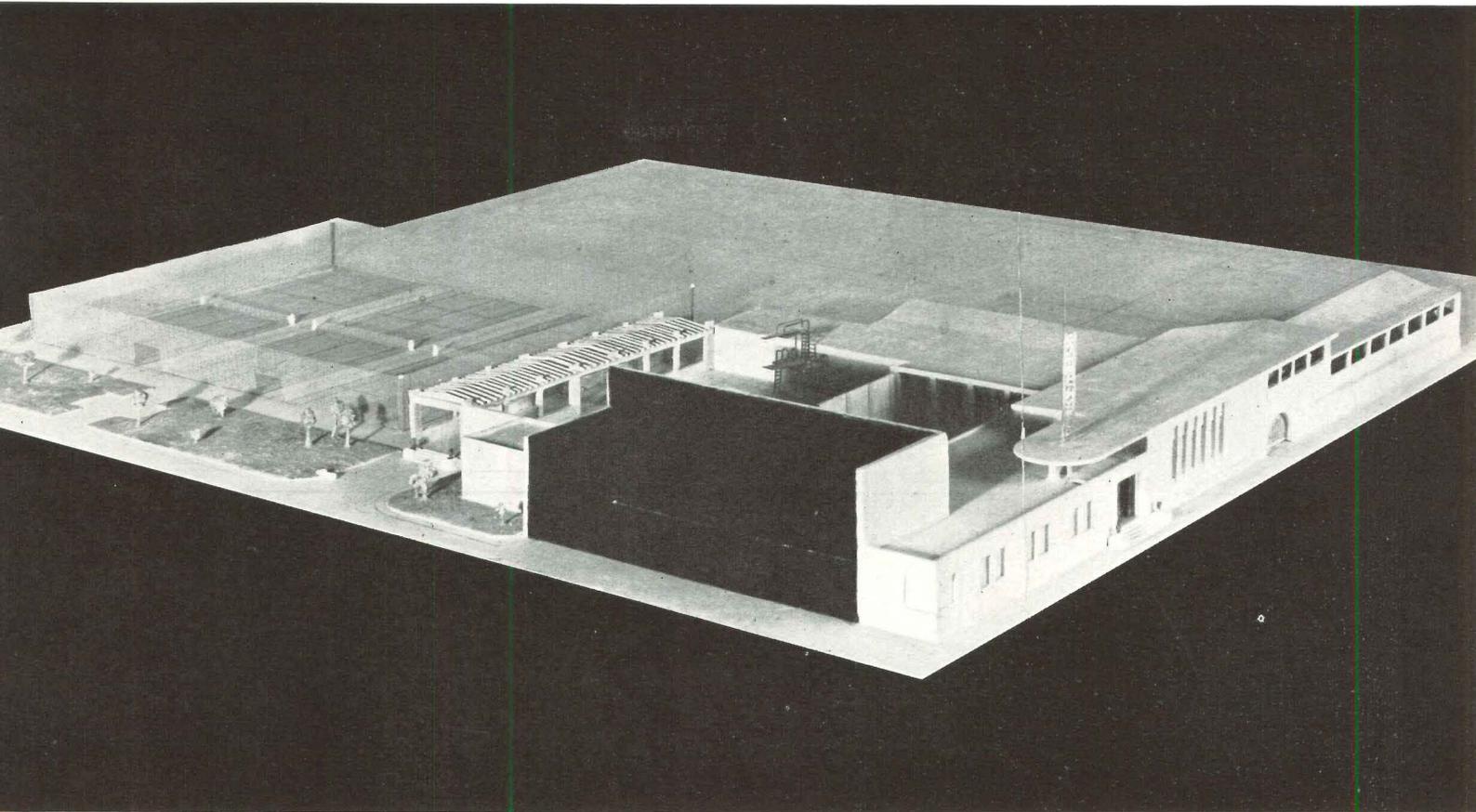
The problem of the airport was presented by Puga as the thesis and examination for the degree of architecture, in December 1935, at the University of Mexico.

The Secretariat of Comunicaciones and Obras Publicas (Department of Buildings) had Puga carry the studies forward, and a model was made of the project. Work started on the building in 1936.

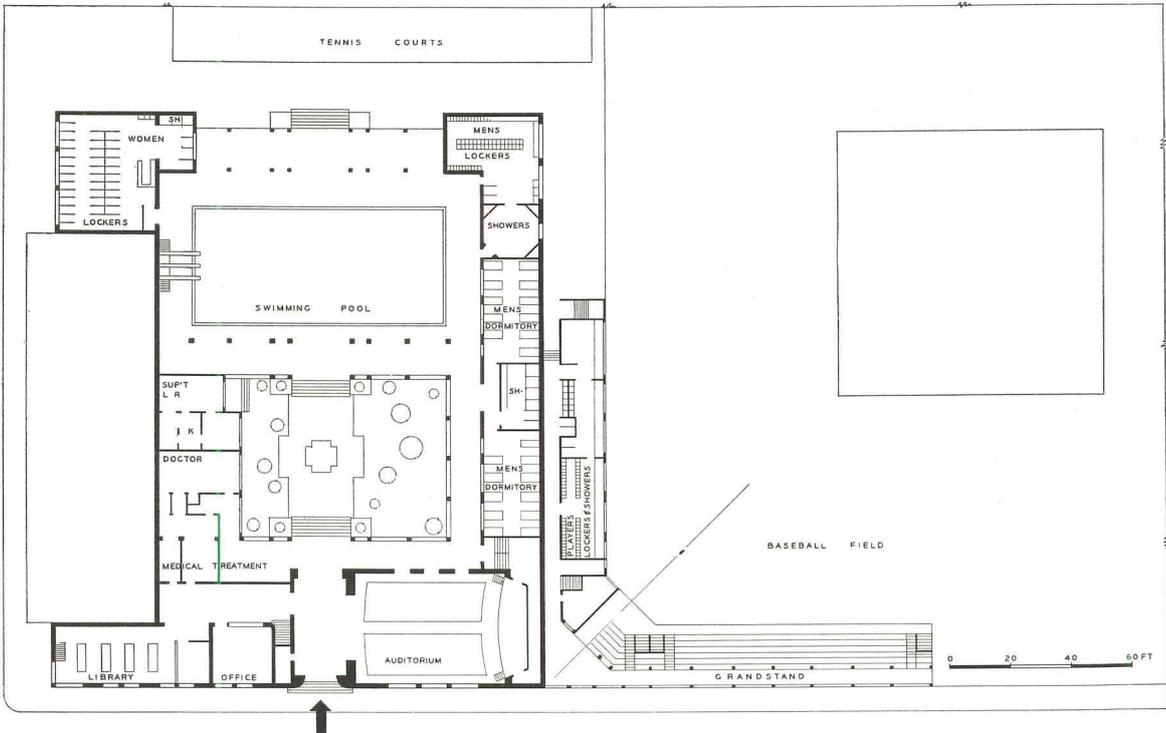
The building will serve the International air lines as well as the local lines in the Republic. It contains a customs house, migration office, post office, emergency hospital, and restaurant. On the upper floor is a terrace from which the planes can be seen as they come on.

Construction is of reinforced concrete, glass blocks used for part of the walls, steel sash elsewhere. Provision is made for enlarging the building; the present investment is 150,000 pesos.

MUNICIPAL CLUBHOUSE, HERMOSILLO, SONORA

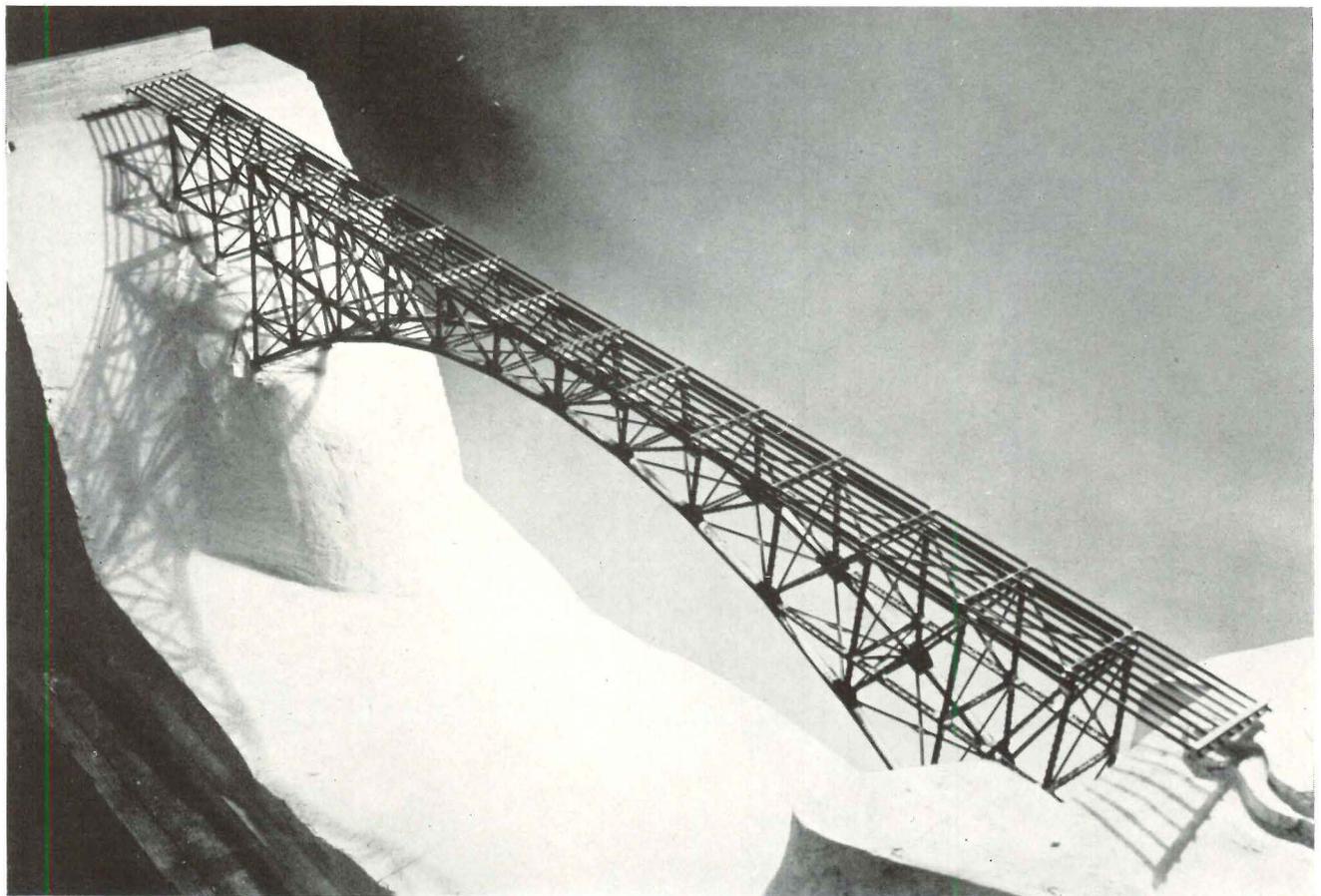


CARLOS TARDITI AND JOSE LOPEZ MOCTEZUMA, ARCHITECTS



Municipal clubhouse at Hermosillo, Sonora, built by the Federal government and maintained by the city to house convention delegates from other constituencies in the Republic. Built under Rudolfo Calles (son of former president) when governor of Sonora. Construction, reinforced concrete frame, brick walls, metal sash. Completed 1933-34.

HIGHWAY BRIDGE PAN-AMERICAN HIGHWAY—NUEVO LAREDO TO MEXICO CITY



SCALE MODELS USED IN STUDY OF ABUTMENTS

DESIGN-CORRELATION

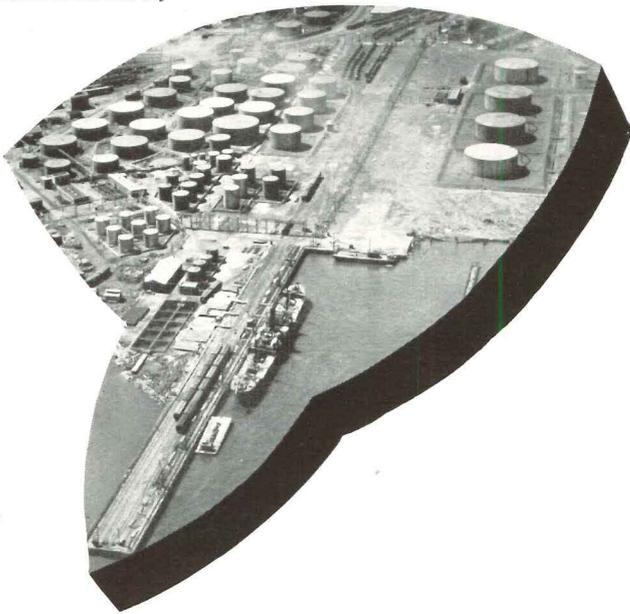
by **FREDERICK J. KIESLER**

*A*nimals
&
Architecture

"It may well be that the more expansive and positive frame of creation which the *free* use of curves (in plan, in elevation and in section) provides will better suit the English temperament than the mere restraint of doctrinaire functionalism uncontrolled by a real sense of purity of form and an *instinct* for perfection of proportions."

(From catalog, "Modern Architecture in England," publ. by the Museum of Modern Art, New York, written by Henry-Russell Hitchcock, Jr.)

Fairchild Aerial Survey



THESE are tanks of steel for oil.
(Standard Oil Company, New Jersey.)

HIS conclusion that the free use of curves in plan, elevation and "in section" is better fitted to **ENGLISH TEMPERAMENT** is at present not of interest to me, much more: whether "the free use of curves" will better suit the animals—english or otherwise—for instance: **THE ELEPHANT.**

Here we see the new tanks for the elephants in Whipsnade Zoo near London. The explanation for this circular form is found near the photograph of it at the Museum of Modern Art in New York.

It reads:

"Because it was discovered that elephants prefer to walk round and round, the architects housed them in four circular **CAGES** instead of the four cubicles." What a self-imposed fallacy!

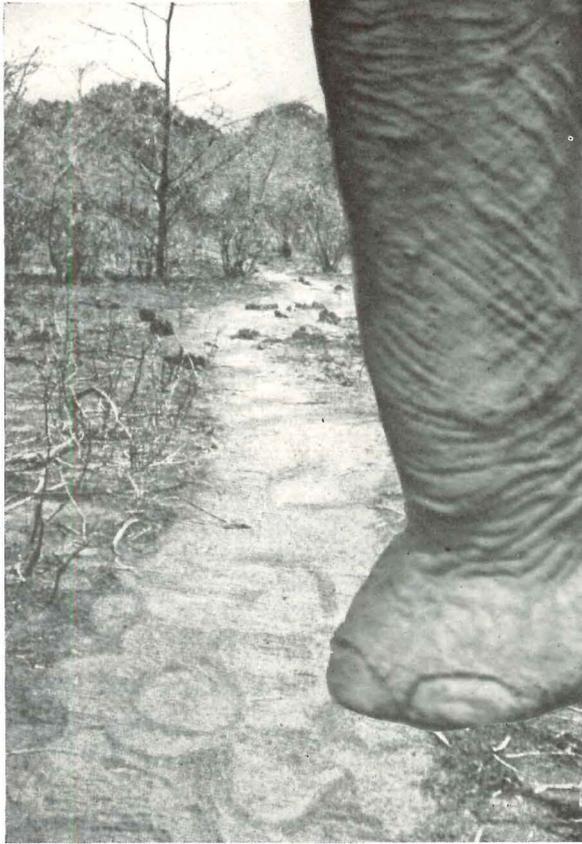
Try to detect elephants walking "round and round" in their natural surroundings. It is evident elephants "are uncontrolled by a real sense of purity of form (meaning circular) and an instinct for perfection of proportions." Otherwise they would conform in advance to the eventuality of being captured and placed within a designer's oval, circle, square or whatever modern or antique **FORMALITY** he might condescend to invent for them.



Courtesy Museum of Modern Art

AND THESE
are circular forms of concrete for elephants.
(New Zoo Building, by Tecton, London.)

This captured pachyderm placed in an incaged area of approximately 50 feet is **FORCED** to go round and round, because it is the only way of escaping injury. It is not his natural path, and the circular cubicle is as false a solution as the museographical assumption that a cubicle **must be square.** [Cubicle: (L. cubiculum, fr. cubare, to lie down) a sleeping space, especially one partitioned off from a large dormitory. Webster's Dictionary.] It is a perfect example of imperfect approach, execution and defense of an inadequate Zoo-design. The real reason for this circular or other curvilinear form-play is to be found in the above-mentioned quotation: I repeat: "The *free* use of curves" rather than "the restraint of doc-



Foot marks of elephant path in Tanaland.

(Courtesy of Captain A. T. A. Ritchie.)

AND

The sole of an elephant's foot showing cartilaginous growth.



trinaire functionalism." Still, the museographical explanation, "going round and round," as functional cause for the circular cubicle, is contradictory to "free use of curves." Evident: Both are obsolete architectural principles: Functionalism as interpreted by the "International Style," propagated by Russell Hitchcock and Philip Johnson* of New York, and the tempered English curvilinear style. Neither Mies van der Rohe's nor van Doesburg's cubic buildings nor the whitewash color of Le Corbusier's stucco walls were designed for stellar style-stimulation.

"In the London area various types of stucco and cement rendering have proved terrifyingly receptive to the grime of the metropolitan air. . . . But after a year or two the effect is extremely disagreeable and a very bad advertisement for modern architecture." Le Corbusier points out in his new book ". . . that the medieval cathedrals were once white. It is perhaps as well for us to remind ourselves that modern architecture can not always remain BRAND NEW." (Hitchcock, same catalog)

[It would be more advisable to remind ourselves that contemporary architecture—english or otherwise—is never "brand new," since it is in continuous progress; and "new brands" in architecture are old ("sales, vieilles . . .") long before they are "branded" new. Kiesler.]

As to building-materials: The wood block as flooring for animal cages is today generally replaced by concrete. The reason: Odors do not penetrate as easily as into wood, and deodorization and cleaning are easier. It would never occur to any Zoo Commissioner to have concrete flooring in the open air, too. There a soft surface is generally adopted.

"The monkey house is said to be absolutely odorless. The sides, top and bottom of all the cages are built of non-absorbent lignolith, a fireproof material akin to asphalt, but warm to the touch, like wood. The temperature can be controlled automatically, and the heat can be kept at any desired grade, no matter whether the windows are opened or closed." (Shepstone)

1st: Experience shows that the ideal surface for hooved stock in New York City zoos is compressed cinders covered with 6" to 8" of coarse sand.

2d: The quick drainage of this surface prevents objectionable odors.

3d: During continuous wet weather it prevents a sloppy and muddy condition, as water runs off rapidly.

4th: The coarse sand tends to sharpen and clean the animals' hoofs.

5th: The sand aids the animals in keeping clean and, when they roll in it, it removes all loose hair and fur, etc.

6th: In the exercising yards of the hippopotamus and elephants, which have large flat feet, a well-rolled mixture of cinders and clay has proven satisfactory. In order to prevent dust during the hot summer season, these areas are dampened regularly with a hose.

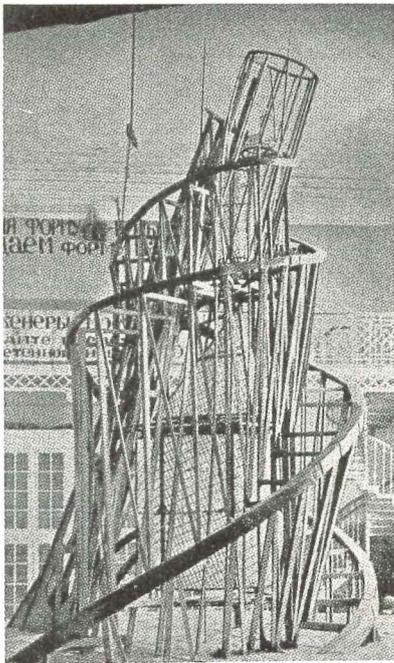
7th: The interior pens and cages for all animals have ground concrete floors. The feet of the jungle-bred animals when placed on these floors for the first time have a tendency to become sore. However, I am happy to say that this condition disappears in the course of several weeks as nature builds up a tougher surface on their pads. (Quotes: Letter of February 25, 1937, from the offices of Park Commissioner Moses, New York City.)

With special reference to the elephant's foot: the sole of an elephant's foot measures twenty inches across, and consists of a tough, elastic gristle or cartilaginous growth. The surface-contact of the foot and the concrete floor is detrimental to the animal, as it logically must be. The elephant's foot, especially the forefoot, carrying the heavy weight of the body when advancing, is used as a mortar to crush obstructions like underbrush or other semi-soft growth of the jungle. It is evident that flooring for such foot-structure must be, in principle, similar to the one in nature without imitating it: Variable in its elasticity-coefficients and differentiations of textures. Inactivity of the elephant in his artificial habitat has brought about the following procedures:

"The elephant at large in the jungle, or doing his day's work in India, gets sufficient exercise to wear the soles of his feet down to the thickness of an inch. But in zoological gardens exercise to this extent is not convenient, with the result that the soles grow thicker and thicker until they crack and pick up all sorts of foreign matter that may work to the quick. A surgeon removed the following articles from the feet of a zoo elephant: one of a set of dice, the bowl of an iron tea-spoon, the handle of a penknife, and an iron nail. The animal had gathered up these things in six months. (Shepstone)

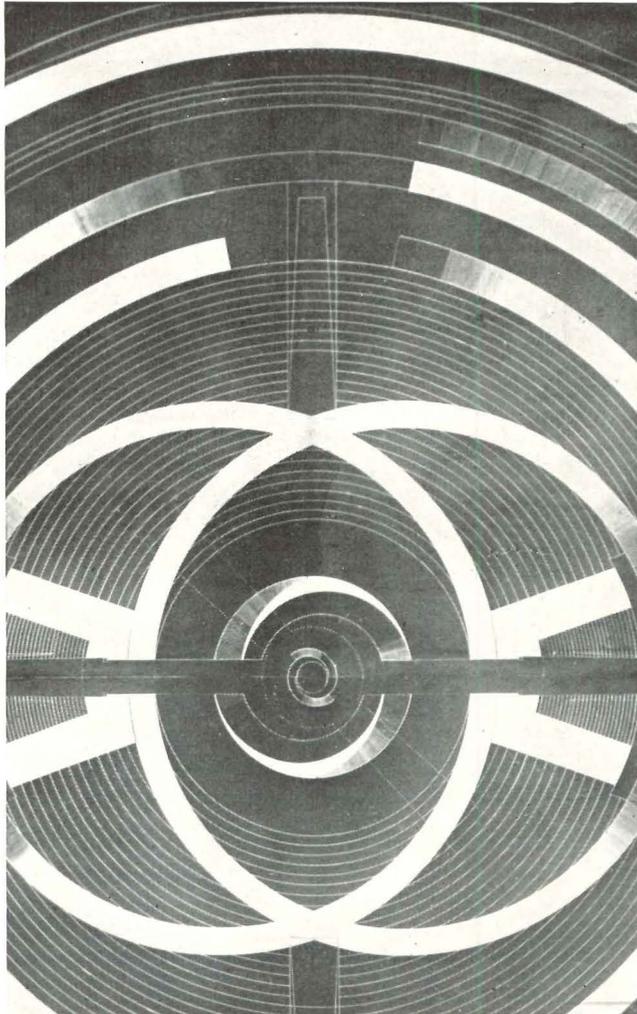
It is stated in the Museum catalog that continental post-war architecture has only reached London during the last five years. No matter how the new zoo cages are: cubic, curvilinear, whitewashed, brick-red, cemented, stone—it is evident that the new designs of the London Zoo, exhibited

*Quit in 1935 post as Curator of Architecture at the Museum of Modern Art to join forces with the late Senator Huey P. Long.



