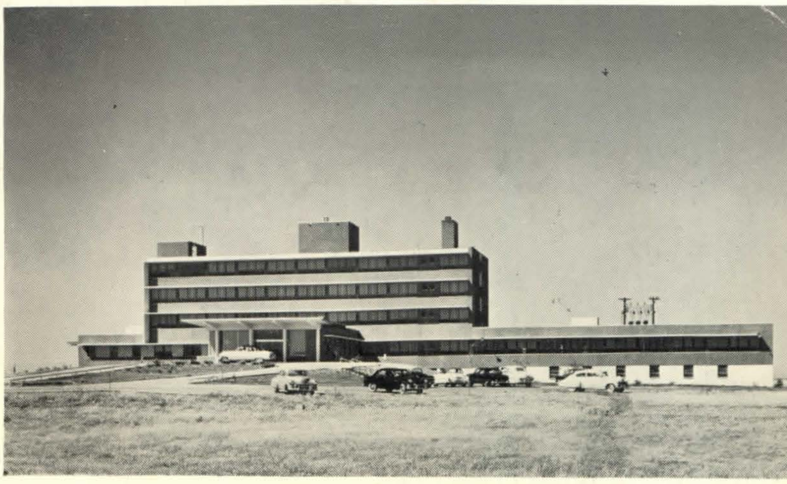
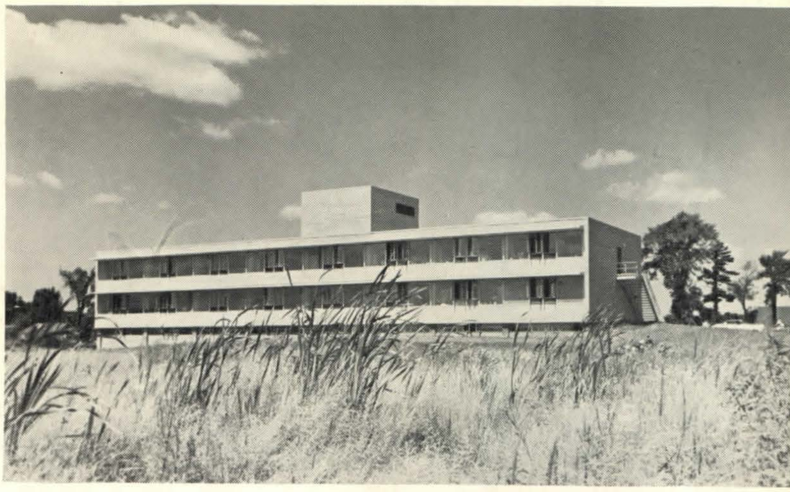
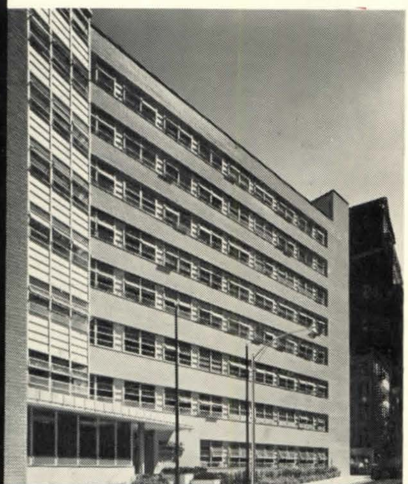
OGRESSIVE ARCHITECTURE





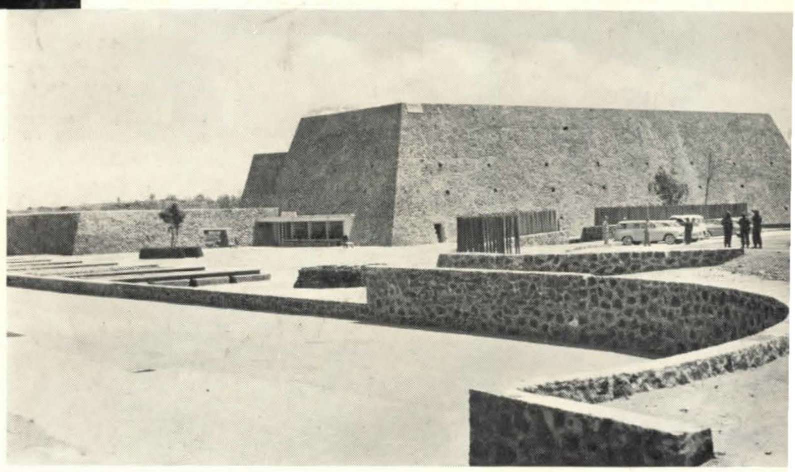


hospital construction