1920

REGARDING THE USE OF CURVES:
 This is the Tatlin Tower, Moscow, 1920.
 (Exhibited in Europe for the first time in Paris, 1925.)



1924

Section of the "Endless" theater with crossing ramps of center Space-stage. Kiesler, 1924, Vienna.
 (Reproduced "Sturm," July 1925, Berlin; The Architectural Record, 1930, New York.)

Wide World

at the Museum of Modern Art in New York, are a direct adaptation of human housing patterns to animal shelter. Failure in the past to conceive appropriate sheltering for the captured animals on exhibition is due to the short history of the existence of zoos (a little over 100 years); but today, due to the progress of natural sciences and the work done by zoological societies, design of wild animal shelter must be based on other correlatives than that of human housing. Project it in reverse and accept the thought of housing humans in animal abodes of today. I quote again: "It was the *unique monument*, The Penguin Pond . . . which first dramatically attracted the attention of the world and to developments in England."

According to this statement England's adaptation of continental "modern" architecture started with a penguin pool. I wonder if England's architects will agree with this. But the author takes back his statement, he hesitates: "It could be objected that the penguin pool was not in the fullest sense architecture, but rather a large object or a permanent stage setting." Which it is exactly (see Tatlin Tower, Space-Stage. Meyerhold-Theater . . .). As can be seen from the illustrations, I am somewhat afraid the monument is not so unique as we all would have liked to see it. Contrary to the previously quoted catalog-writings, the Director of the Museum, Alfred H. Barr Jr., was objective in his criticism: "Some of Gabo's constructions have in fact been projects for semi-architectural monuments, but it is his pupil Lubetkin and not himself who has had the privilege of designing the Constructivist Penguin Pond for the London Zoo." [From "Cubism and Abstract Art," published by the Museum of Modern Art, New York City, November 1936.] The architects and the Zoological Societies are within their best aims in doing whatever they have done and one can not fail to appreciate them, but over-statements like the above in an official catalog are too challenging to any student of contemporary design. The historical facts are too obviously known not to be presented to offset such misinformation.

It is stated in the catalog that continental post-war architecture has only reached London during the last five years. Fortunately the penguin pool is not the beginning of progressive shelter design in England. Even if one agrees with Miss Bauer in the same catalog: "But there has been almost no positive expression of new architectural form (in England), however tentative or experimental, within the housing movement." But: It is very much to the credit of England to have driven on many roads to the center of architecture, namely, to correlative planning, rather than concentration on unique form. These specialized problems it has left to sculptors, painters and draftsmen of the Morris-spirit. England has been interested in *service-design* rather than *design-service*. We can only learn from that.

Zoos are obsolete, Obsolete like menageries as permanent educational institutions.

Zoo exhibition practices are not compatible with modern principles of physical and mental hygiene.

Zoos are obsolete unless the pure entertainment value is left to wandering circuses, and a system evolved whereby the exhibition of animals is integrated with a social, educative, scientific and recreational meaning and the animals find themselves in surroundings salutary to their mental and physical conditions. The amusement value of today's zoos is in no way commensurate with the

PURCHASE—CONSTRUCTION AND MAINTENANCE COSTS. They are a superfluous burden to the taxpayer. They are a "monument de luxe" ornament of a sentimental civiliza-

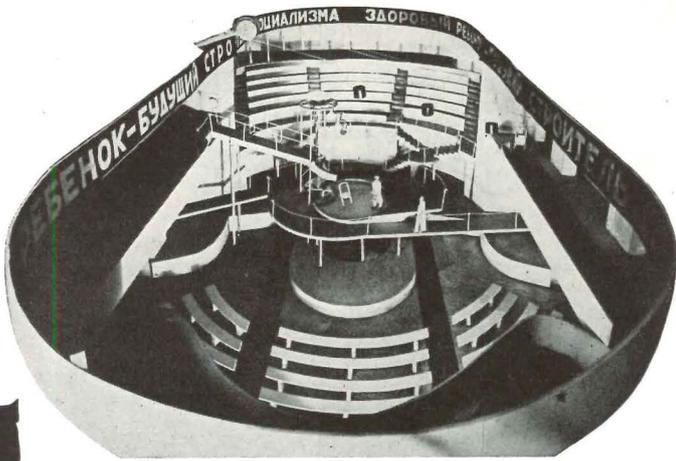
tion. Concrete and glass is but a new habitat for this old sentimentality. Meanwhile, masses of mammals remain

Under-nourished
Under-housed
Un-developed.

IN ALL SERIOUSNESS: Our present Zoos are as superfluous for the human being as for the animal. We teach children not to annoy animals—even not in play; while grown-ups invent special machinery for capture ("Bring 'Em Back Alive"), transportation, salesmanship and iron-bar byplay.

"While there is no desire on the part of those in charge to inflict cruelty, nevertheless this short-sighted policy is leaving thousands of wild animals condemned to the most atrocious suffering." (From a letter of the American Society for the Prevention of Cruelty to Animals, March 5, 1937.)

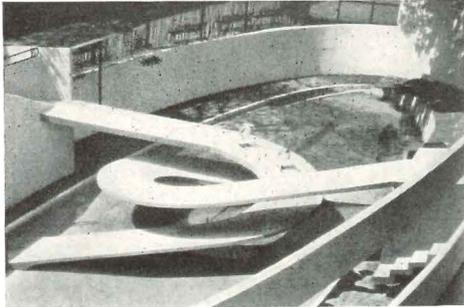
The most abhorred crime can be psychologically explained. So can the practice of menageries and zoos be reasoned. But to sustain false reasonings and to build new edifices to house them, seems beyond the realm of psychology.



Courtesy Russian Institute

1928

Project for a theater by Meyerhold and Lissitsky, Moscow, 1928.



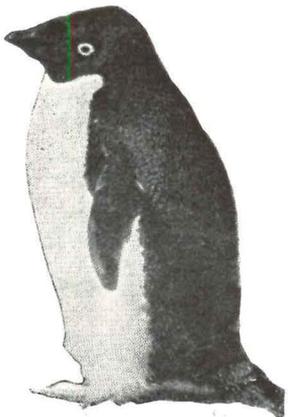
Museum of Modern Art

1933

Penguin pool designed by Tecton, London, 1933.
(Concrete construction by Ove Arup.)

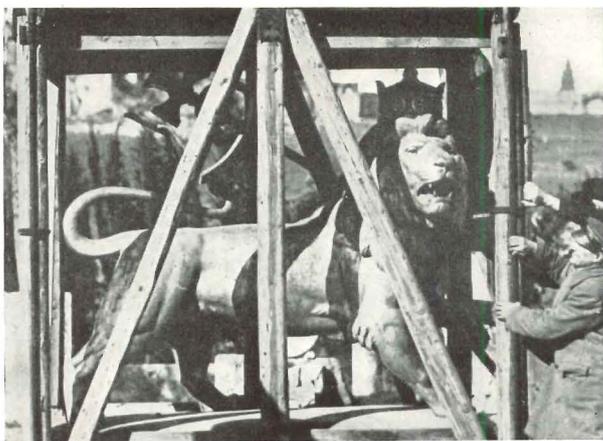
1937

STILL
COMPETITORS
IN
SUB-STANDARD
SHELTER



The obsolescence of conventional zoo layouts is not as new to the zoologist as it may be to the architect and his public. "The zoo without bars expresses the zoo idea at its best, and reaches its highest form in national reservations and bird sanctuaries." The terrace system of exhibiting animals is progressive. (First zoo to try the open terrace system was Stellingen, near Hamburg, Germany.) Cages, bars and individual cubicles are omitted and replaced by large areas on which the animals are more liberated. These areas are divided from the public by an artificially created moat or elevation. The animals' grounds are either built up in terrace-formation, for better visibility, or they are sunk deep into the ground, creating a ravine for safety. **Acclimatization in new surroundings rather than keeping the exhibits in close confinement and stuffy atmosphere is another way of approach.** Such acclimatization can, of course, only be tried on animals which are eligible for climatical zoning. Otherwise, artificial climates must be created and such air conditioning can only be economical in small areas, which naturally leads back to cage-cubicles. This, however, creates contradiction to the large, open-space-areas which are inherent in the conception of zoological-parks and reservations.

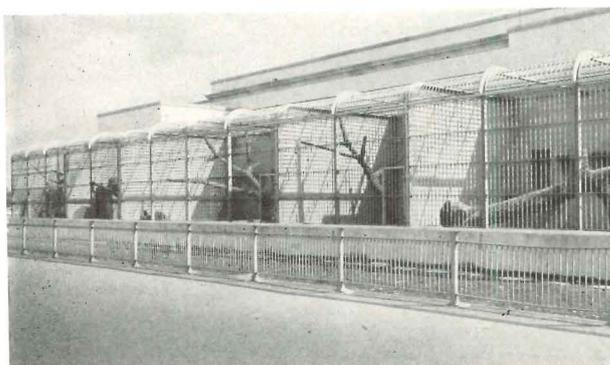
The Art Museum-idea applied to zoos, namely: to house all species of all climates under one roof, is more harmful to livestock than it is to Art-stock. Proper appreciation in both cases is made impossible due to the absence of surroundings in which or for which they were created. Every zoo desires to have everything. Limitation of space, financing, adequate housing-material, etc., are pushed aside. Pride of possession and exhibitionism is only gradually being overcome. The proper place of housing all species and origins of animals, plants and geologic formation under one roof is the Museum of Natural History, not the Zoo. Such a museum is the place for the study of structure of animals, plants, and geologic formations in their morphological and physiological development. This is the morgue the human being has built for nature. Livestock exhibits should be split up into reservations. If countries are unable to provide natural surroundings suited for acclimatization of an animal, that species must be dropped from the exhibition. Artificially created surroundings for animals is a difficult and most expensive task. "The whole of the artificial sunlight and the heating apparatus has been specially worked out to the reptiles' requirements, and all is automatically controlled. It is an electric house throughout and many different types of heating and lighting are used in it. In the main dens alone twenty miles of electric wire are employed." (Shepstone) **Between decorative imitation of nature (diaramic) and cubicle methods of zoo housing, I select the third and fourth methods, namely: the natural reservation field with its replanning, and the ecological abstrac-**



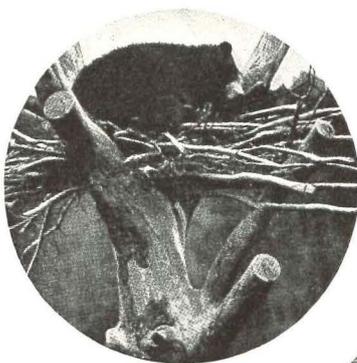
Pictures, Inc.

It starts usually with gifts. Monuments en-caged like this one from Addis Ababa for the *Vie dei Trionfi* in Rome; or animals en-caged in steel or wood; or slaves, male, female, voluntary and involuntary gifts for victors.

And it ends in another cage, more or less hygienic, more or less romantic. (Zoo-housing near Chicago.)

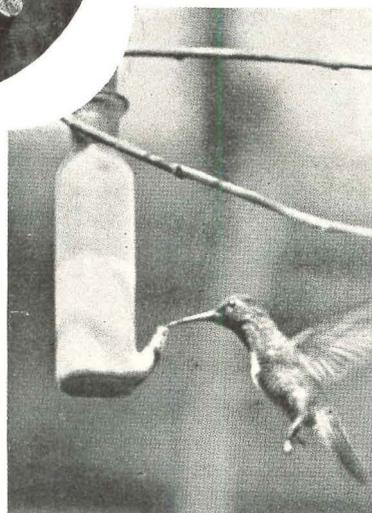


Trowbridge



Some animals refuse to accept it, like this bear who went out, broke branches and built himself a resting place . . .

Some accept the good will, like the humming bird.



tion of it if natural surroundings cannot be provided. The general lack of success in breeding foreign animals is indicative of the failure not only of zoo management but in zoo conception, whereas the reservation idea harbors all possibilities for preserving species and by that the balance through continuity. The basis of the very life of a populace is fertile soil, and no fertile soil exists without a cultivated animal life and vegetation. "It takes about 400 years to lay down ONE inch of new soil on land, which is not disturbed by man." (M. L. Cooke, *The New York Times*, March 1, 1937) Zoo expenses and their public-value must be a priori considered. Air conditioning (as applied in zoos here and there) is only one of the remedies and, unless linked to other industrially created environment-elements of in-and-out-door living, it is but a waste of effort. "No city or municipality has a moral right to undertake the keeping of wild animals in captivity unless it is willing to expend a sufficient amount to insure a condition that, in as far as architectural ingenuity is concerned, will create a natural habitat." (From a letter of the American Society for the Prevention of Cruelty to Animals, New York, March 5, 1937.) The link between reservation and conservation of livestock is of prime importance. Its educational value correlating animal life with soil and the human being is paramount to the welfare of human society. Such planned *Correlation-design* is practical in the very meaning of the word. Its practice demands all of the efforts of science, industry and commerce. Biotechnically planned, such exhibits become logical and therefore natural. They are then polarizations in a system of willfully coordinated currents—like dams that control the flow and overflow of water, with the purpose of mutating inherent destruction by natural forces into irrigation for drought-prevention, propelling energies into serviceable mechanical power.



After the principle of approach to livestock-exhibits has been found and formulated: The question of the *technique* of exhibiting arises.

We may say:

LIQUIDATE FIRST: Isolation of single species.

INSTEAD: Inhabitants of land, water and air of a specific climate should be shown together. [Up to now in most zoos birds of similar climates are separated from the mammals, fishes, flora.]

LIQUIDATE SECOND: Lack of guidance.

INSTEAD: Data on: Soil formation, climate condition, on biology of the species, etc., to be provided by automatically released motion-pictures or other devices of quick optical interpreting facts.

The design and placement of roads, stands, structures . . . will depend on the formation of the ground, visibility of terrain and on the contact-points between public and exhibit during winter and summer conditions.

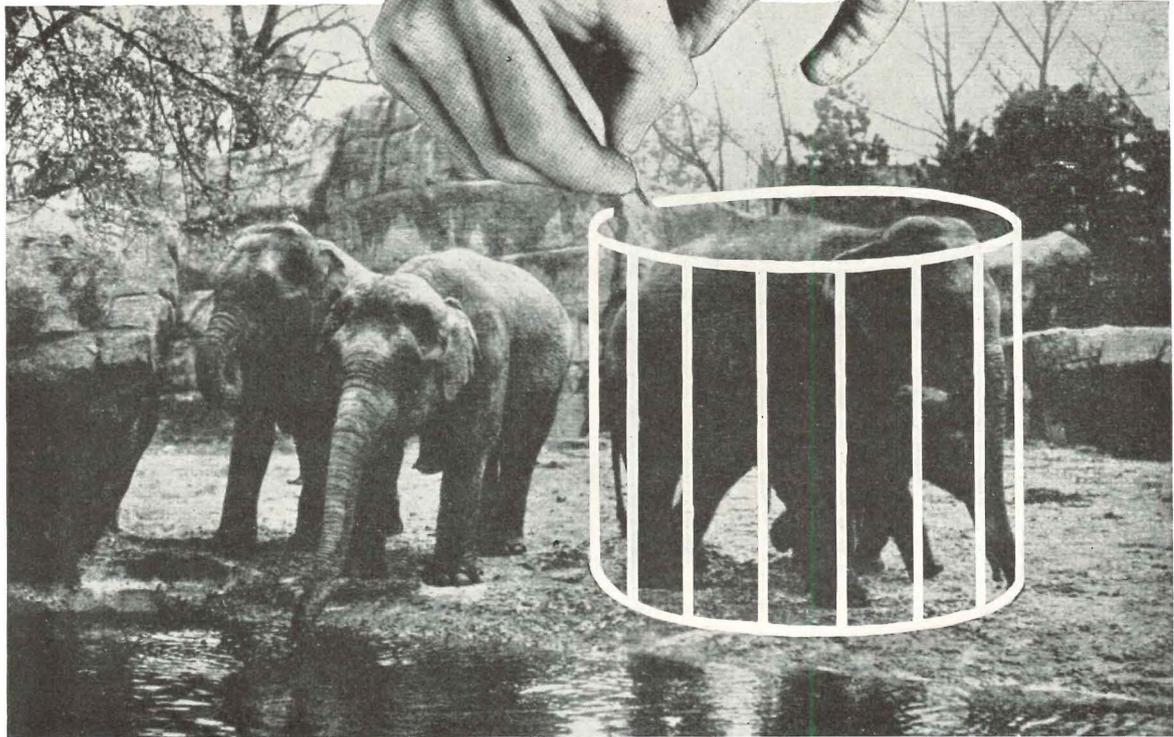
FURTHER: Mobility of the public will play an important part. Wide areas and the "free" life of vegetation and animals demand systems of easy transportation to observation points within and from the reservations.

LIQUIDATE THIRD: Lack of industrial evaluation.

INSTEAD: Demonstration of industrial exploitation of fauna and flora of a definite climate. Control over the corollary between nature and man in its inter-dependence. The service of man to nature and of nature to man to be equalized in a cycle for the survival of both. Industry as a mechanical tool for gearing.

LIQUIDATE FOURTH: The cage-zoo, the monumentalized animal-architecture, curved, square, ornate or without décor.

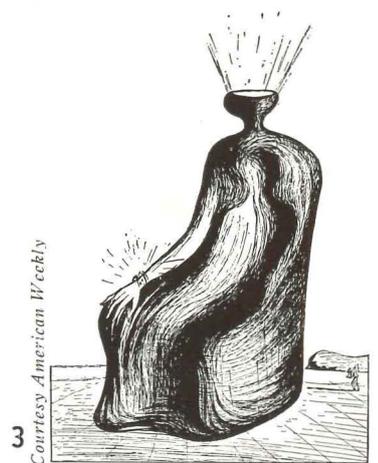
INSTEAD: The cinema tells details of the life of nature better. It is pure entertainment. It is theater. It goes for laughter and shivers. It has drama as art or applied art. The picture-frame is the cage of the show. But it lacks the coordination to our own life. And we are in search of elements and techniques for this phenomenon of continuity.



BUT IT IS UP TO

progressive design-correlation to choose between en-caging or reservation fields, or as an interregnum: the creation of zoological "parks" like this one of Hagenbeck near Hamburg, or those in Whipsnade, Canada, Africa.

NEWS-DOCUMENTS 2



1. Chair by Cora Scovil, New York, 1937. Upholstery replaced by transparent plastic material. 2. "Correct posture chair," National Cash Register Co., New York. 3. Chair designed by Salvador Dalí to fit the curves of the human body. A warm arm of artificial flesh is to keep the occupant from growing lonely. An electric lamp is to throw light on the ceiling. (Description from the "American Weekly.")

THE WAR AGAINST AIR POLLUTION

The swift expansion of industry has brought with it the problem of man-made air contaminants—poisonous dusts, gases and fumes. This atmospheric pollution is costly: bills for cleaning and painting go up; vegetation is destroyed; sunlight is cut off and artificial illumination frequently becomes necessary all day. Most important is the health hazard: according to a study by the Temperature Research Foundation of Kelvinator Corporation, more than 1.2 pounds of various dusts are precipitated in the lungs of the average city resident during a single year. Industrial diseases, like silicosis, have begun to receive front-page attention in recent months.

Air pollution is always present everywhere. No matter how much the air may be cleaned, it will not be entirely free of solids—nor need it be made so. The task is simply to keep the pollution to a concentration that will be hygienically safe or will not be a nuisance (as in the case of soot). But, as H. B. Meller of the Air Hygiene Foundation of America, Inc., pointed out in a paper presented before the American Chemical Society last September, there are many questions still unanswered by the medical profession as to causes of some of the important industrial diseases and as to allowable limits of concentration of certain air pollutants for the human organism.

Meanwhile the chemists and physicists are at work, and new means of controlling air pollution are being developed. For in-

stance, a microscope has been designed with a special dark field illuminating system that permits dust particles in the air to be counted and even measured for classification as to size. From the engineering standpoint, atmospheric control includes minimum exposure to polluted air as well as means for conditioning the air. In building design this involves the installing of exhaust equipment to carry off toxic dusts and gases and to provide adequate ventilation.

But what is the precise meaning of "adequate ventilation"? As shown in a report presented at the recent National Conference on Silicosis in Washington, different types of dusts and gases require different treatment, even though there are certain fundamental engineering principles common to the control of all. What are the minimum air velocities required to "capture" the different dusts? To what extent is air-cleaning practical to permit recirculation of air? The American Standards Association has undertaken to answer these and similar questions, and is now developing a set of separate standard specifications for exhaust hood designs and air velocities for each distinct process or industry in which the occupational disease factor is present. A national committee of toxicologists and pathologists headed by Dr. R. R. Sayers, senior surgeon of the U. S. Public Health Service, is acting in an advisory capacity to set threshold limits beyond which certain dusts and gases become a menace.



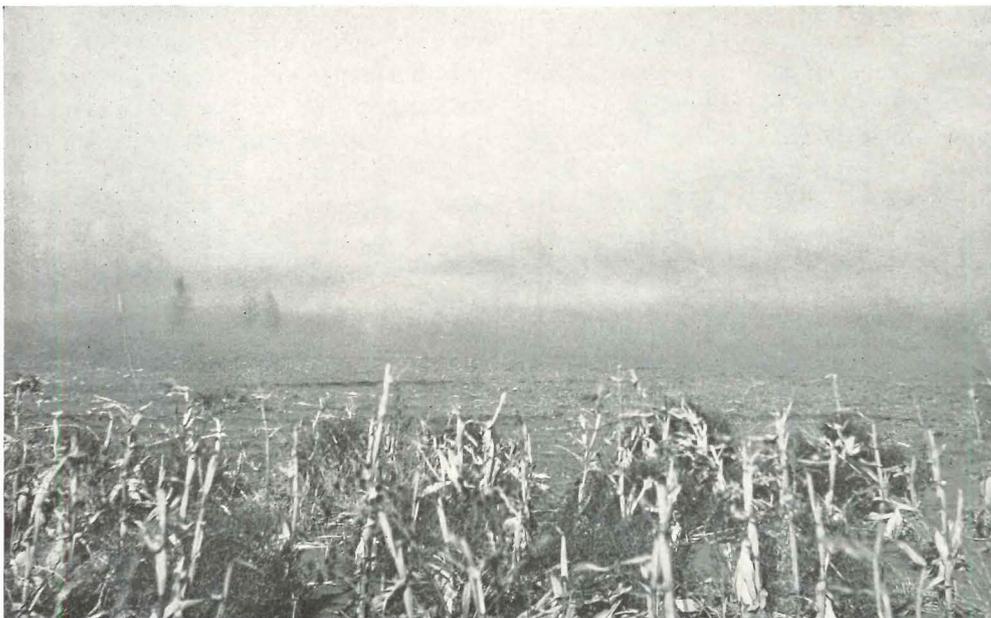
Fairchild Aerial Surveys, Inc.

2



Fairchild Aerial Surveys, Inc.

3



Ewing Galloway

STAUBOSPHERE: dust structure of atmosphere. (1) Smog over Manhattan. (2) Dust storm over Indiana. (3) Dust bowl in Colorado. . . . Dust density varies with height. A dust count in New York showed 2,300,000 to 1,000,000 particles per cubic foot in subways; 118,000 on street level; 72,000 on tenth floor and 23,000 on fifty-eighth floor of the Woolworth Building.

ATMOSPHERIC POLLUTION

Contaminants of air come from numerous sources. Some originate in the soil of barren areas and are carried along in ravaging dust storms. Other wind-borne particles include pollen, viruses and bacteria, bits of leaves and twigs, street and road dust, lint, garbage, bits of rubber from automobile tires and many similar waste products. Then there is the "smoke nuisance"—the products of fuel combustion (smoke, cinders, ashes, gases) which come from millions of industrial and domestic chimneys and locomotive stacks. Automobiles add their exhaust gases to the atmosphere. Likewise, factories are responsible for many small particles and gases that result from industrial operations.

Recognition by many industries of the need for coordinated effort in combating these health hazards led to the formation of the Air Hygiene Foundation of America, Inc., a little more than a year ago. The Foundation, with headquarters in Pittsburgh, is intended to "conduct and stimulate investigation and research on problems in the field of air hygiene and gather and disseminate factual information relating thereto. It will cooperate with and assist other agencies active in this field and will collaborate in the coordination of such investigation and research efforts."

The Foundation is immediately concerned with occupational diseases arising from industrial air contaminants—toxic dusts, gases, vapors, and the like. In the accompanying paragraphs H. B. Meller, managing director, describes work which is currently under way.

INDUSTRY UNDERTAKES AIR HYGIENE RESEARCH

The first part of the Air Hygiene Foundation's program was "inventory-taking"—the collection and evaluation of existing knowledge of air hygiene in order to combat industrial diseases. This part has been recently completed. The second part comprised the drawing up of a plan of scientific research based on the findings of the evaluation surveys. The Foundation is now engaged in completing this plan of research and in mustering the necessary support to execute the whole program.

Legal survey: "A Survey of Statutes and Court Decisions Respecting Occupational Disease from Air Pollution," which was the first study to be published, discloses sharp conflicts among the laws of the various States governing compensation for workmen who may have suffered physical impairment through accident or disease. The study also shows a trend in more and more States to enact occupational disease legislation distinct from workmen's compensation laws. The report describes the statutes of each State as regards court decisions.

This survey was conducted by the law firm of William, Eversman & Morgan, Toledo, under the supervision of the Foundation's Legal Committee of which Attorney A. C. Hirth is chairman.

Preventive engineering survey: This study was directed by Prof. Philip Drinker of the Harvard School of Public Health, chairman of the Foundation's Preventive Engineering Committee. The report emphasizes that dust control is primarily a maintenance job and should be made routine procedure. It states:

"The dust collecting plant consists of four essential parts: the exhaust hoods, the piping, the dust arrestor, and the fan or blower.

"If dust collecting is to be installed in any plant, it usually is well worth while studying each process with the help of experimental hoods and a portable blower. A series of such studies gives the engineer the data he needs for his final design work, and permits him to select with confidence his piping, dust arrestors, and fans.

"Published data for the design of hoods is comparatively meager. In practical work the engineer must rely largely on his own experience and use purely empirical methods. Obviously such lack of data results in needless expenditures of fan power, for the engineer is forced to allow much too large factors of safety.

"On the other hand, information available regarding dust respirators, air supplied masks, sandblast helmets and other protective equipment is fairly complete and commercial competition in its use is keen. In

general, better results are obtained by controlling pollution or dustiness at its source; the use of protective equipment should be the second step, not the first, in the dust control project."

Medical survey: The report of the Foundation's Medical Committee, of which Dr. A. J. Lanza is chairman, deals with "Silicosis and Allied Disorders." It outlines a 6-point program of health control for the guidance of employers confronted with disease problems arising from air pollution: "A practical program of pre-employment examination of all workers exposed to dust containing silica is essential. Such examinations should include a complete physical examination of each individual, a careful history of past occupational exposure to dust, and a chest roentgenogram (x-ray)."

On this basis the following research projects have been listed for consideration:

1. The relationship between silicosis and tuberculosis.
2. The effect of other substances upon the action of silica in the body.
3. Study of the mechanism by which silica exerts its injurious effects.
4. Research in the technic of roentgenography.

Silicosis: The medical report involved the weighing of findings gleaned in a number of industries, in hospitals and in research centers here and abroad. It concludes that on the basis of present knowledge, nine points are definitely known:

1. Silicosis results from the inhalation of dust containing free silica.
2. The time required for development of silicosis varies from a few years to twenty or more, depending on concentration of particles in the air and length of exposure.
3. Beginning silicosis is recognizable only by properly taken roentgen films (x-rays) of the chest.
4. Associated with silicosis is a marked pre-disposition to tuberculosis.
5. Silicosis can be prevented by protecting the worker from inhaling silica dust. This involves engineering measures.
6. Concentrations to which dust must be reduced in order to be safe have not been absolutely determined.
7. Industrial dusts, containing silica, are frequently not all silica, being mixed with other materials. Some of these substances may alter the silica action in the body.
8. Asbestos, a silicate, is the only dust other than free silica which has been shown to cause lung fibrosis and disability.
9. Simple—that is, uncomplicated—silicosis, as seen in industries in the U. S. A., causes relatively little severe disability.

ATMOSPHERIC CONTROLS

ultraviolet rays kill air-borne germs

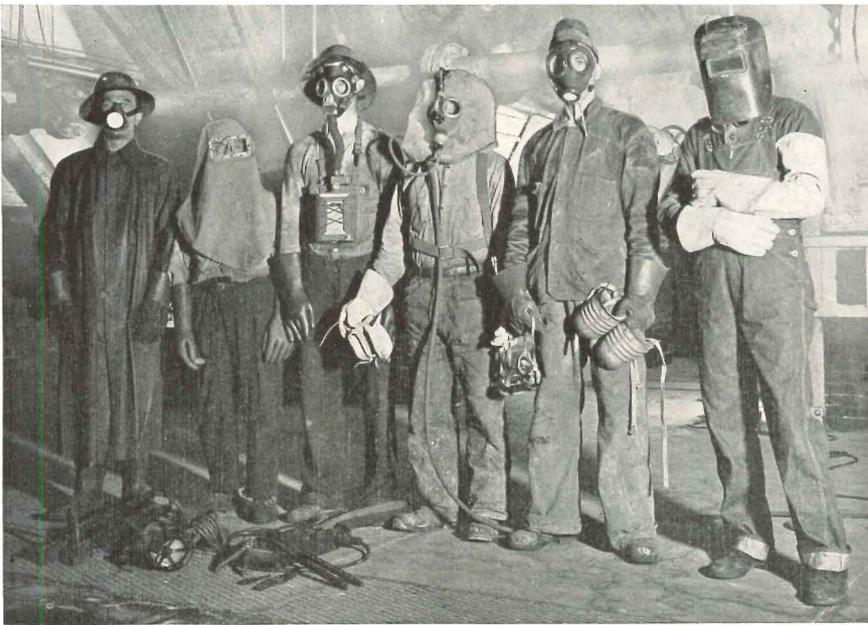
Surgeons have long sought a way to rid operating-room air of bacteria. They have tried washing and repainting the room often; forbidding infected patients to enter; requiring all persons entering to wear masks; and even circulating "washed" air through the chamber in large quantities. These experiments were not entirely successful. Convinced that some way of killing tiny air-floating microorganisms could be developed, Dr. Deryl Hart, chief of surgery at Duke University, Durham, N. C., hit on the idea of bactericidal rays. Westinghouse scientists at Bloomfield, N. J., aided by developing the new "Sterilamp" (trade mark) which creates a screen of invisible germicidal rays around the operating table.

The new device is a slender glass tube, containing a small quantity of special gas. When electricity is passed through the gas, ultraviolet radiation (from 2,700 Angstrom units down) is produced. The lamp operates at a temperature only a few degrees above room temperature.

Further experiments are in progress at the Westinghouse laboratories to determine the practicability of using these ultraviolet rays in air conditioning installations as a means of preventing the spread of epidemics, also for keeping mold out of food products. The method is to install several lamps inside the air duct. Air in any particular room location may be kept sterile by installing lamps over that spot and flooding it with radiation.

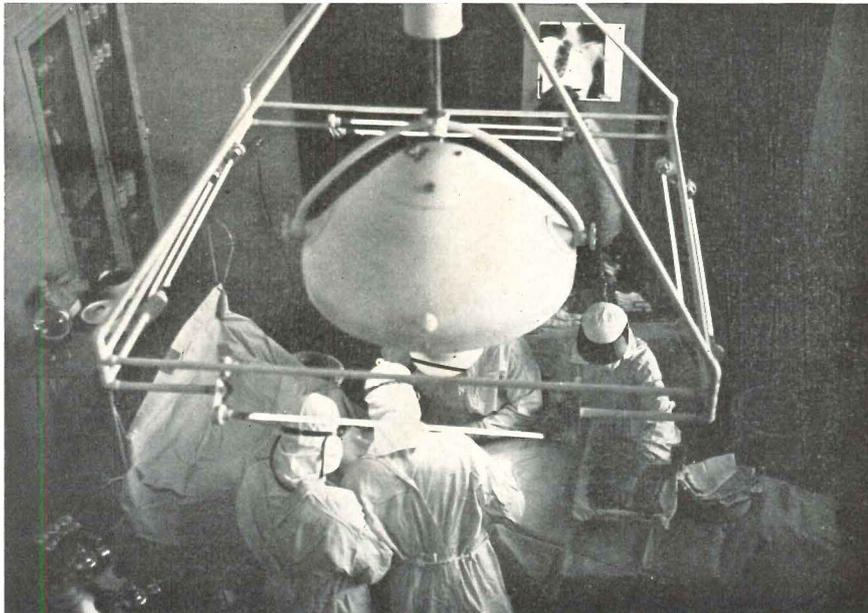
At the Harvard School of Public Health similar tests are being conducted with ultraviolet floodlights. Aluminum reflectors direct the rays that emanate from long, slender quartz tubes. The beams can be kept away from body and eyes, but are arranged to form an invisible barrier through which air-borne bacteria cannot pass.

Last July Dr. William F. Wells and Dr. H. W. Brown announced that, as a result of these Harvard experiments, they had discovered the influenza virus could be killed by ultraviolet rays. Since then this development in preventive medicine has been put to tests in everyday life. In January the apparatus was switched on for the first time at the Children's Hospital in Boston, separating the infectious diseases wing from other sections; nurses can walk through the ultraviolet barrier, but infections cannot float through. A replica of a railroad car has also been built to test the possibilities of minimizing the risk of colds and influenza.



Ewing Galloray

Different types of safety clothing designed for different kinds of atmosphere.



Westinghouse

Operating room at Duke University: eight ultraviolet "Sterilamps," arranged in pairs, produce a safety screen of sterilized air around the patient and surgeons.

As a phase of air conditioning, air purification involves elimination of odors, dust and bacteria. At present odors are usually controlled by dilution with outside air. A good air conditioning system will ordinarily remove 90 to 95 per cent of the dust from air. At the January convention of the American Institute of Electrical Engineers, Westinghouse engineers announced a new "electrostatic precipitator," which purifies air to 95½ per cent, the purest now known to man.

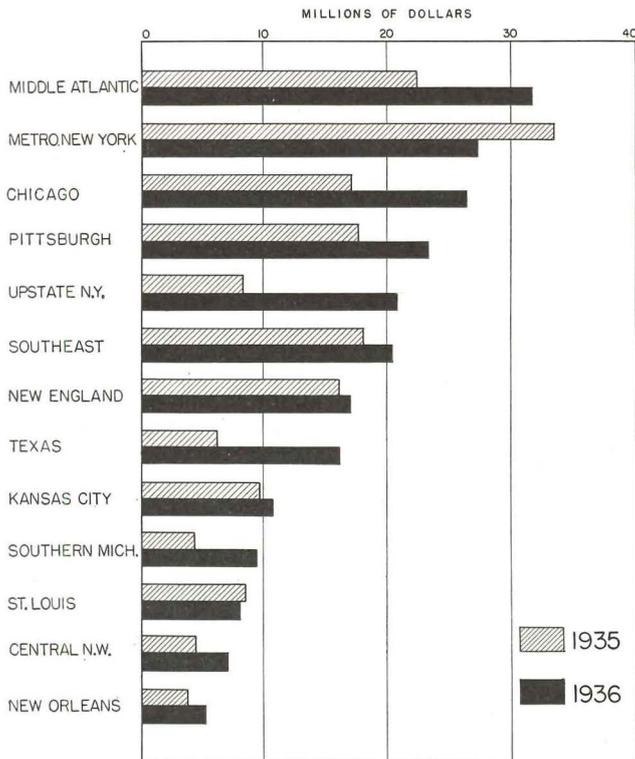
BUILDING TYPES



Lincoln

S C H O O L S

EDUCATIONAL BUILDING IN 37 EASTERN STATES
ARRANGED AND RANKED BY DODGE DISTRICTS



The Middle Atlantic States in 1936 outranked in educational building all other areas in the territory east of the Rocky Mountains. In the previous year the Metropolitan Area of New York held this distinction.

RECOVERY IN EDUCATIONAL BUILDING HAS BEEN MARKED

By L. SETH SCHNITMAN

Chief Statistician, F. W. Dodge Corporation

Educational building has come a long way since the depression low of 1933. That further recovery is probable, there can be little doubt. An expanding school population, a rising national income, better real estate tax collections, aging educational facilities, and shifts in emphasis on requirements as between primary and secondary schools and colleges seem to assure further growth.

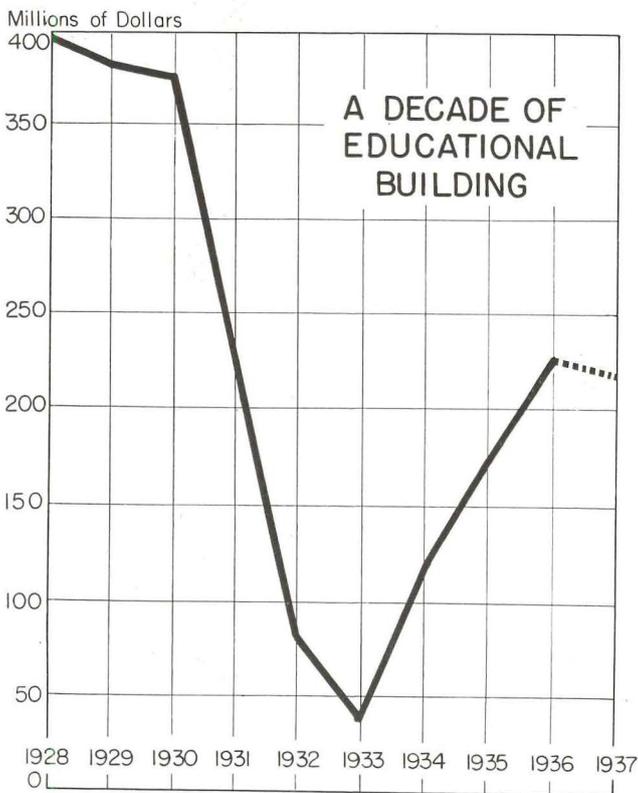
Demands for facilities as between primary and secondary schools have changed in their importance during the last ten years; this tendency is likely to continue for a few years to come, chiefly because of the slowing in the birth rate and the gradual aging of the existing population of school age.

In spite of the factors which favor continued expansion in the building of educational structures—primary schools, high schools, colleges, libraries, gymnasiums—there is ample reason to believe that for 1937 an interruption in the recovery movement may be experienced. This rests upon the fact that an increasing proportion of the load for educational building operations is being returned to the states and municipalities, now that the PWA has passed its peak activity.

The transition is not an easy one. Some states and municipalities are now only little better able to cope with the problem than they were a year or two back, in spite of the generally improved conditions. Some municipalities, even though able, are cautious. And still some are awaiting further expected grants and loans from the Federal Government which may not eventuate.

Then, too, the spiral of rising prices, for materials and labor, can—and probably will—operate to slow the forward movement.

That educational building will soon again resume the proportions of 1928 or 1929 appears now as quite unlikely over the next three years at least. But that further gains will occur after the indicated 1937 lull appears a practical certainty.



The recovery from the 1933 depression low in educational building has been great but a temporary interruption of relative unimportance is probable for 1937.



SCHOOLROOMS DESIGNED FOR CHILDREN



Imandt

Children at Hessian Hills School, Croton on Hudson, New York, using their shop-made surveying apparatus.

In the design of school buildings the administrator can always be found. It is sometimes hard to find the child. He has no direct voice.

Two trends mark a great change in schoolrooms, the heart of the school. One is toward a multiplication of activities. This trend has paralleled the growth of technology outside. As factories multiplied and diversified, so the plain schoolrooms of the nineteenth century articulated themselves into chemical laboratories, woodworking shops, domestic science kitchens, music rooms, theaters, studios. By this time the question is how much more specialization one small child will bear.

There has lately developed another trend which likewise talks of substitut-

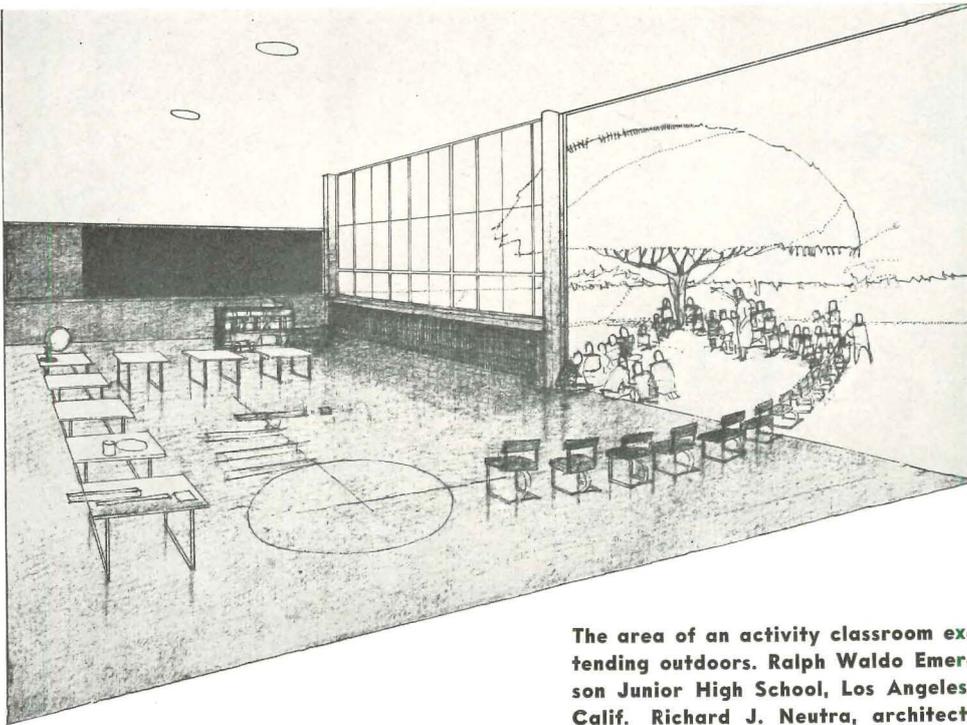
ing "activity" for "listening," but with a different aim. It is the progressive trend. Stripped of high-sounding language, it has a simple base. It represents the rediscovery of the children. When it advocates more activity and experiment as against "listening," it is because that is an easier and more natural way for children to learn. Throughout, the new teaching seeks to discover the natural steps by which children actually grow. It seeks to make capital of the children's interests instead of fighting them down.

So the architect designing a school is working to help educators present a complex world in terms that can be grasped by the small child. The problem has its effect on every detail.

I. THE NEED FOR A HOME ROOM

This is a problem that affects primarily the *distribution of space*.

(a) In the past two decades the emphasis has been upon the need for "special" rooms. The effort now will be to see how many of the "special" activities can be carried on in the "home room" of the group. This rests upon the need of the child for a steady environment. The small child in the big school is at best required to make a great many more adjustments than his parents did. Unnecessary ones, such as the repeated adjustments to new rooms and new teachers, are to be avoided; they take energy that should be put to positive use. Hence



The area of an activity classroom extending outdoors. Ralph Waldo Emerson Junior High School, Los Angeles, Calif. Richard J. Neutra, architect.

the renewed effort to provide for the new activities, whenever possible, "at home." The series of "home rooms" for each group or grade must occupy the most favored locations in the school building with respect to sunlight, view, and access.

(b) Since the "home room" is the headquarters of the group, it must reflect their life and interests. To be "home-like" for school purposes by no means calls for paneling or bric-a-brac. It means that the children must be able to surround themselves with objects important to them. For this purpose, the blackboard must surrender part of its wall monopoly to bulletin-board space for pictures, clippings, announcements. As bulletin-board material, some of the most exclusive private schools employ common fiberboard; the standard, of course, is cork. In a room for 40 children, bulletin space should occupy at least 10 linear feet. In addition, small children make large drawings and paintings which they are entitled to display to their comrades. The simplest device is a batten or tacking strip, at least 28 inches above the reach of the particular age group. A stout 4- or 6-inch shelf running along the top of the blackboard will carry a great many of the children's products in clay.

(c) "Rats and Snails." The mark of the old-fashioned school is the cut-out paper tulip pasted by the teacher on the windows. A more realistic gen-

eration of children demands that its contact with Nature be more exciting. A modern classroom is incomplete without space for the tanks and jars that hold an "aquarium" of frogs and pollywogs, salamanders, guppies, or other water life; cages for white rats or other favored small animals; pots for flowers. Obviously such space must be on broad shelves under sunny windows, possibly window-bays.

(d) Room to move in. That the "home room" will call for more space, possibly taking some of it back from the special rooms that developed so rapidly during the immediate past, is indicated not only by the space requirements of the children's hobbies, but by the nature of the room as a shelter of *group activities*.

2. ROOMS PLANNED FOR GROUP ACTION

The "formal" pedagogy of the nineteenth century was adapted to each child as a separate individual learning the three r's at his own seat, with occasional excursions, when the class became too restless, to the board. Modern education is obliged to retain some of this essential drill, but it provides also for action by the group as a group. The first result is mobile furniture: that is, that the seats and desks be unfastened from the floor. Such mobility is constantly spreading. It began in the kindergarten, has now become accepted in the first two or three grades,

and can be expected to become standard throughout the entire elementary school.

It is essential for mobility that seats be detached or detachable from desks. Many groupings call for seats only, desks being pushed back.

The more pronounced forms of group activity will perhaps remain confined for some time to private schools where the cost of education per pupil far exceeds the national public school average of \$73.58. Thus in one of the most successful New York "experimental" schools the second grade (seven-year-olds) occupies, in addition to its seating space, a floor approximately 12 by 20 feet for a permanent city, built of blocks, and devoted entirely to this purpose throughout the year. As the children build and improve this city, the stories they write about it furnish the incentive for the study of reading and writing. In the same school it is customary for the third grade to conduct the school post office, leading the pupils not only into the problems of keeping accounts involving arithmetic, but also to the geography behind "carrying the mail." Another typical group project is the school store. Modest group enterprises are possible even within an economical public system. The basic necessity in conducting highly valuable group programs is, as a principal expresses it, "*space, space, and more space,*" rather than more fancy equipment.

3. HOME-ROOM REQUIREMENTS OF "LEARNING BY DOING"

The use of the home room for "learning by doing" requires, apart from ample space, certain kinds of equipment, chiefly for storage.

(a) The essential innovation is a simple washstand in every home room. This is because small plants and animals are kept by the children, the less elaborate activities such as painting, pasting, the less advanced chemical experiments, and the like, take place in this room.

(b) Cupboard space. The smaller the children the fewer but larger the compartments. This is because the size is related not to the size of the child but to the accuracy, or rather the inaccuracy, of his movements. For example, a first and second grade are likely to use large building blocks stored on the floor in the bottom compartment of an open cupboard, the next shelf being two feet high and the

top shelf not more than three feet high; vertical partitions no closer than two feet. In keeping with the principle of training large muscles first, even small children use large sheets of drawing paper, so provision must be made for sheets 22" x 28" stored flat before use (2-inch clearance each direction) and rolled afterwards. The other principal objects to be stored are tempera paints and tumblers or tin pans; crayons; paste; linoleum for carving; clay or other modeling material; small tools such as scissors, hammers, nails, small boards. Open shelves are favored for small children as against closed cupboards, because they are easier for the teacher to inspect.

Beyond the third or fourth grades an ideal arrangement under the activity program is for every child to have cupboard space of his or her own. This is because *the desk, being mobile, should hold only a minimum of equipment*, such as a few pencils, a notebook, two or three books. Twelve to fifteen inches square are adequate dimensions. Depth, except for special equipment such as flat paper, should not exceed ten inches or at most twelve. Placing objects on a shelf behind one another is to be discouraged as likely to end in disorder.

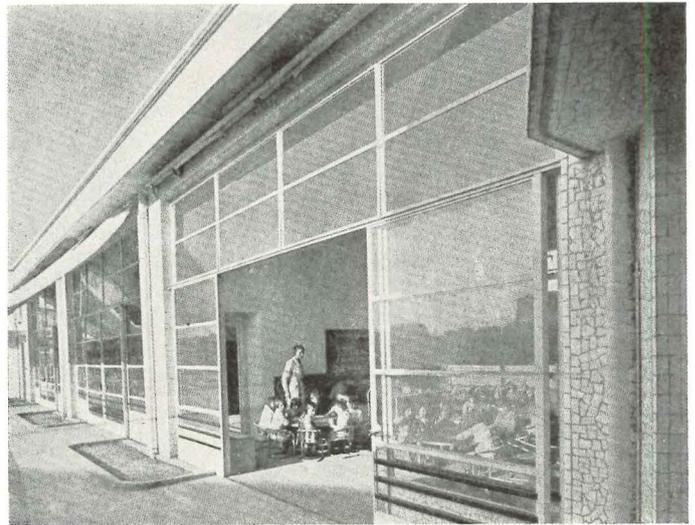
Cupboards involve a problem in room arrangement. If placed at the rear of the room they cannot conveniently be built-in because of the need for keeping room partitions easily changeable. If placed along the side, the best compromise appears to be placing them under the bulletin-board space, not under blackboards. Teachers oppose cupboard space under windows. Wardrobe cupboards or lockers are frequently placed in outside halls.

4. SPACE ARTICULATION IN THE HOME ROOM

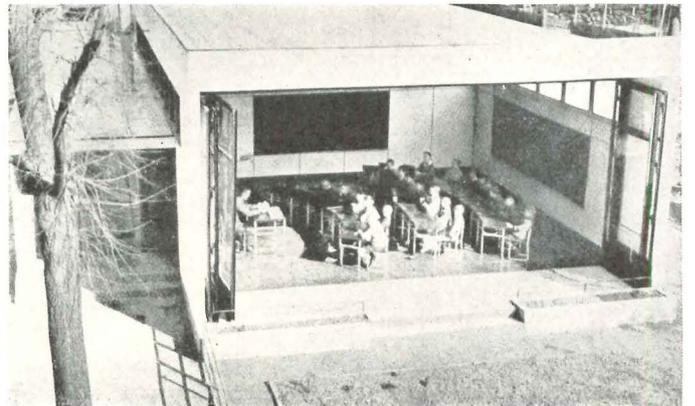
A home room being used for different activities taking place simultaneously might give an outsider an impression of considerable confusion. With the work in the hands of trained teachers, however, it is still believed that such confusion is less objectionable than confusion caused by pupils shifting about from room to room.

The division of working space within the home room can sometimes be extremely simple. Thus, by arranging the seats in a hollow square, many a teacher has been able to bring within close distance of herself the group with which she was working, while

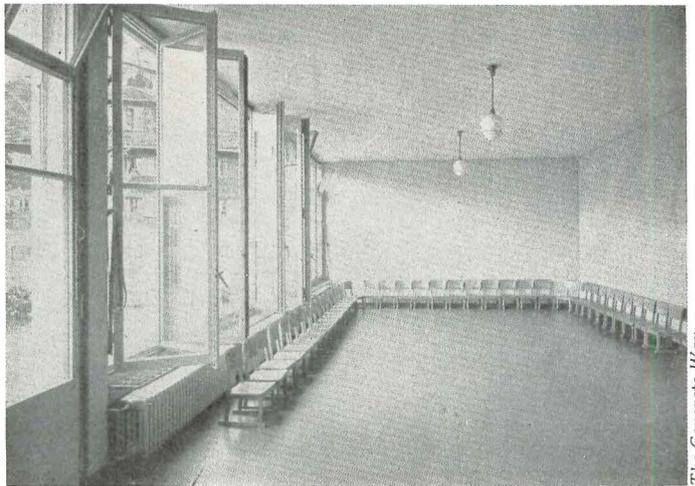
The Jules Ferry School at Maisons-Alfort (Paris). Dubreuil and Hummel, architects.



Classroom with the entire side open. W. Shirette, architect, Frankfort.



The playroom of the kindergarten, Dula School, Lucerne. Albert Zeyer, architect.



The Concrete Way

pupils in the outer circle, further removed from her and closer to the light, continued to study alone silently. Highly prized in private schools are:

(a) Alcoves. These may be used by pupils quietly studying, or by the noisier active group, according to the relative size of each. In buildings such as the Hessian Hills School, Croton

on Hudson, New York, the alcoves are considered indispensable by the teachers even though, with unilateral lighting, alternate alcoves are dark and need artificial light. Such alternating alcoves are fully practical only when single-story construction permits transom lighting on the corridor side of the room.

(b) Movable partitions. These can be managed more flexibly than alcoves and with a better control of light.

(c) Shop space in the room. *For the younger pupils only.* Up to the second grade it is considered best practice to keep what shop or handicraft materials are used in the alcove or at the rear of the room, and not to send pupils to the general school shop. These materials include two or three very low workbenches with vise for the simple sawing and nailing operations that will take place here, in addition to the storage space for the painting and other materials already mentioned.

5. CHILD-SCALE INVOLVES MORE THAN PROBLEMS OF SIZE AND DIMENSION

Experience with children leads to a totally different attitude toward design than work for adults. The small size of the child is a factor involving more than dimensions. Small children are still making adjustments to the world which for adults have become habitual. For example, still training their large muscles, children never by themselves achieve adult standards of finish. Consequently refinements of finish are lost on them; they are not aware of the difference. Thus the adult preference for having things put away and hidden is of later growth. Children are not annoyed by having their clothes hang in open compart-

ments or their toys lie on open shelves. Since such arrangements are easier and cheaper there is no valid reason for the adult desire to "slick up" and give a high polish to an environment used by young children. It is better that available funds go to provide the necessary elementary *space*.

As children approach adolescence they must be treated in a totally different manner, and the need for belongings of their own and a private space to keep them in is paramount. At such a stage in development it is more important to the child than to the adult that his prerogatives be respected.

6. CHANGED EDUCATIONAL CONCEPTS AFFECT EVEN THE PLUMBING

In the face of the lengthy treatises published on the subject of school plumbing, it takes courage to assert that further mechanical refinement is less important now than relating the plumbing properly to the scheme of education.

The problem of toilets, for example, is less a mechanical problem of evacuation than a social problem of discipline.

Every architect who recalls his own school days knows about that. The trip down the long hall—the longer the better—was a relief from the perils of recitation and the rigors of posture. In this long hall, away from the teacher's eyes, pent-up energy was likely to

release itself in fracas with other children bent on similar errands. There resulted, for the school, a whole series of disciplinary problems. Teachers assert that more than half of the disciplinary problems arise in the halls.

In schools still devoted to sit-down education with military standards of discipline, it is highly to be recommended that toilets be grouped together, if possible at the end of a very long hall.

In schools permitting a more normal flow of activity, the recommendation can be equally emphatic that the lower grades, at least up to the fourth, be supplied a *single toilet opening from the classroom*. Where tried this has secured the enthusiastic indorsement of the teachers.

The expense of such an installation is mitigated by cutting the number of fixtures in half, since boys and girls use the same one, as they do at home. Elaborate mechanical protections against soiling are less needed because supervision is direct and responsibility traceable at once to "the last one in." The training in neatness carries over into the home; the habits are not of a kind confined to school.

7. FOOTNOTE ON SPECIAL ROOMS

Special rooms are outside the province of this study, except to suggest economies permitting the desired exploitation of the home room. The high degree of specialization already men-

(Continued on page 44 adv.)



Fairchild Aerial Surveys

The school for the Ten Eyck Housing development, New York. Use of interior courts and poor relationship to the surrounding buildings are the main characteristics of this recently completed school.

STANDARDS FOR PLANNING THE ELEMENTARY SCHOOL CLASSROOM

The school building is the result of planning in relation to our pedagogical conceptions of a free and unhampered formation of man. It expresses then the educational system which it shelters and, above all, the child—his physical, spiritual and emotional reality, his state of constant development, his first steps towards a social life. For this reason the design must be primarily inspired by a deep sympathy and understanding of the child and the scale of his world. Old practices in construction or architectural traditions often present obstacles which hamper the educational process. The creation of a serene, lovable and healthy environment must be one of the final aims of the design.

As our ways of living, our social needs, the character of family life in relation to community life all have a definite influence upon the conception of such a building, consequently the design of a school building must be in a constant evolution to keep in harmony with them. Likewise the curriculum is constantly changing to meet new pedagogical needs and requirements. In opposition to rigid, symmetrical solutions the school plan should be flexible, so as to accommodate any future changes of the curriculum. It must provide possibility of expansion, as very often it serves communities whose populations have not reached the saturation point. But this expansion should never lead to the creation of mammoth groups of buildings, the scale of which is oppressing to the child and the contrast between home and school too great.

It is rather difficult to give an outline of the elementary school building of the near future. Educators' opinions often vary and usually they are far ahead of the actual possibilities. However, we can point out the following tendencies:

1. *Reduced number of classrooms; more decentralization.*
2. *More area per pupil; less pupils per classroom.*
3. *Unilateral corridors if not open corridors.*
4. *More class-pavilions.*

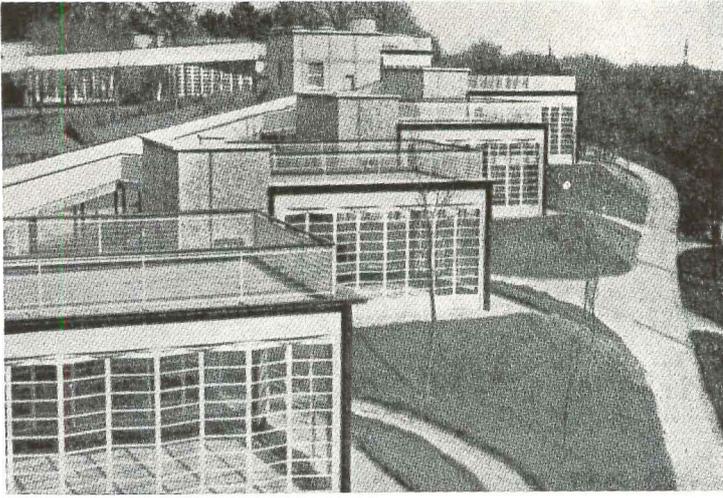
The scale of the child demands special adjustments for work and play.



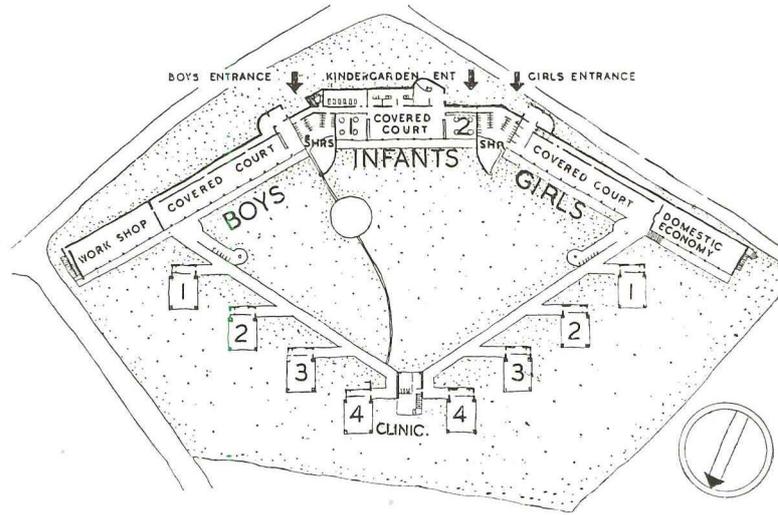
Ewing Galloway, N. Y.



Ewing Galloway, N. Y.



School at Suresnes (Paris). Beaudoin and Lods, architects.
Each classroom is a free-standing pavilion.



THE CLASS-UNIT

The important changes in the educational system involve important changes in the conception of the class-unit. If school is not the one place where children merely grow, it is not any longer the place where they receive a certain amount of knowledge which they have to assimilate.

The class of "listening" has given place to the activity class, which requires a bigger area, natural lighting from more than one side to facilitate the grouping of pupils, and less pupils per class for easy supervision. On the other hand, new technics make possible a return to nature: by eliminating the old frontiers between the inside and the outside, we have now arrived at a complete reversal of the traditional class layout. In recent schools the outdoor class is a direct continuance of the classroom and makes one inseparable unit.

ORIENTATION

1. Northeast—Exposure offers early sunshine in the morning and constant light during the rest of the day.
2. Southeast—Exposure has sun in the morning but not too direct in the afternoon, during the hottest hours.
3. South—Exposure offers plenty of sunshine during the day but there is a continuous change of light; suitable for very young children.
4. Southwest—Exposure provides daylight saving but the classroom receives direct sun during the hottest hours.

The direction of the heavy rains will

indicate the proper location of the windows so that they may remain open during the rain. The direction of the prevailing winds will influence the location of the outdoor class.

LOCATION

Classrooms situated in a single-story building have the following advantages:

Immediate connection with the outside (possibility for outdoor classes); the building is in better harmony with the scale of small children and less oppressive to them; less expensive to build; less fire hazards because of elimination of vertical spread of fire; they can be made economically earthquakeproof; more useful area in relation to the total area of the building, than in multi-story buildings; easier maintenance of discipline by elimination of corridors and stairs.

The main disadvantage is in the relatively large area of ground which a single-story solution requires.

Free-standing pavilions, one for each classroom or for a group of two classrooms with a folding partition between them, have the advantage of free exposure from at least three sides and no interfering noises from other classes during the outdoor classwork.

ROOM SIZES

The "listening" type of classroom is determined by the pupils' stations with the necessary area for aisles between them, the teacher's desk, etc.

1. The width will depend upon the height of the ceiling which should not exceed more than twice the width, and

the length is dependent upon convenient distance from the blackboard.

2. A typical New York size is 24 feet in width, 28 feet in length and 12 feet in height. Forty pupils can be accommodated in 8 rows of 5 stations, allowing 16 sq. ft. per pupil. In England there is the same general allowance of 16 sq. ft. with minimum room size of 19 feet by 26 feet and 11 feet height. In Germany there is a 12-16 sq. ft. allowance per pupil and the room size is 18 feet by 27 feet.

There is no definite way to determine the necessary minimum area for an activity class. It will depend upon a desirable grouping of pupils, the number of projects they will be working at, also the age of the pupils, as younger children need more space to move. The area per pupil varies from 25 sq. ft. at the Bell School in California, to 40 sq. ft. at the Hessian Hill School in New York. However, 30 sq. ft. should be considered as desirable.

Minimum width of aisles between two rows of stations is 1 ft. 6 in. and 3 ft. for aisles next to walls.

NATURAL LIGHTING

If natural light enters the classroom from one side only, the windows must be located at the longest side of the room and at the left hand side of the pupils. If light enters from more than one side, the strongest light must come from the left.

The windows must stop at least 5 ft. 6 in. from the blackboard to avoid reflections, unless special measures are taken (see artificial lighting), and they must reach the rear end of the class-

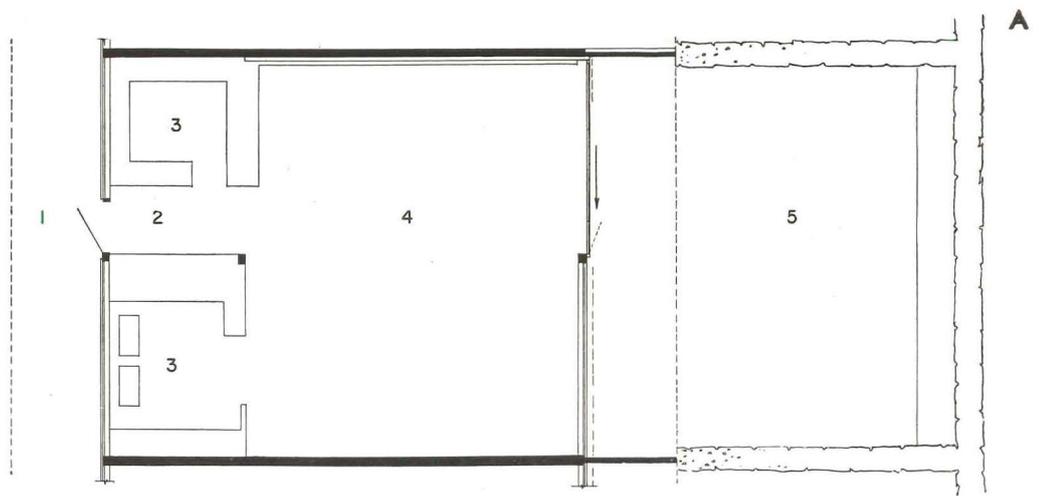
room in a continuous row with a minimum use of mullions. The window sills should not be more than 3 ft. 6 in. above the floor and no less than the height of the desks. Window heads must be at 6 inches or less from the ceiling. The upper part of windows must open, but it is desirable if the entire window area is ventilable. The glass area should be no less than 1/5 of the floor area. At the Bell School the glass area reaches 56% and the ventilable area 17% of the floor area.

For ground floor classrooms attention must be given to the treatment of the outside grounds. Highly reflecting surfaces must be avoided and easy and quick removal of snow is necessary so as to avoid glare. Casement-type windows with two side-hinged ventilators and pivoted or projected type are favored. The latter can stay open during rainstorms. When one or more sides of the classroom open to the outside, either sliding or folding doors are in use. It is desirable that the openings remain free of posts, stiles, etc., and that the doorsill is notched or rabbeted below the floor level to avoid drafts.

Daylight control is necessary to avoid window glare. This is effected by means of awnings, shades or louvers. Awnings are most suitable for ground floor classrooms with continuous doors to the outside. Shades are used, two for every window, made of buff-colored material in soft finish with the rollers located at half the height of the window. Space between rollers should have a V-shaped metal covering. Louvers are horizontally set at various permanently fixed angles to direct the light to the ceiling and away from the pupils' eyes. The louvers start from a point a little above eye level. In the "listening" type of classroom, where all pupils are facing in the same direction, these louvers can be set vertically directing the light towards the front of the room. This type of control is practical for large glazed areas; however, by isolating the classroom from the outside it takes away some of its cheerfulness.

ARTIFICIAL LIGHTING

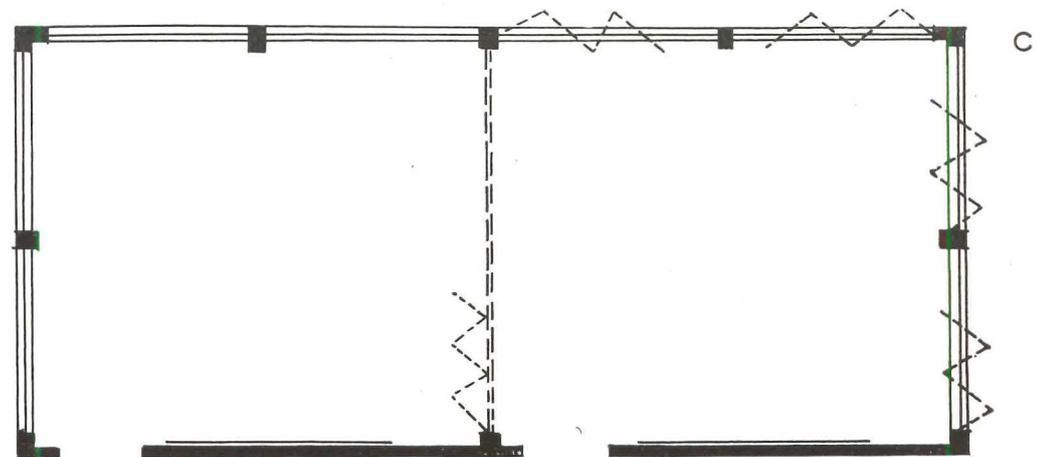
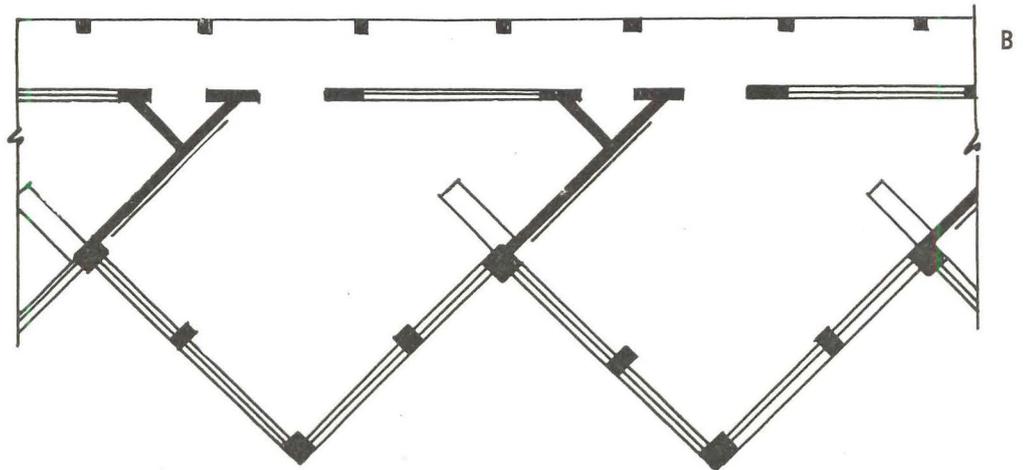
As the aim of artificial lighting is to provide easy seeing, an intensity of 15 to 30 foot-candles is necessary at desk-top height which, in this case, is the working plane. The lighting should be evenly distributed, diffused and without glare.



A. Classroom unit by Richard Neutra with light entering from two sides. (1) Corridor protected by a canopy, (3) project alcoves, (4) and (5) indoor and outdoor space for classwork.

B. Classroom units with one project alcove. Light enters from three sides and outdoor classes are separated from each other.

C. Class pavilion with sliding partition dividing two classrooms.



Lighting Fixtures:

NUMBER: 6 outlets in two rows; the inner row will serve to complete the natural lighting on dark days and it is advantageous that they are on an independent switch.

HEIGHT: 9 ft. 6 in. for a 12-ft. ceiling height; below this point there will be reflections on the blackboard.

SPACING: 4 ft. 6 in. to 6 ft. from the walls.

TYPE: Globes of diffusing or refracting glass in sizes proportional to the lamps: 14-inch globe for 150-watt lamp; 16-inch globe for 200-watt lamp; 18-inch globe for 300-watt lamp.

Semi-indirect type of fixture offers a better quality of lighting but requires about 30% more wattage than the direct type.

Blackboard units to eliminate glare from artificial and natural lighting. These are placed above the blackboard 6 ft. 6 in. o.c., with 150-watt lamps and refracting lenses concentrating the light on the blackboard surface.

At least two more outlets are necessary, one in front and the other at the rear of the classroom.

COLOR: A synthetic white light close to natural light can be obtained with the combined use of mazda lamps, rich in red and orange colors with mercury vapor tubes. A 950-watt lighting unit is in use with a 450-watt, 220-volt, 50-inch mercury vapor tube and a 500-watt, 110-volt mazda lamp.

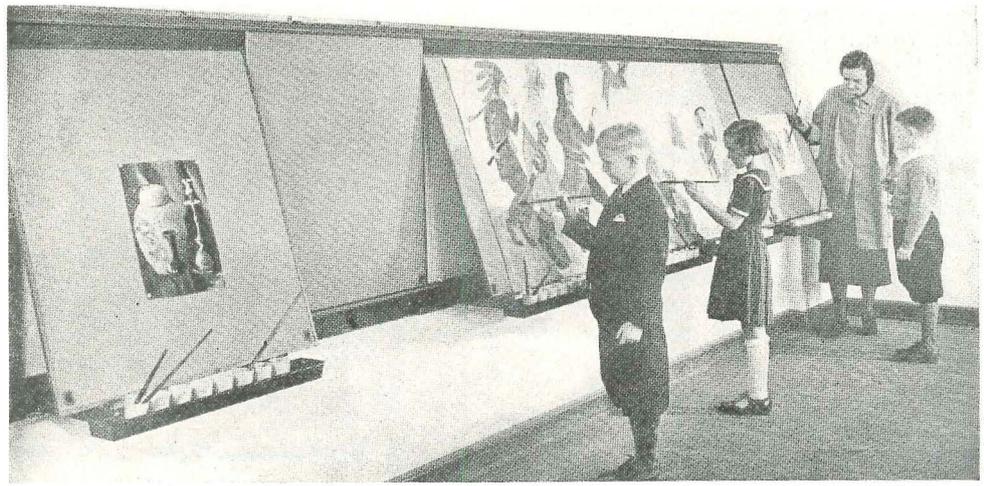
CONTROL: A photoelectric cell at a distant point from the source of daylight starts the artificial illumination when it fails to register the required standard. Children usually do not realize when the lighting becomes insufficient and this important feature eliminates any guesswork in the lighting of a classroom. The same photoelectric cell can control several classrooms of the same exposure and layout.

WIRING: Adequate provision must be made for a possible increase of loads to meet future requirements.

SOUND INSULATION

Tolerated noise levels are 40-45 decibels; prevailing noises in suburban areas are 60 decibels and in large cities 70-90 decibels. Sound insulation can be obtained:

- By shielding when outside noises are relatively localized.
- By a special location of the classrooms in relation to the source of noise.



Projecting bulletin board used as an art easel.

- By acoustic treatment of the classroom itself.

VENTILATION

In most of the states 30 cu. ft. of outside air per minute per pupil are required.

FINISH

As the ceiling is part of the lighting system the factor of reflection should be no less than 70%. The acoustic ceiling decreases the illumination by 25% and this fact should be taken into consideration in order to determine the proper intensity of the lamps.

For walls the maximum acceptable factor is 50%. Glossy finish should be avoided, also warm colors, as the latter accentuate the yellow and red of the light. The lower part of the walls and the floor must stand frequent cleaning. The floor material must be silent and easy to clean.

EQUIPMENT

Stations

The following types are in use: fixed desks, single tables, double tables, chair-desks. The seats must be located at right angles to the strongest light; tables and chairs for younger children should be movable. The height of seats should allow a vertical position of the lower part of the legs and a horizontal position of the upper part. The height of the desks should allow children to sit upright while writing. It is desirable that seats and desks be adjustable.

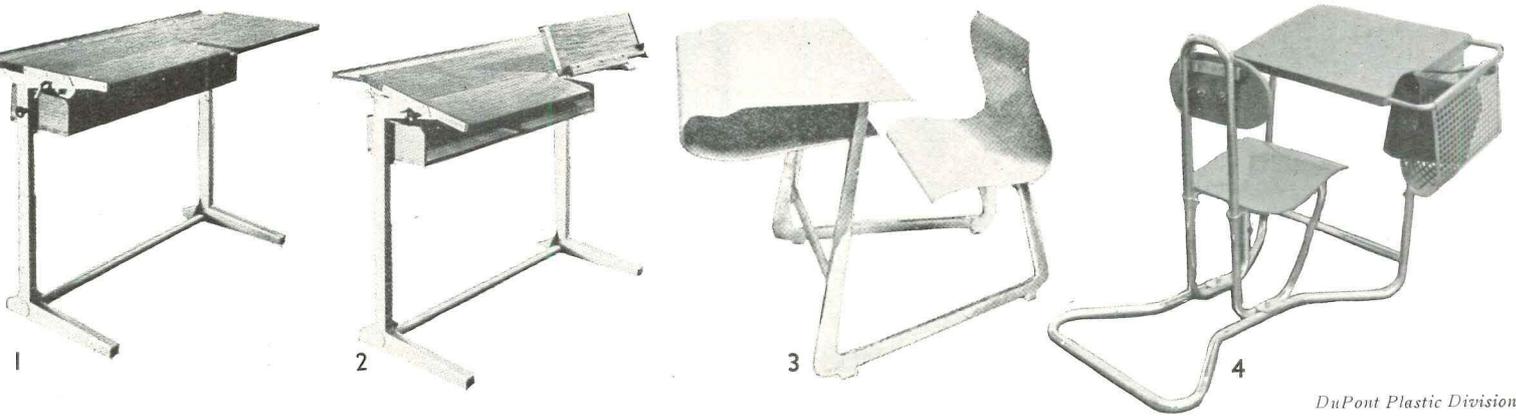
Heights for Seats and Desks

age	seat	lower end of desk
5 to 7	11" -13"	19½"-23½"
7 to 11	13" -14½"	23½"-25"
11 to 14	14½"-16½"	25" -27"

Width of desks is 18" for young children and 20" for older pupils. Size of average single desk is 1'-8" in width, 2'-5" from back to back.

Individual wardrobes without doors for younger children.





DuPont Plastic Division

1, 2 Double desk adjustable for writing and reading. 3 Metal double desk designed by René Herbst. 4 Single adjustable desk by same designer with desk top, chair seat and back of acetate plastic material.

Blackboards

Size: 30' to 39' by 42".
 Height above floor: 26" for little children, 30" for elementary schools, 36" for secondary schools.
 Height for the chalk trough:

- 1st and 2d grades 24"-28"
- 3d and 4th grades 26"-30"
- 5th and 6th grades 28"-32"
- 7th and 8th grades 30"-36"

Material: Slate, composition, in mat finish.

As the black color affects the intensity of light and tires the children's eyes, it is advisable to cover the blackboard surface when not in use with a light color. For younger children other colors than black can be used. When blackboards are in two or three sections, like double-hung windows, the teacher can adjust them at the children's eye levels. Reversible blackboards with a cork facing on the back offer additional bulletin-board surface when required.

Bulletin Board

Size: 25"-42" high, and at the same height as the blackboard.

Material: Corkboard or compressed insulation board.

Bulletin boards in 3 ft. removable sections and adjustable into easel position can be used by pupils as designing boards.

Teacher's closet with shelves at least 11 in. wide.

Shelves and closets for books, tool racks. The closet doors for young children must be hinged and not sliding.

Benches for project work 2 ft. wide.
 Water basin: Height from floor (see lavatory equipment): and drinking jet.
 Collapsible cots for younger children.

ANNEXES

Cloakrooms, adjoining the classroom preferably at the rear end, well heated and ventilated with a minimum of 1 sq. ft. ventilable window area to every

10 sq. ft. of floor area.

Equipment: 2 poles 10" apart with hooks 18" o.c.

Height of lower pole:

- grades 1, 2—36"
- grades 3, 4—38"
- grades 5, 6—42"
- grades 7, 8—46"

Shelf for lunch baskets.

Umbrella rack.

One cloakroom can serve more than one class, but this makes supervision difficult. For older children the use of individual lockers is advisable, built-in at the rear end of the classroom or corridor.

Storage space for activity classes is necessary for the materials used in the different projects; if a separate room is not possible, extra closet space within the classroom must be provided.

For lower grades a toilet connected with the classroom has certain advantages for the maintenance of discipline and easy supervision.

5 Desk-chair, fixed or movable, with one adjustment and book box, and 6 fixed desk with two adjustments, designed by Welfare Engineering Co. 7 Double metal desk designed by René Herbst with desk tops of plain unvarnished wood.



DuPont Plastic Division



Courtesy "Nation's Schools" and Woodrow Wilson School

Work and rest periods. Woodrow Wilson School, Westfield, N. J. Coffin and Coffin, Architects.

CORRIDORS

There are three distinct types: bilateral, unilateral, open to the outside.

Bilateral corridors have the disadvantage of poor natural lighting and ventilation, as the use of windows is limited to small sections. They are a constant source of noise and present many disciplinary problems. Their width varies from 12 to 16 feet, depending upon the number of classrooms served.

Unilateral corridors with a continuous row of windows offer a far better solution. Their width is from 8 to 11 feet.

Open corridors protected by a canopy are successfully in use in Europe in multi-story buildings, and in one-story buildings in the United States. They offer the possibility of cross ventilation for the classroom, they are not a source of noise, and they are more easily supervised and safer in case of fire.

The doors to the classroom must be 3 feet wide. If only one door is provided it must be located at the teacher's end of the room for easy supervision.

Artificial lighting: 6 foot-candles and emergency lights.

STAIRS

Stairs must be of fireproof material, no less than two, and one for every 200 children seated above the ground floor.

Maximum number of steps for each run: 14.

Width: 4 feet to 4'-6" for single stairs and 8'-9" for double with rail between.

Landings between two runs of the same width of stairs.

Treads should be no more than 12", nor less than 10½". Treads of 11½" with risers of 6" are advisable. Treads must be of nonslip material and nosings flush with treads.

Height of railing: 3 feet above nosing. Height of handrail: 2'-4".

All inclosing walls must be of fireproof material, and at least one wall must be external; doors leading to corridors are necessary as a smoke screen and they must be self-closing and equipped with wire plate glass.

RAMPS

Ramps are safer than stairs in case of emergency; less noisy and easier to keep clean. As they may be substituted for stairs they should meet the same requirements concerning number, widths and heights of railing and handrail, nonslip floor, doors, fireproofness, and inclosing walls; but no intermediate landings are necessary. Ramps, however, occupy more space than stairs and are costly.

TOILET ROOMS

Location within the building. This is essential for ease of supervision, minimum loss of time, possibility for heating and access under cover. Toilet rooms must be easily accessible from both playgrounds and classrooms. For elementary schools of more than one story 70% of the toilet accommodations must be located at the ground floor.

All pipings, clean-out, flushometers must be located in access chamber.

Only the extended handle of flushometer should be exposed.

The rooms must have adequate natural light and sun and be well ventilated; the floors of nonabsorbent material, easy to clean and sloping to drains. Walls also of nonabsorbent material and easy to clean. All internal corners must be coved.

Number of washbasins: 6 for the first 100 pupils, 2 for each additional 50 pupils.

Height of washbasins:

5-7 years old 22" to 24"

7-11 years old 24" to 28"

11-14 years old 28" to 30"

Toilets: Wall-hung of vitreous china of the extended lip type with seats of nonabsorbent material with open front and back.

1 water closet to each 32 boys.

1 urinal to each 26 boys.

1 water closet to each 25 girls.

Height: 5-7 years old 10"

7-11 years old 12"

11-14 years old 14"

Stalls of nonabsorbent material, 5 feet long, 2'-10" wide, 4'-6" high. Doors must remain open when stalls are not occupied.

Height of urinals: 14" to 20".

Drinking fountains: 1 to every 100 pupils, at least one on every floor. Fountains in corridor must be located in a 30-inch recess; no drinking fountains in toilet rooms.

Height: 28 inches.

NOTE: Information contained in this article was obtained in part from National Council on Schoolhouse Construction, Nashville, Tenn., and from "A Method of Procedure and Checking Schedule," by John J. Donovan, Bruce Publishing Co., Milwaukee; also from "Planning," by E. and O. E., 1936, The Architect and Building News, London.

ANSONIA HIGH SCHOOL

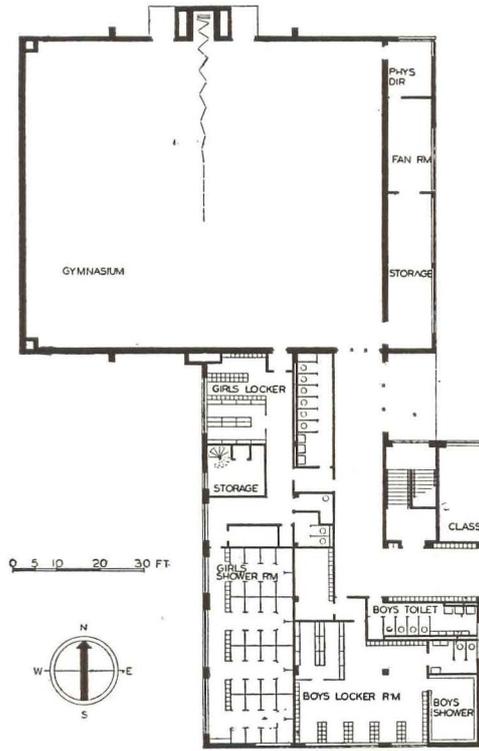
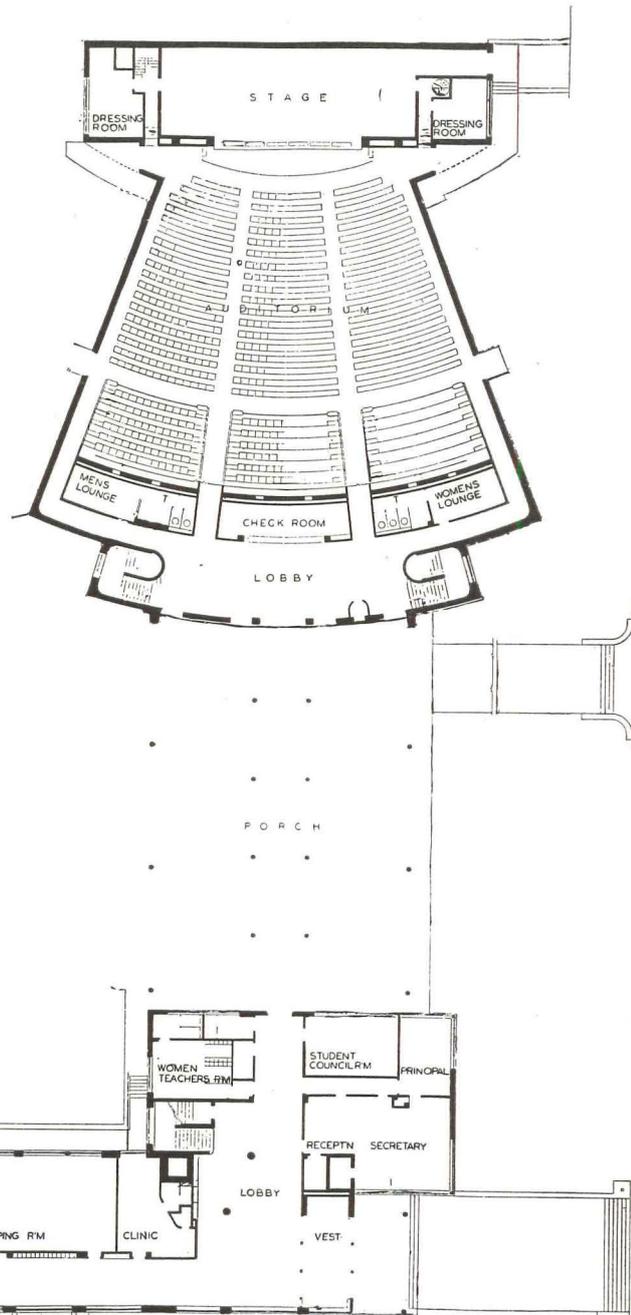
ANSONIA CONNECTICUT

WILLIAM LESCAZE, ARCHITECT
VERNON F. SEARS, ASSOCIATE



Zimmerman

ENTRANCE DETAIL



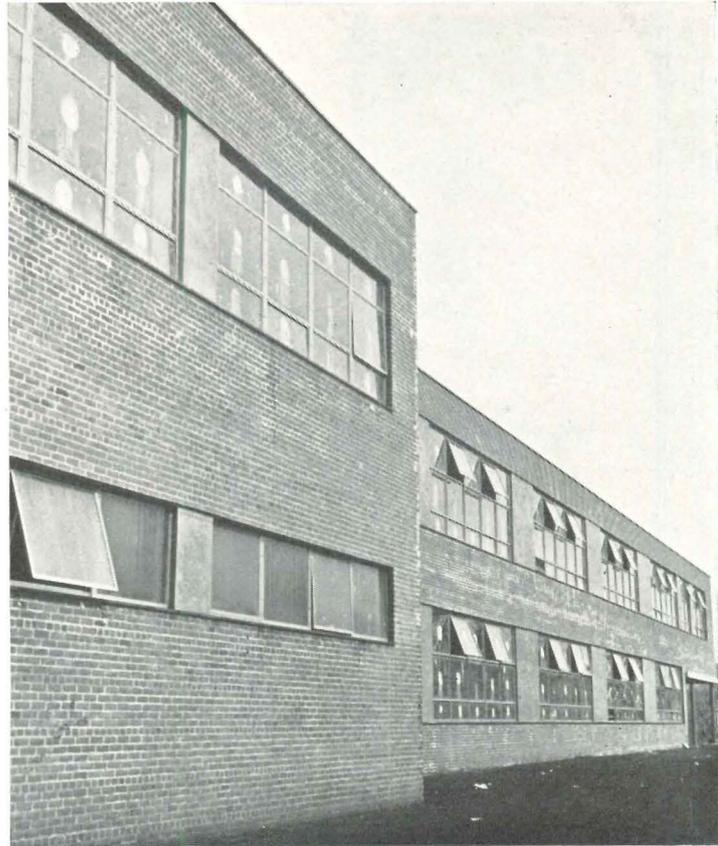
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ANSONIA HIGH SCHOOL



ENTRANCE PORCH



CLASSROOM WING

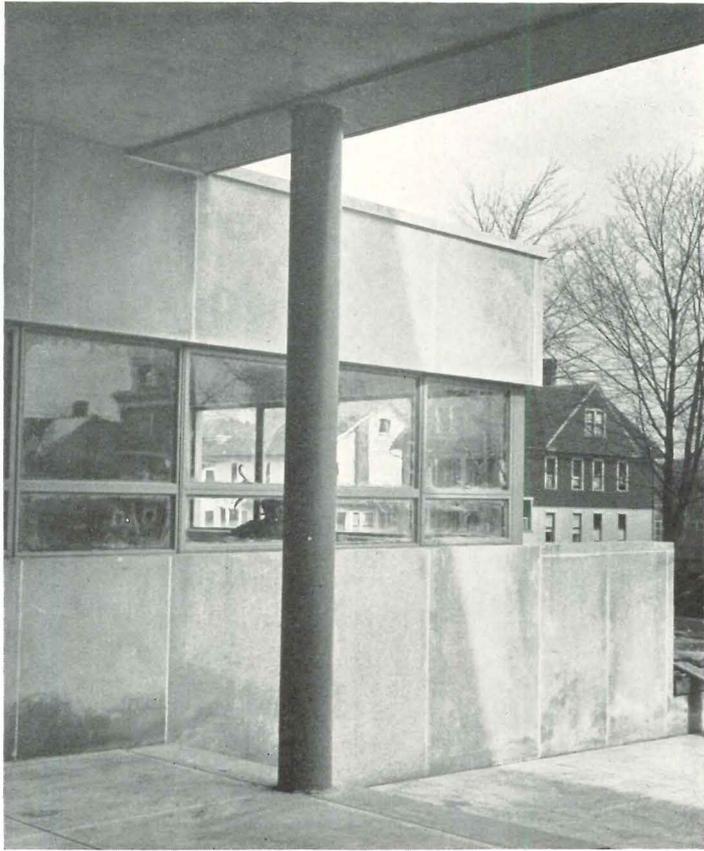
WILLIAM LESCAZE, ARCHITECT

Photographs by Zimmerman

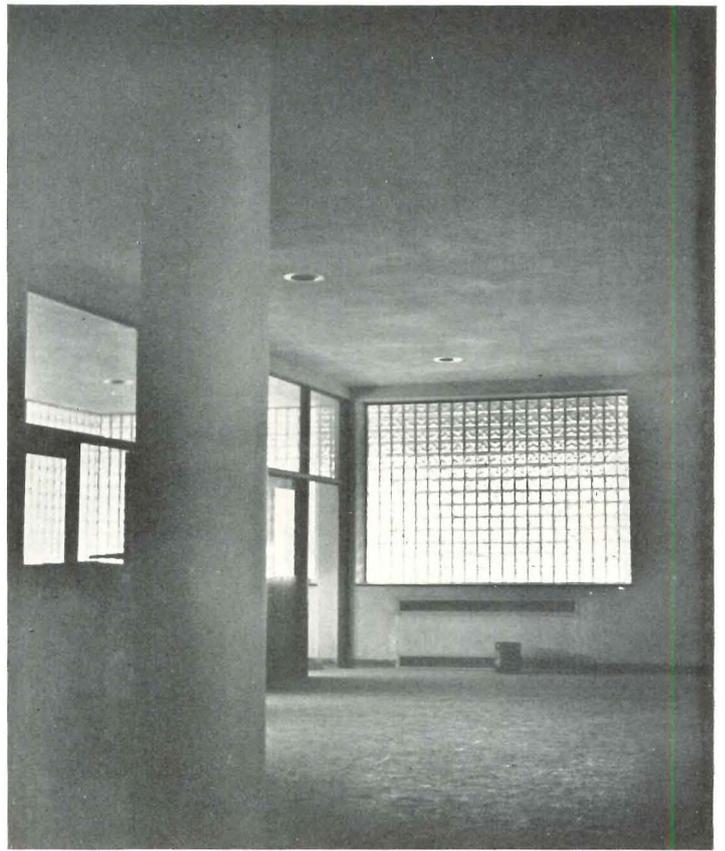


PASSAGEWAY
TO INNER COURT

ANSONIA, CONNECTICUT



PORCH



INTERIOR AT ENTRANCE

VERNON F. SEARS, ASSOCIATE

The three major elements of the plan of Ansonia High School were auditorium, classrooms and gymnasium. The auditorium was placed on the extreme north side of the property as near as possible to the main thoroughfare to provide easy access for the public, since the auditorium will also be used by other than educational groups. If the auditorium is used in the evening it will not be necessary to open the high school proper, thus insuring better control. On the other hand, students may quickly assemble in the auditorium upon call from the classrooms. A stadium type auditorium was decided upon so as to allow students to pass from the second floor corridor to the orchestra level as well as from lower floors to the ground floor level of the auditorium.

The east-west light is considered best for the ordinary classrooms. These are on the second floor level. For the most part the administration has been restricted to the ground floor. An open porch was created between the administration unit and the auditorium so as to allow people passing on the main thoroughfare an opportunity to see the open court and groups playing in the athletic field. This porch will also serve as an entrance to athletic events and to the gymnasium. The gymnasium unit is designed to relate the services as closely as possible to activities. The physical director's office permits a view of the athletic field. Perhaps the most stimulating innovation in the plan is the use of one-room deep classrooms. The corridor is therefore at one side and is not at center as becomes customary. This permits quiet and better ventilation. Lockers for pupils are in the corridors. This arrangement is similar to lockers in the hallways of the two Michigan schools by Lyndon and Smith, architects.

NORTHVILLE GRADE SCHOOL



Photographs by F. S. Lincoln

GENERAL VIEW, DAY

PLANNING: Arranged to face principal street and have no classrooms face the noise of the major playground at a lower level, located inside the L classrooms on one side of corridor affording best light and ventilation. Kindergarten planned as practically a separate unit with entrance, coatroom, toilets, terrace and playground. South wing arranged for future extension. Boiler room located at end of building adjacent to present building which will also be heated from the new plant.

CONSTRUCTION: Concrete frame and exterior bearing walls structure with concrete joist floor and roof slabs. Exterior walls, face brick. Monumental type steel sash mounted flush with brick surface by special detail. Stone coping. Concrete canopy slabs. Glass block light panels in stairs, kindergarten and playground.

INTERIOR FINISH: Painted plaster walls and furred ceilings. Hollow metal entrance and vestibule doors and frames. Hollow metal frames to all classrooms, metal plaster clip trim throughout. Flushwood interior doors, linoleum floors except terrazzo in corridors and stairs. Stairs have alundum abrasive and built-in aluminum tube rails with satin chromium brackets. Hardware with satin chromium finish throughout. Casework and cabinets of birch plywood.

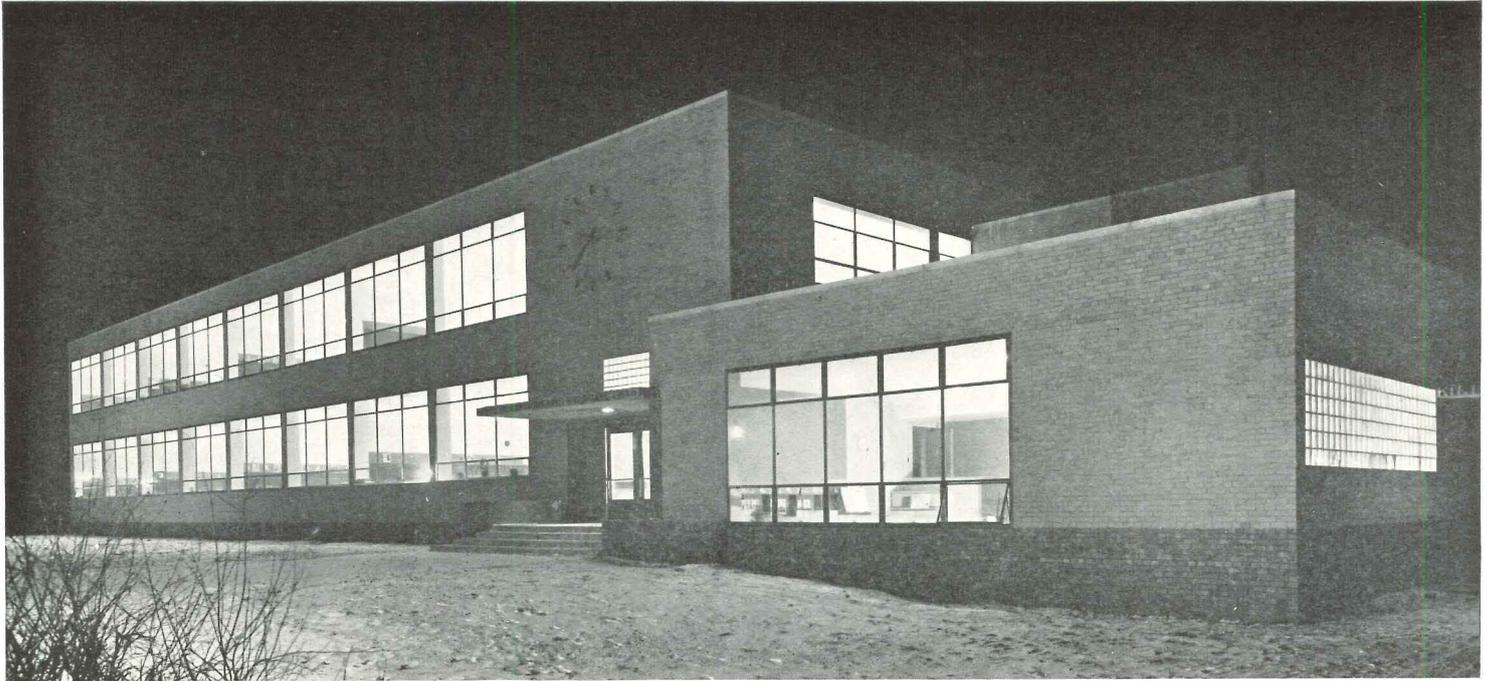
LIGHTING: Indirect fixtures with Silvray processed lamps in classrooms and offices. Corridors and other spaces have recessed reflectors with lens or louvers as suitable. Inside row of lights in all classrooms is automatically controlled by photoelectric relay to maintain required intensity.

HEATING: Conditioned air with ceiling outlets at windows, automatically controlled temperature, central steam plant.

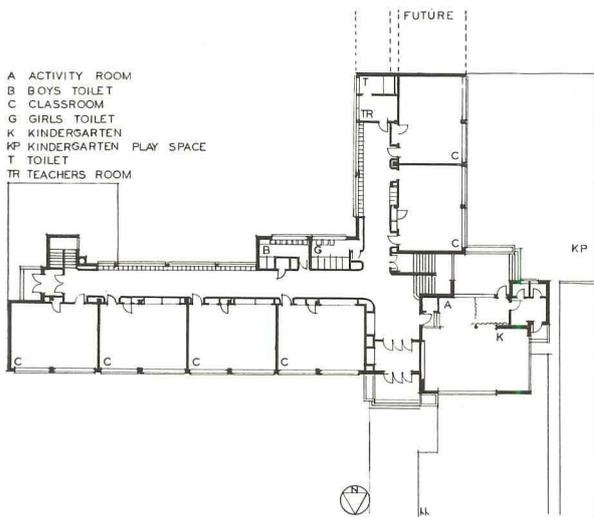
COST: 32¢ per cubic foot, exclusive of classroom and office furnishings.

LYNDON AND SMITH
ARCHITECTS

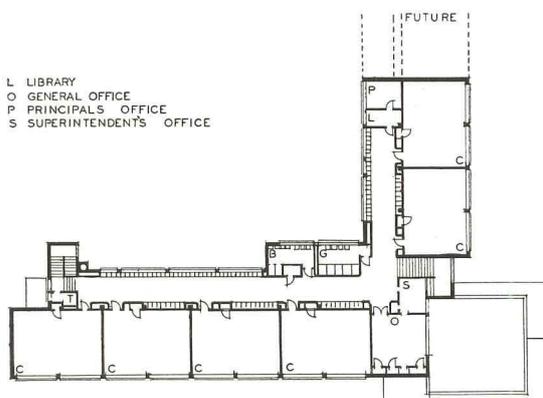
NORTHVILLE, MICHIGAN



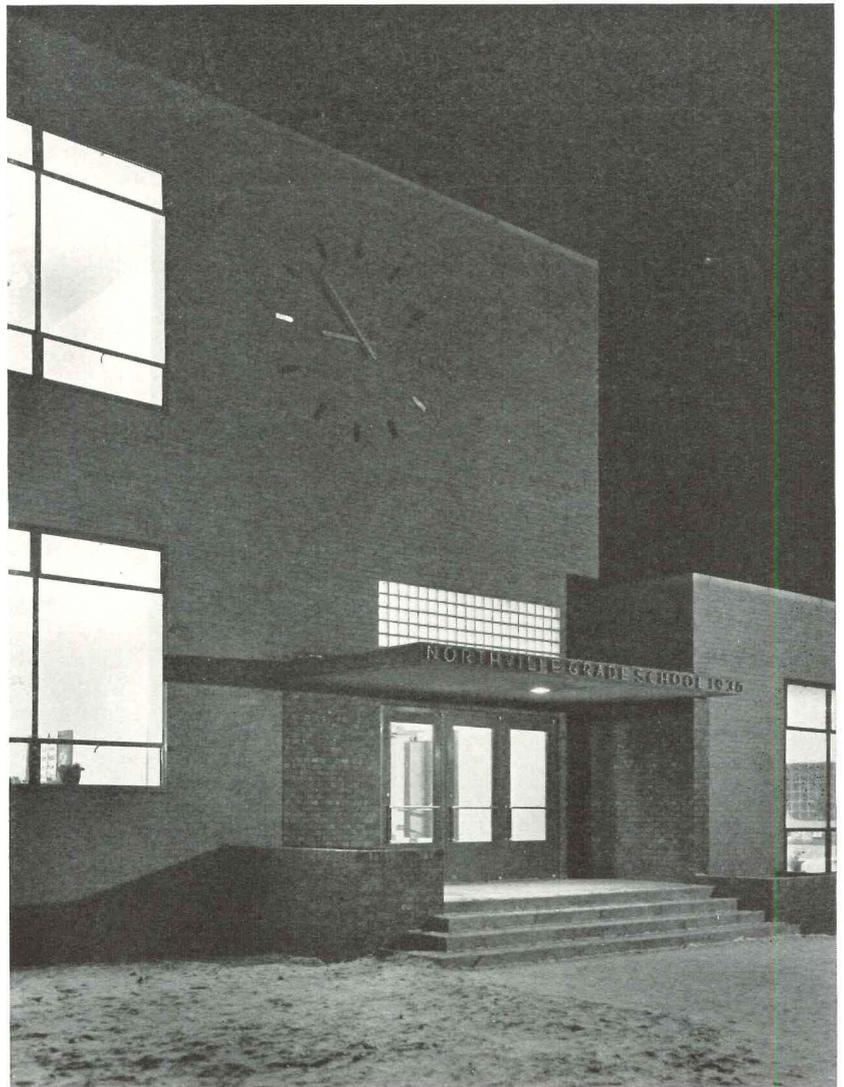
GENERAL VIEW, NIGHT



FIRST FLOOR

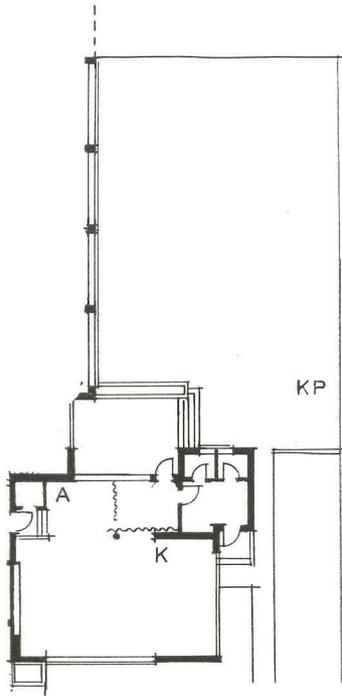


SECOND FLOOR



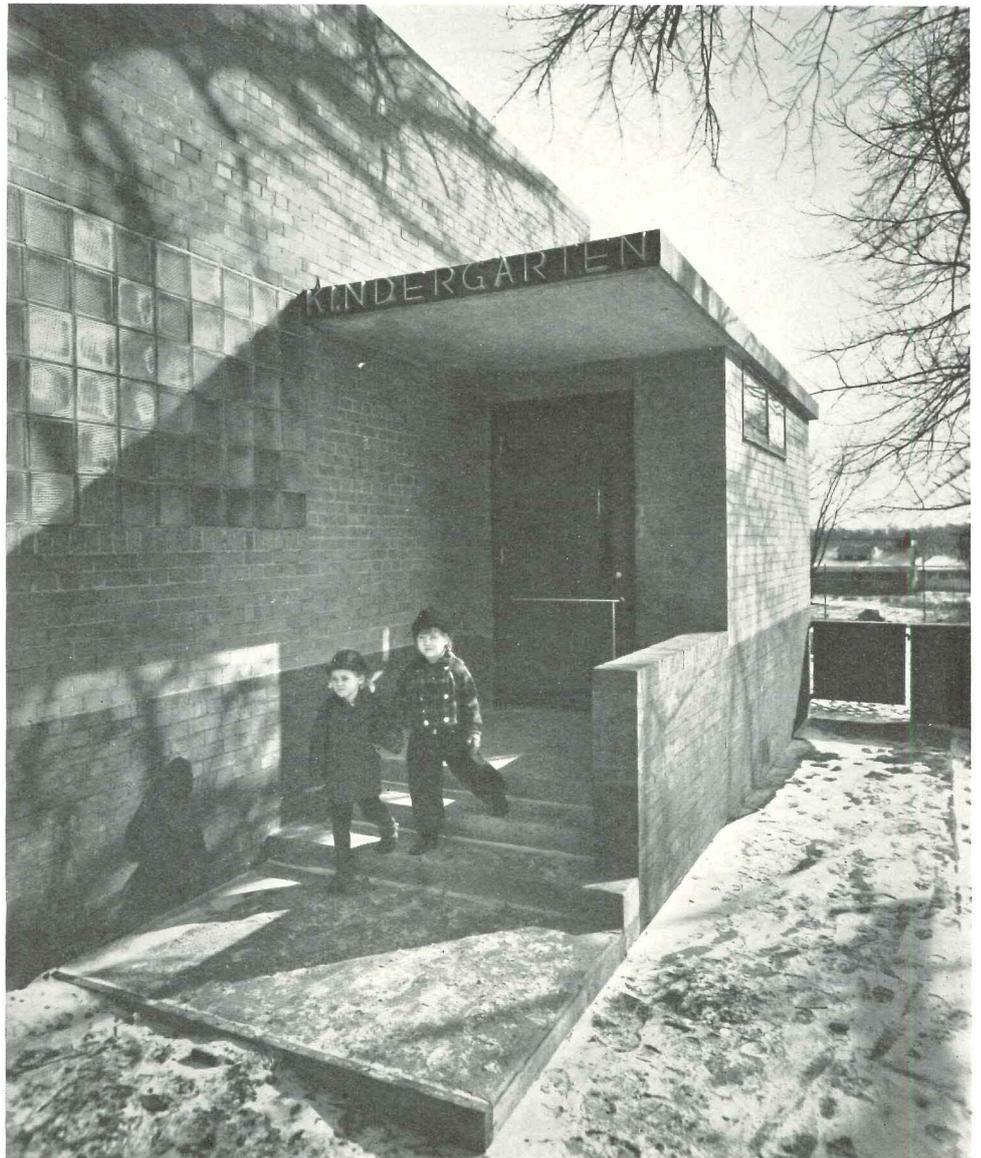
KINDERGARTEN, NORTHVILLE GRADE SCHOOL





Photographs by F. S. Lincoln

Plan of kindergarten attached to Northville School. Note separate entrance through kindergarten play area. The large room, shown on opposite page, is for play activities. This room may be subdivided by means of curtains. Special care was executed in providing natural daylight and artificial illumination.

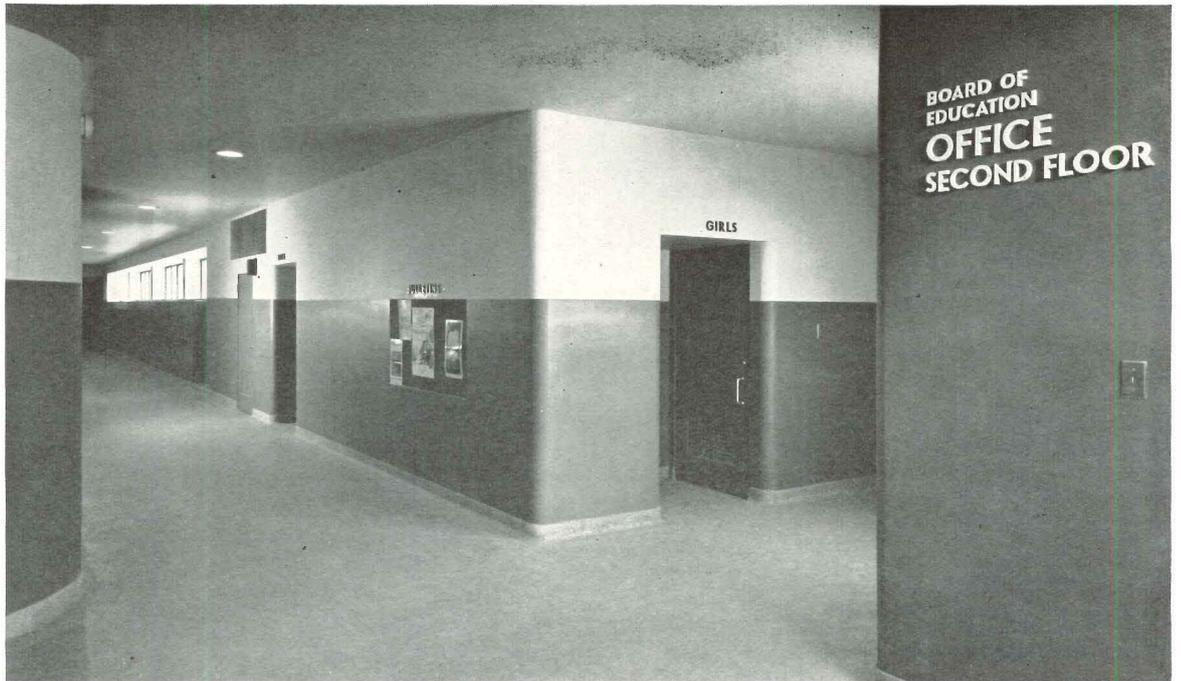


LYNDON AND SMITH
ARCHITECTS

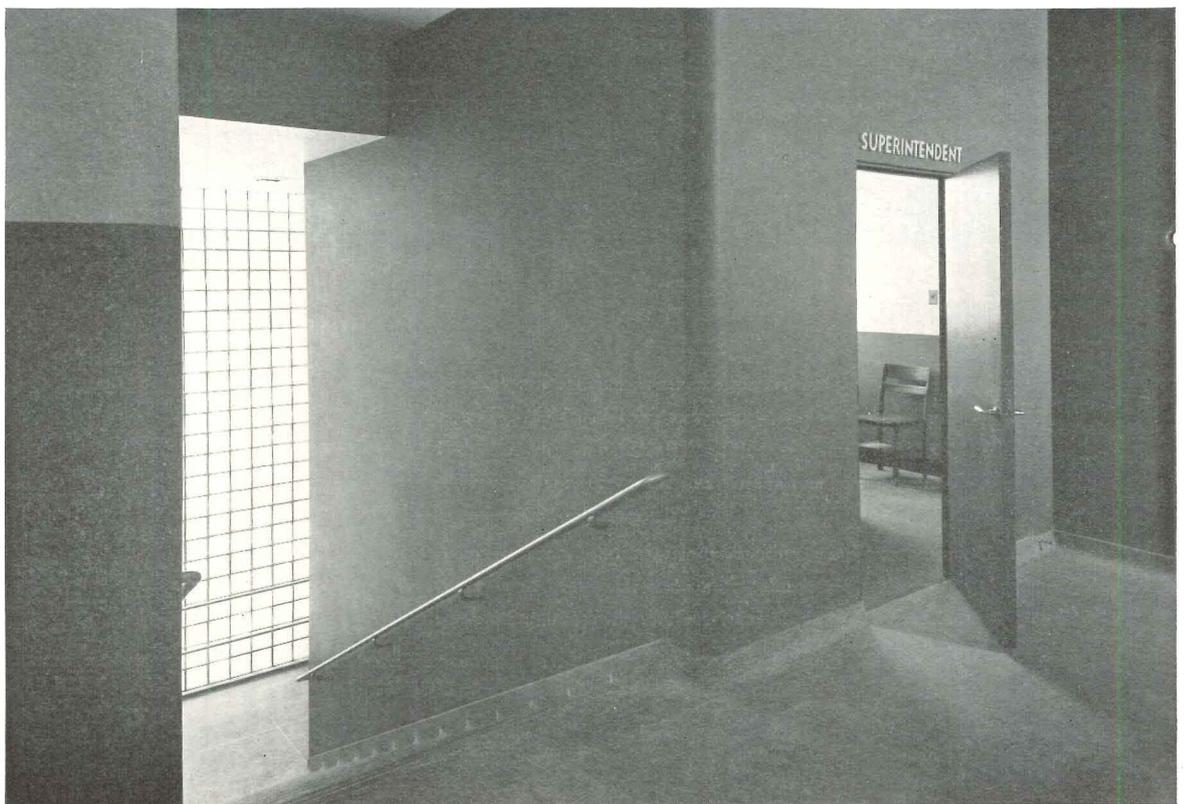
NORTHVILLE GRADE SCHOOL



NORTHVILLE, MICHIGAN



1
Photographs by F. S. Lincoln



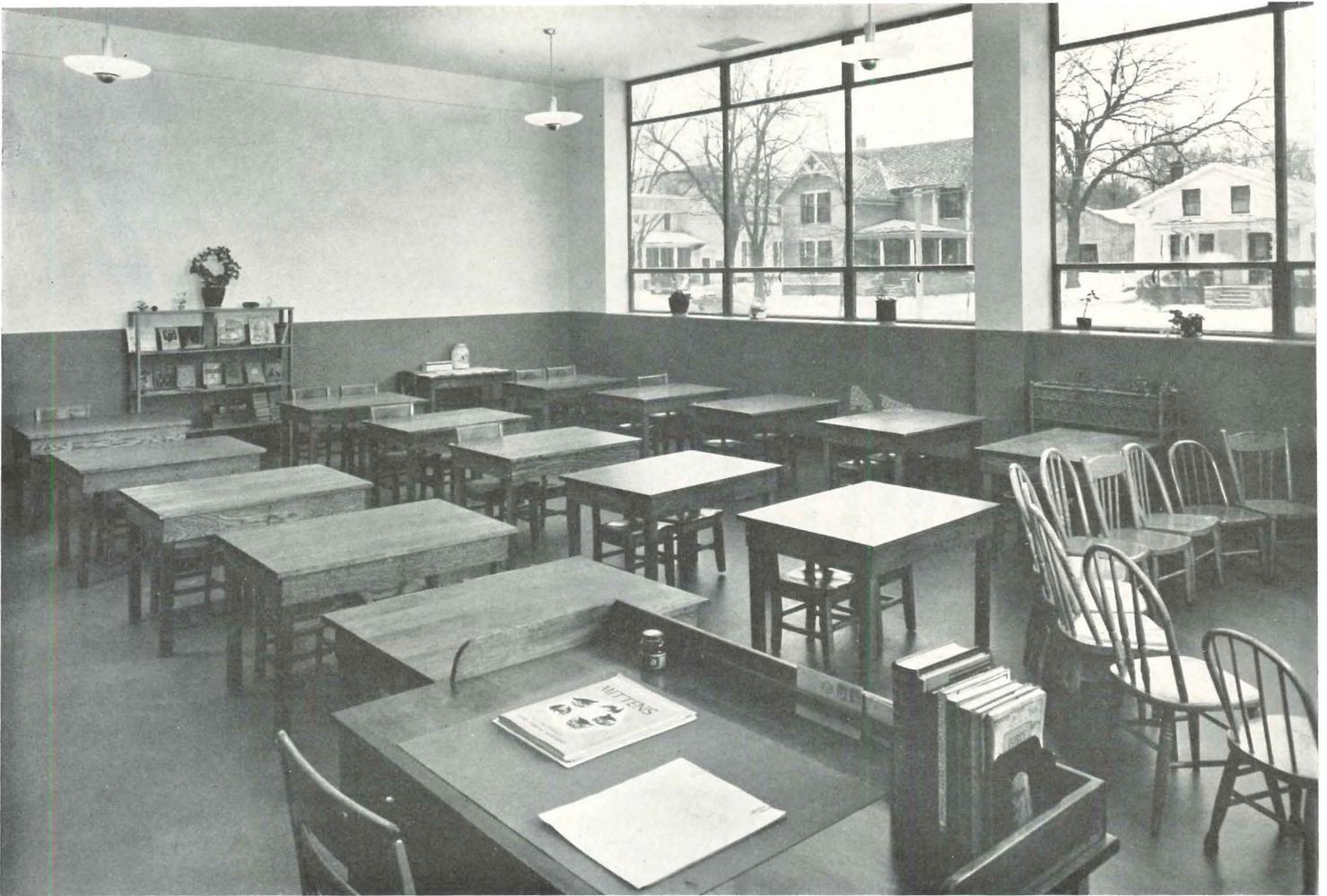
2

LYNDON AND SMITH
ARCHITECTS

1 Corridor with dark hard-finished walls at base and white walls above reflect light. 2 Stairway lighted by glass block wall.

Opposite page: Detail of stairway off corridor.

NORTHVILLE GRADE SCHOOL



Photographs by F. S. Lincoln



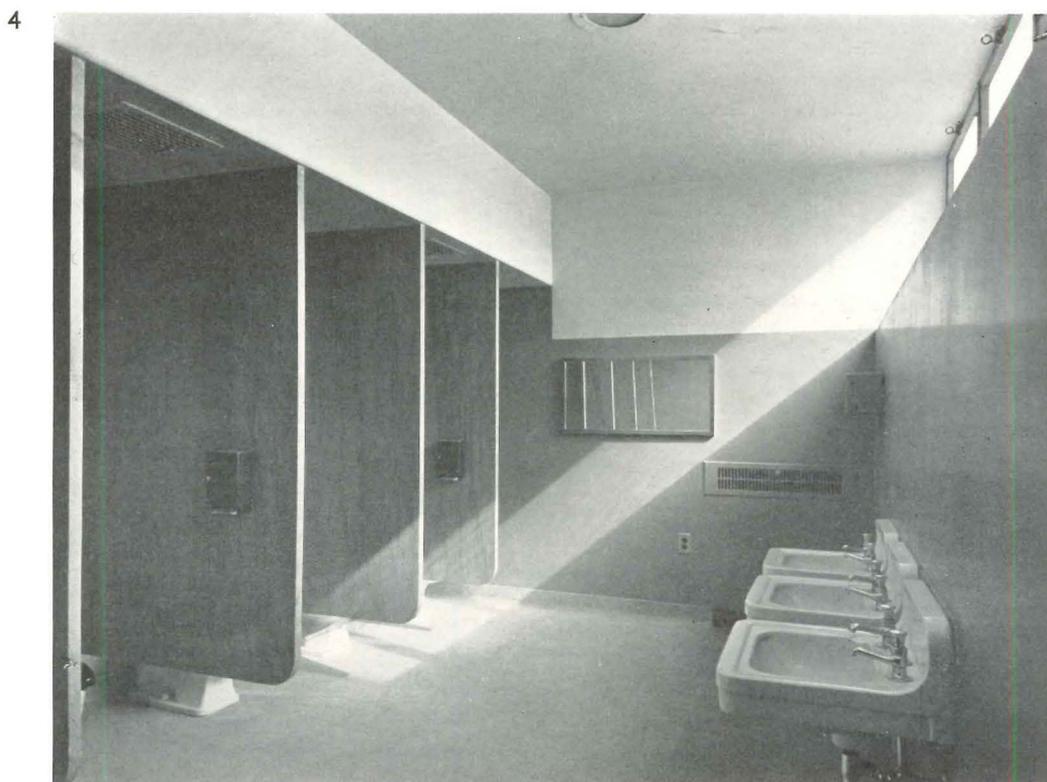
2

LYNDON AND SMITH
ARCHITECTS

1 Activity classroom. 2 End of class-
room showing movable seating equip-
ment. Doors are flush type; bulletin
boards are equipped with cork surface.



3



4

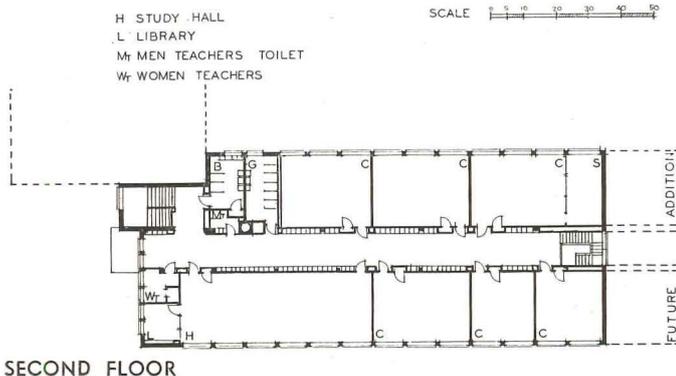
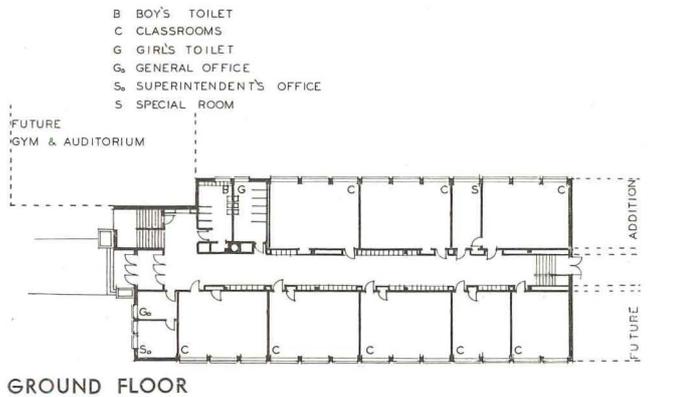
3 Main entrance. 4 Washroom showing toilet stalls of hung type facilitating cleaning. There are special ventilating ducts.

BEECHER HIGH SCHOOL



Photographs by F. S. Lincoln

LYNDON AND SMITH
ARCHITECTS



PLANNING: Conditions dictated maximum space of substantial building with available funds, planned definitely for economical extension in near future. Hence, concentration of mechanical facilities at one end to facilitate extension with steel stairs at other end which can be moved as required. Standard classrooms required.

CONSTRUCTION: Concrete frame and exterior bearing wall structure with concrete joist floors and roof. Exterior walls, face brick. Monumental type steel sash mounted flush with brick surface by special detail. Stone coping.

INTERIOR FINISH: Classrooms and offices, plaster walls, furred ceilings painted, linoleum floors, metal plaster clip trim, flush wood doors, slate blackboard. Corridors, painted plaster walls and furred ceiling, terrazzo floor and base, recessed steel lockers, satin aluminum hardware. Stairs, terrazzo risers and treads with alundum abrasive. Built-in aluminum tube handrail with satin chromium brackets.

LIGHTING: Indirect fixtures with Silvray processed lamps in classrooms and offices, Lumiline strips in corridors.

MECHANICAL: Mechanical ventilation, direct radiation from steam boiler with automatic stoker.

COST: 26½¢ per cubic foot, including stoker, deep well pump and septic tank, but excluding steel lockers and movable classroom seating.
GENERAL VIEW: Provision is made for future addition to existing unit.

ENTRANCE



BEECHER HIGH SCHOOL

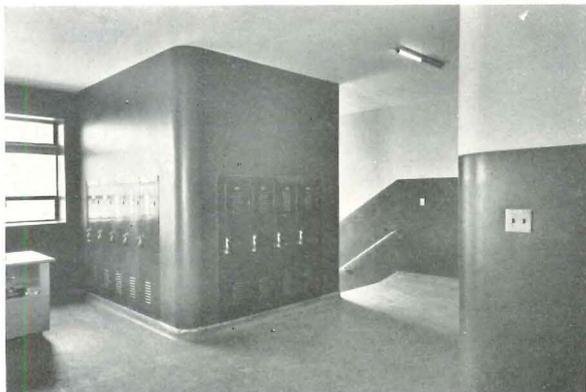


Photographs by F. S. Lincoln

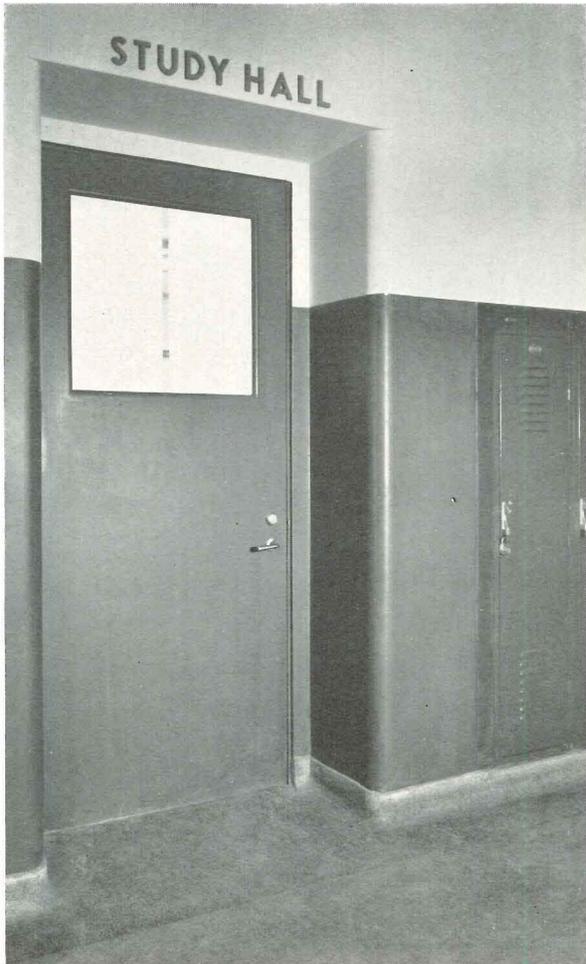


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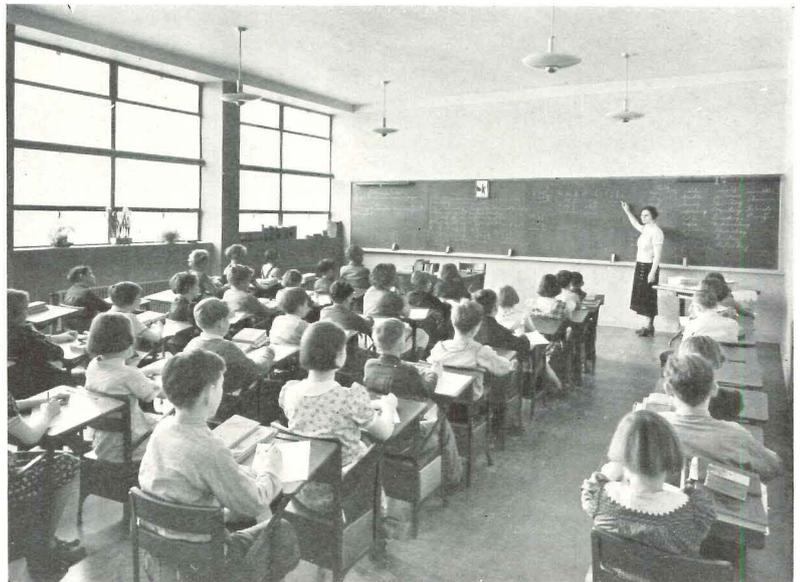
LYNDON AND SMITH
ARCHITECTS



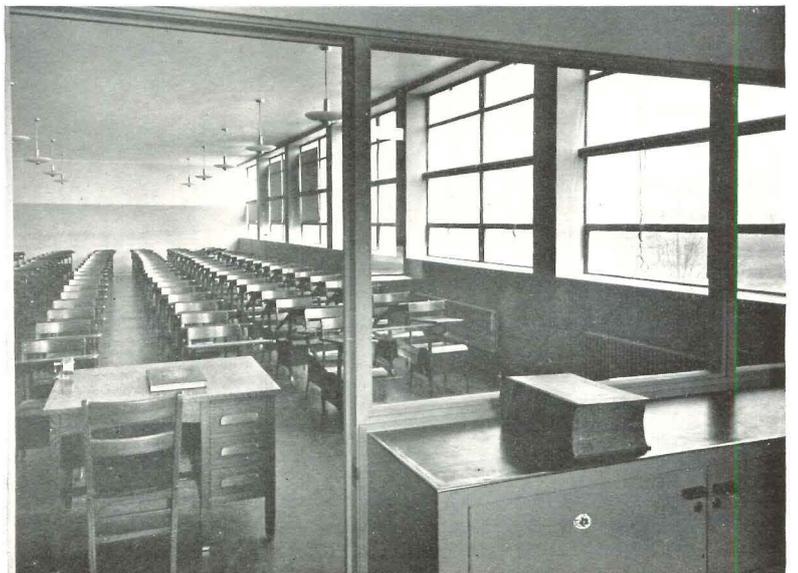
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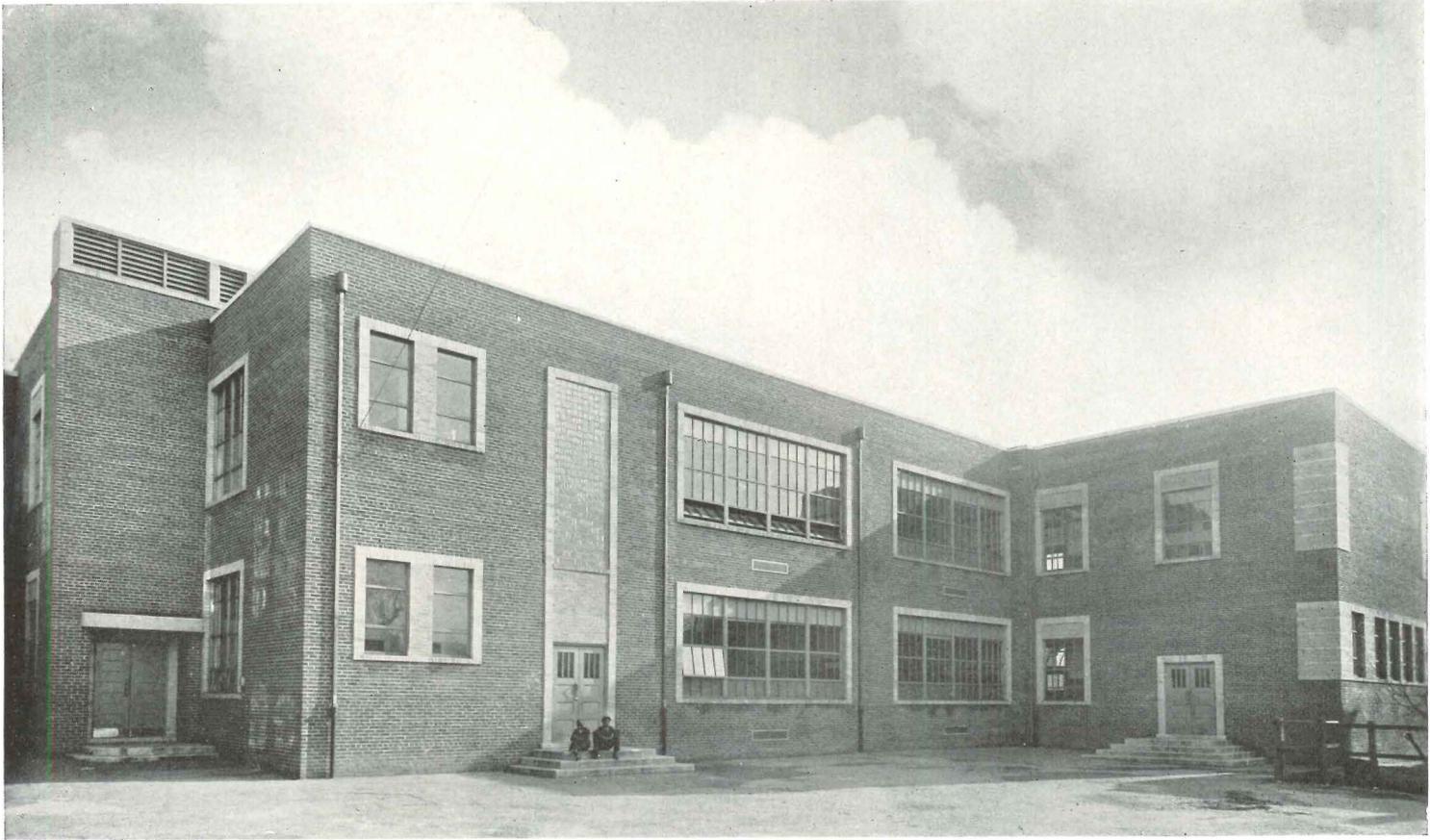
6



7

1 Entrance lobby. 2 Corridor showing built-in lockers. 3 Additional lockers. 4 Entrance to study hall. 5 Stairway. 6 Typical classroom. 7 Assembly hall seen from library.

GEORGE MASON SCHOOL



SCHOOL BUILDING ADDITION

LEE, BALLOU & VAN DERVOORT, INC.
ARCHITECTS AND ENGINEERS

This building is an addition to a grade school serving a part of the colored district in the city of Richmond, Virginia. As the old buildings to which this new unit was added have outlived their usefulness, this addition was planned as a first unit of a future building to which a one-story addition can eventually be built.

A heating pipe tunnel encircles the entire structure and also serves as a means of preventing ground water from causing dampness on the ground floor.

The building is of reinforced concrete construction, with brick spandrel walls of three colors—red field, buff trim and gray spandrels.

The corridors have terrazzo floors and glazed brick walls 6'-0" high. Stair halls are lighted by means of glass blocks; corridors are lighted by fixed sash above the wardrobes.

Classrooms have maple floors, plaster walls and ceilings. Blackboards are placed on the front and rear walls of each room. In addition, each classroom is equipped with oak wardrobes with hanging space to take care of the wraps of forty-eight children, a teacher's locker and a book cabinet. The windows of the classrooms are of the projected type with the lower ventilator opening in, and the center ventilator opening out. The lower ventilators are glazed with obscure glass to prevent the attention of the pupils being distracted by outside interests.

Classrooms are heated and ventilated with a unit ventilator, controlled by thermostats in each room. Air is forced from the rooms through grilles in the lower portion of the wardrobes, and into a duct in the furred area of the corridor ceilings, and in turn into a vertical vent stack. The air passing through the wardrobes dries the pupils' wraps.



STREET
FRONT

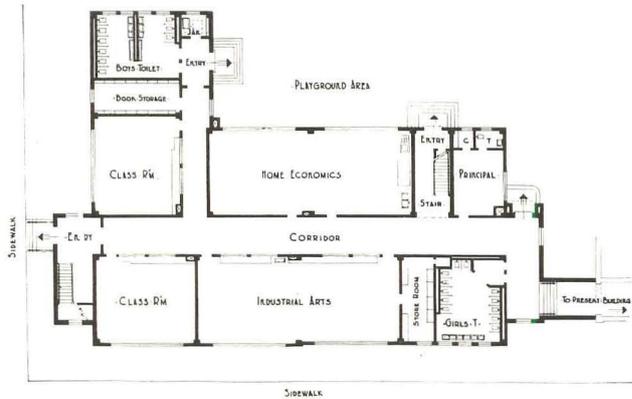
RICHMOND, VIRGINIA

Photographs by
W. Bagley

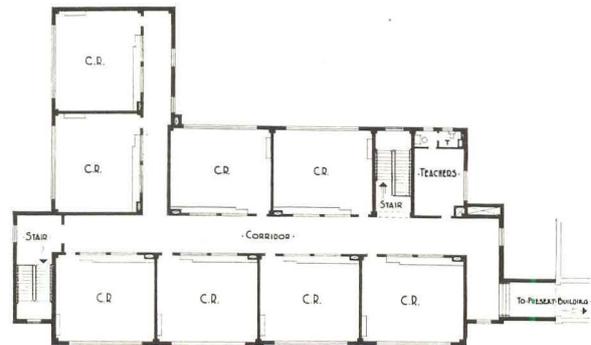


TYPICAL CLASSROOM

LOUIS W. BALLOU, ARCHITECT AND DESIGNER



GROUND FLOOR

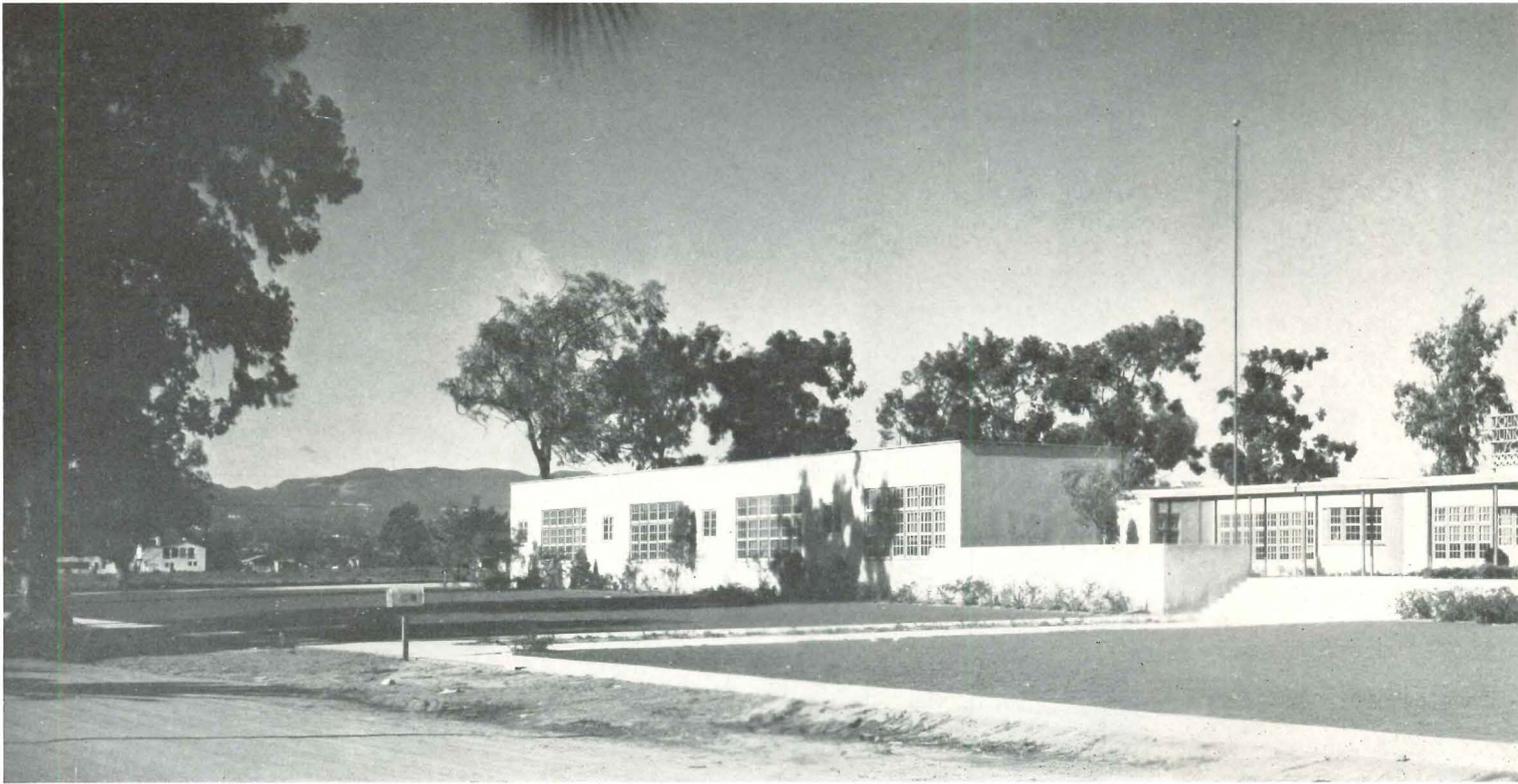


SECOND FLOOR



STAIRWAY

JOHN ADAMS JUNIOR HIGH SCHOOL



SCHOOL BUILDING GROUP

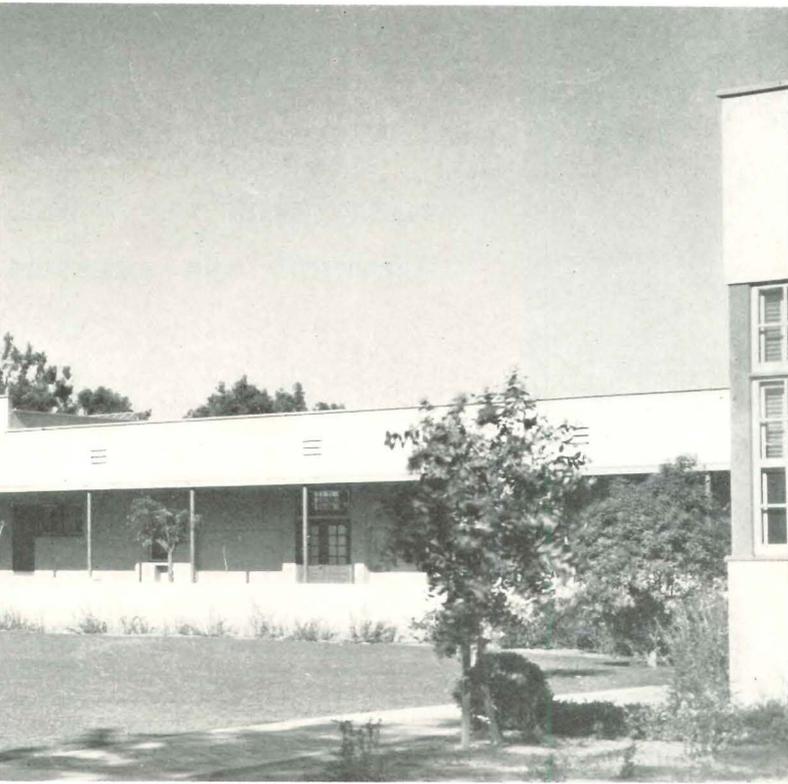
MARSH, SMITH AND POWELL
ARCHITECTS AND ENGINEERS

Photographs by Luckhaus Studio



OUTSIDE CORRIDORS
connecting separated parts
of school plan.

SANTA MONICA, CALIFORNIA

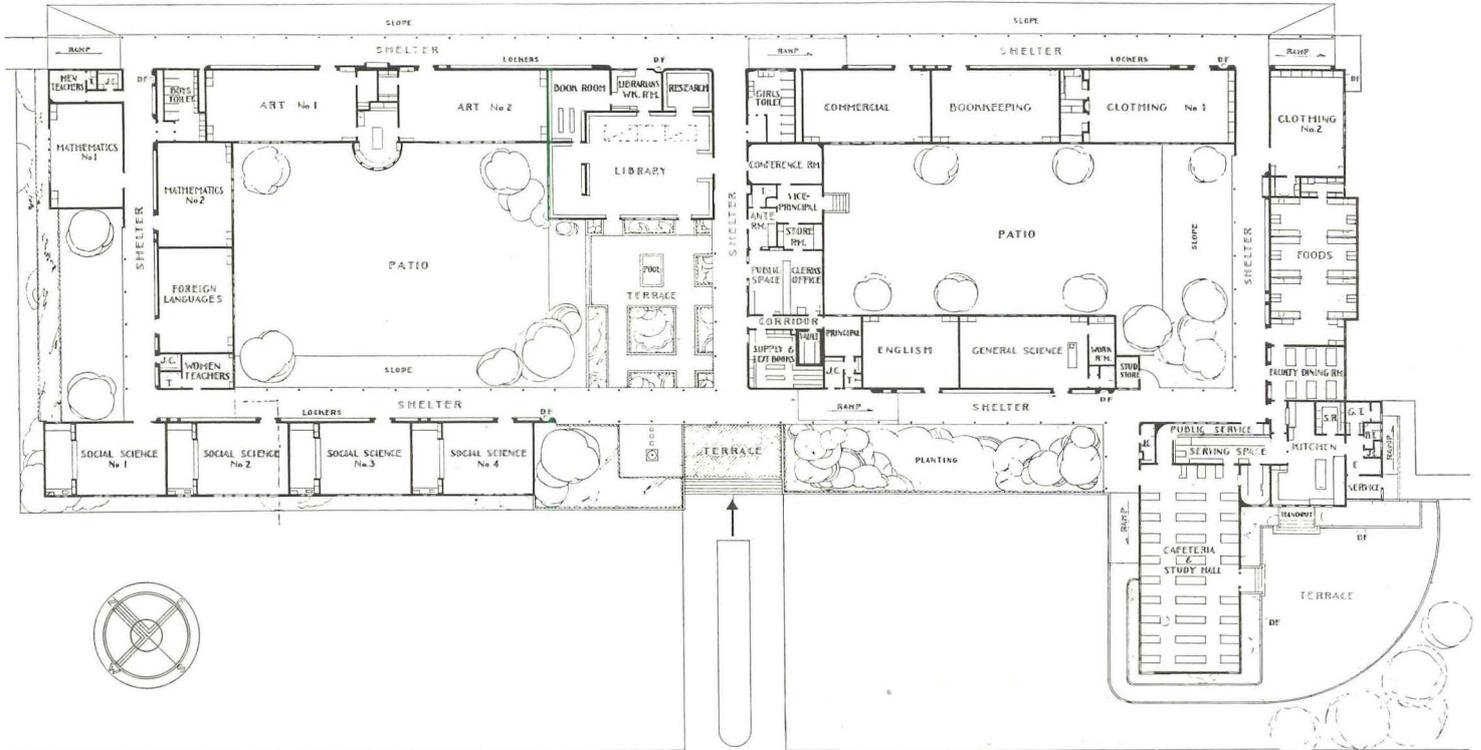


"We are finding our new Junior High School most usable indeed.

"It is attracting favorable comment from visitors far and wide.

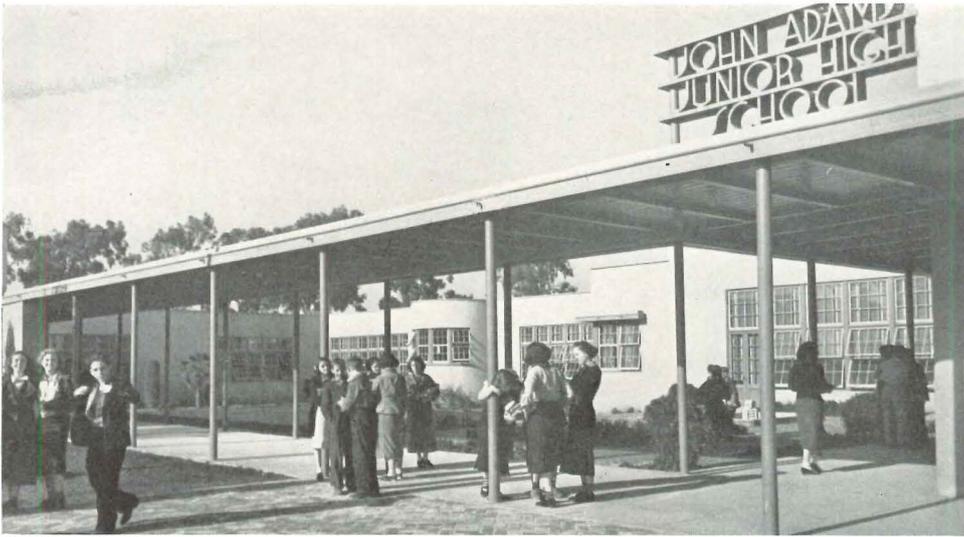
"Best of all it is providing an attractive, efficient and modern workshop where youth may learn by doing."

LAURA CRAWFORD
of Santa Monica City Schools



THE SCHOOL PLAN. There are two large open courts. All rooms are on what is termed a "shelter." This is in reality an exterior corridor made possible by the mild climate of Southern California. Even the lockers are available from this corridor.

JOHN ADAMS JUNIOR HIGH SCHOOL



Luckhaus Studio

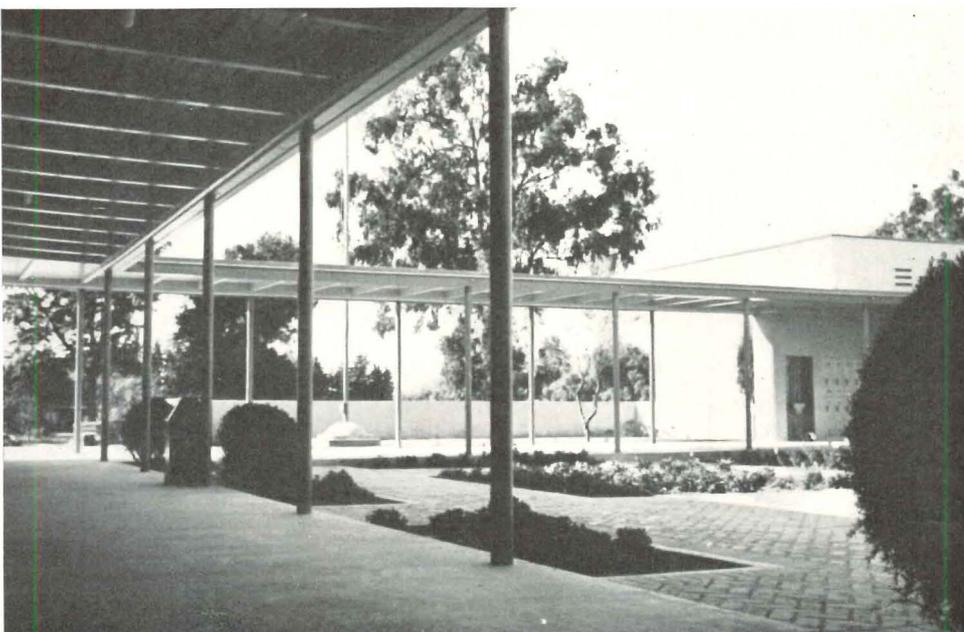
1

MARSH, SMITH AND POWELL
ARCHITECTS AND ENGINEERS



Victor Haveman

2



Victor Haveman

3

1 Main entrance. 2 Court-
yard. 3 Another view of ex-
terior corridor.

SANTA MONICA, CALIFORNIA

The John Adams Junior High School, Santa Monica, replaced an old two-story brick building made obsolete by the Long Beach earthquake in 1933. The building was moved to a new site of 12.3 acres, the land being low in cost and in a territory about 25 per cent built up.

At the outset, in discussions with the school board, a one-story *parti* was selected because of the low land cost and the ample size of site, and because it was easy to install the required lateral bracing to conform to the requirements of the Field Bill.

The type of construction finally selected was wood frame, because funds were not available for making this an all-concrete building and our office has made a practice of designing our buildings all of one type of construction; that is, reinforced concrete, wood frame, etc., rather than mixing the types and having exterior walls of heavy construction and interior construction of wood frame.

We feel that homogeneity of structural materials makes for unity of the mass of the building as a whole and therefore we can expect more uniform action of the mass under vibration of an earthquake. A further consideration which decided us to use wood frame was the request of the Board of Education that this be done as permitted by law. Fire resistance was taken into account by making all walls one-hour fire resistant according to the Uniform Building Code and by firestopping all stud walls at floor, plate, and mid-height and by firestopping off attic spaces as required by law.

The engineering design of the building, from the standpoint of vertical loads, is simple and follows regular practice. The design for lateral forces is as follows: horizontal loads are carried through diagonally sheathed exterior walls and to required intermediate diagonally sheathed walls acting as vertical diaphragms. These vertical diaphragms in turn transfer the loads to the reinforced concrete foundation walls and/or into supporting walls.

The building was started as an FERA project and completed under the Works Progress Administration, being built entirely with relief labor. The total cost of the project was \$171,162. This figure includes full compensation to all relief labor and assumes 100 per cent efficiency of same. This cubes approximately 28.3 cents a cubic foot. If the efficiency of the labor were taken into consideration, the cost of the building would be materially reduced and the cost of the cubic foot would drop to between 20 and 25 cents. This price includes a very complete installation of case and cabinet work in the various special departments of the junior high school.

The plan of the building is an open rambling type, 420 feet long, 206 feet deep, built around two patios. The building was carefully designed to preserve the appearance of openness and vistas of the patios may be had on approaching from the front. Administrative offices are in the center and are marked by the large decorative sign which desig-

nates the building, "John Adams Junior High School." Across this main corridor is the library with a librarian's workroom, school book room, and a research room opening from it. A pair of art rooms are joined by a work unit with a circular bay and supply rooms. The rooms designated as Social Science Nos. 1, 2, 3, and 4 are also used as English rooms, the alcove at the northwest ends being raised two steps from the level of the balance of the room. The laboratory rooms of commercial subjects, clothing, and foods, as well as general science, open on a second patio. The relationship of the foods department to the faculty dining room and kitchen to the cafeteria seems to be desirable. It will also be noted that the commercial subjects are adjacent to the administrative offices.

Owing to the fortunate orientation of the streets of Santa Monica, the building faces on a quarter point of the compass, southwest, thus giving sunshine at some time during the day in every room of the building save one.

Inasmuch as this building has been deliberately designed without the usual ornamental and decorative architectural features, the use of color was very carefully and thoroughly studied. One of the first factors in determining the color scheme was a structural one. Because of the extreme length of the building in frame and stucco construction, it seemed desirable to create mechanical joints in the wall surfaces to provide logical points of expansion and contraction in the stucco surfaces. These joints were so arranged that a moving pattern progressed around the building. The stucco on the north sides was made a warm color; on the south sides, a cool color; and a range of three intermediate shades were used between, changing at joints. Long shadows of the eucalyptus trees on these moving colors give a very lovely effect. The walls under the shelters were made a medium yellow green stucco to accentuate the shades.

Wet samples of all paint used on the building were mixed by the architect and duplicate paddles of each sample were kept at site and office. Factory mixed paint was then made from each wet sample.

The exterior color scheme was as follows: exterior trim, dull red violet brown; sash, pale blue green; doors, deep dull blue; pipe columns, dull red orange; fascias and parapet caps, medium green blue. All of these colors were definitely related to each other and to the stucco color range. The colors of the doors and sash were carried through the interiors of all rooms which were also completely studied as to their color schemes.

The reactions of the students and the public to this use of color have been very good indeed. Our firm has concluded that the public has been starved for color and in its fear of "sour" color schemes has become timid in the use of any colors other than browns and grays. When a carefully related scheme of colors is used, the acceptance is immediate.

By HERBERT J. POWELL of MARSH, SMITH & POWELL, ARCHITECTS

DEERFIELD ACADEMY



Photographs by Samuel H. Gottscho

ADMINISTRATION BUILDING

WILLIAM AND GEOFFREY PLATT
ARCHITECTS



ADMINISTRATION BUILDING
STUDENTS' CONSULTATION ROOM

DEERFIELD, MASSACHUSETTS



SCIENCE BUILDING

Below: GYMNASIUM BUILDING



WILLIAM AND
GEOFFREY PLATT
ARCHITECTS



Photographs by Samuel H. Gottscho



INTERIORS
GYMNASIUM BUILDING

AUTOMATIC CONTROL OF CLASSROOM LIGHTING

To the architect, the importance of proper seeing levels at all times is now clearly recognized. Problems arise, however, in the proper utilization of artificial light sources to maintain desirable illumination levels during day after day operation, under constantly changing conditions of daylight.

At the Highland Elementary School, Lynn, Mass., George A. Cornet, architect, an installation was provided which permits artificial illumination to level out the peaks and valleys of light created by daylight near the windows and in the darker portions at the inside wall. One way to avoid eye strain for those occupying desks on the inside of the room is to turn on in the classrooms 3,000 watts as soon as the light on the first desk falls below the required standard. This, however, would constitute a gross waste of current as pupils near the window would be getting unnecessary light.

The best solution of the problem was found in a flexible system that permitted artificial light to level the normally dark areas to a uniform intensity. This was made possible by the use of automatically controlled lighting, plus "3-lite" double filament lamps operating at 200, 300, 500 watts.

Each classroom has six of these lamps hung in semi-indirect fixtures, forming two rows of three lamps each. Fixtures were hung three feet below the 12-foot ceiling on approximate 10x12-foot centers in a 25'x32' room and at 6½ inches from the walls.

The light graduation consists of three steps, as follows:

Step 1—300 watts on row A
None on row B, nearest the windows

Step 2—500 watts on row A
200 watts on row B

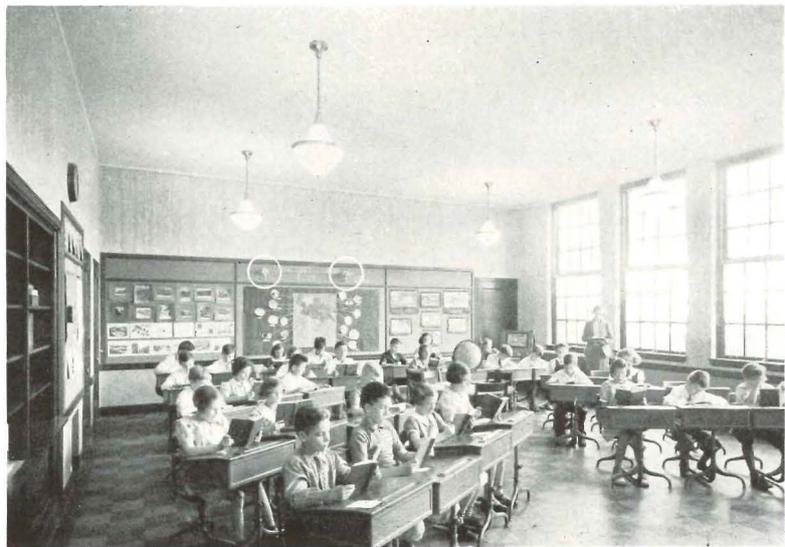
Step 3—500 watts on row A
500 watts on row B

Steps 1 and 2 operate by automatic control and maintain the required illumination levels during regular school hours. Step 3 is for a condition of total outside darkness. This step, being rarely used, is operated by a throw switch inside of the classroom.

The first step adds 11 foot-candles to



1



2

(1) Classroom with natural illumination only. (2) Same classroom with the artificial lighting turned on (Step 2). The white circles show the location of the photronic cells.

the daylight on row B. Step 2 increases the intensity by 9.5 foot-candles, giving a 20.5 foot-candle level from artificial lighting alone plus 3 to 4 foot-candles of natural light. The manually controlled 300-watt circuits bring the room to a uniform 26 foot-candle level when daylight is zero.

The automatic control was accomplished by the use of two (Weston) Photronic cells placed several feet apart at a height 7'-6" above floor level and turned to pick up illumination on desks

near the windows and at the inside wall respectively. These cells operate the control relays located in corridor panel boxes where they are available for servicing without the interruption of classes.

In the basement, a master switch operated by the building engineer puts circuits into operation at the beginning of the school day. It would be also possible to mount all relays and the master switch in a basement control room.

SCHOOL HAND-WASHING

by AUBREY B. GRANTHAM

Health as study is usually assigned to the physician's field of work but there is at least one opportunity for the architect, by careful planning, to guard against the spread of communicable disease.

Hand-washing facilities in schools are, generally speaking, inadequate. School architects cannot be held solely responsible for the fact that very few of the nation's twenty-six million school children are washing their hands enough for health and decency during the school day. Sanitary equipment is not the only factor. There must be soap and towels, encouragement from the teacher, and time for washing as well.

Health authorities tell us that the causative agents of most of the children's diseases that may spread rapidly through a school travel from hand to mouth in the regular course of work and play. They urge the washing of every child's hands at least before eating and after toilet as a common-sense safety measure.

The architect gives the question of cleanliness consideration in the same manner that he considers the lighting and heating necessary for a healthful building. That is, he applies the "standard rule." Many architects and school administrators have felt that,

having met those standards, they have discharged their duties in full, and very often no check is made on whether or not the facilities installed enable the children actually to wash. Where we got these standards, on what judgment they were based, or what year they were written leaves some room for thought. A study of a number of leading school authorities discloses standards varying as widely as one lavatory to every two toilet fixtures, one for every 15-20 children and one for every 80 children.

The simple explanation of this wide range in "standards" is, of course, that the factors involved vary too much in different localities and that no one figure can be expected to satisfy all situations.

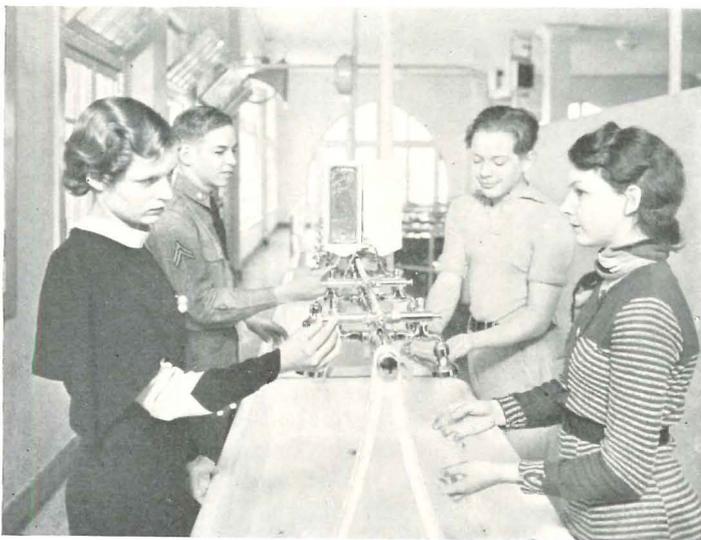
Without laying down any laws, we may mention a few general principles which apply in every situation and will serve as a basis for carrying out a program:

1. There should be enough equipment to permit *every child to wash no less than twice during the school day*. To determine how much will be enough, it is necessary not only to know how many children will use the equipment and how quickly washing may be done with that particular type, but also whether all the children are

to be dismissed at once or whether, on the other hand, the recesses and lunch periods are to be "staggered." Children cannot be handled in the same way as adults. Cleanliness habits have not yet been established, but are in process of formation, and the washing must be a matter of routine that can be carried out easily and pleasantly if it is to take place.

2. For sanitary reasons washing should be done preferably in running water, since children cannot be counted upon to clean a basin after use, even though time permits them to do so. This will automatically outlaw the stopper and self-closing faucet which has been installed in so many schools with a view to saving water. In order to assure economical washing in running water many schools are installing long sinks with perforated pipes above them or fountains at which the children wash in groups, while the flow of water is controlled by a teacher, janitor, or class monitor. Occasionally parental objection is met when it is proposed to install sinks: "Too much like a factory." There are, of course, certain personality values to be derived from letting each child wash at an individual basin, but usually schools find it wise or even necessary to let children carry on school activities in groups.

(Continued on page 44)



Adequate number of wash sinks, located in the school cafeteria.

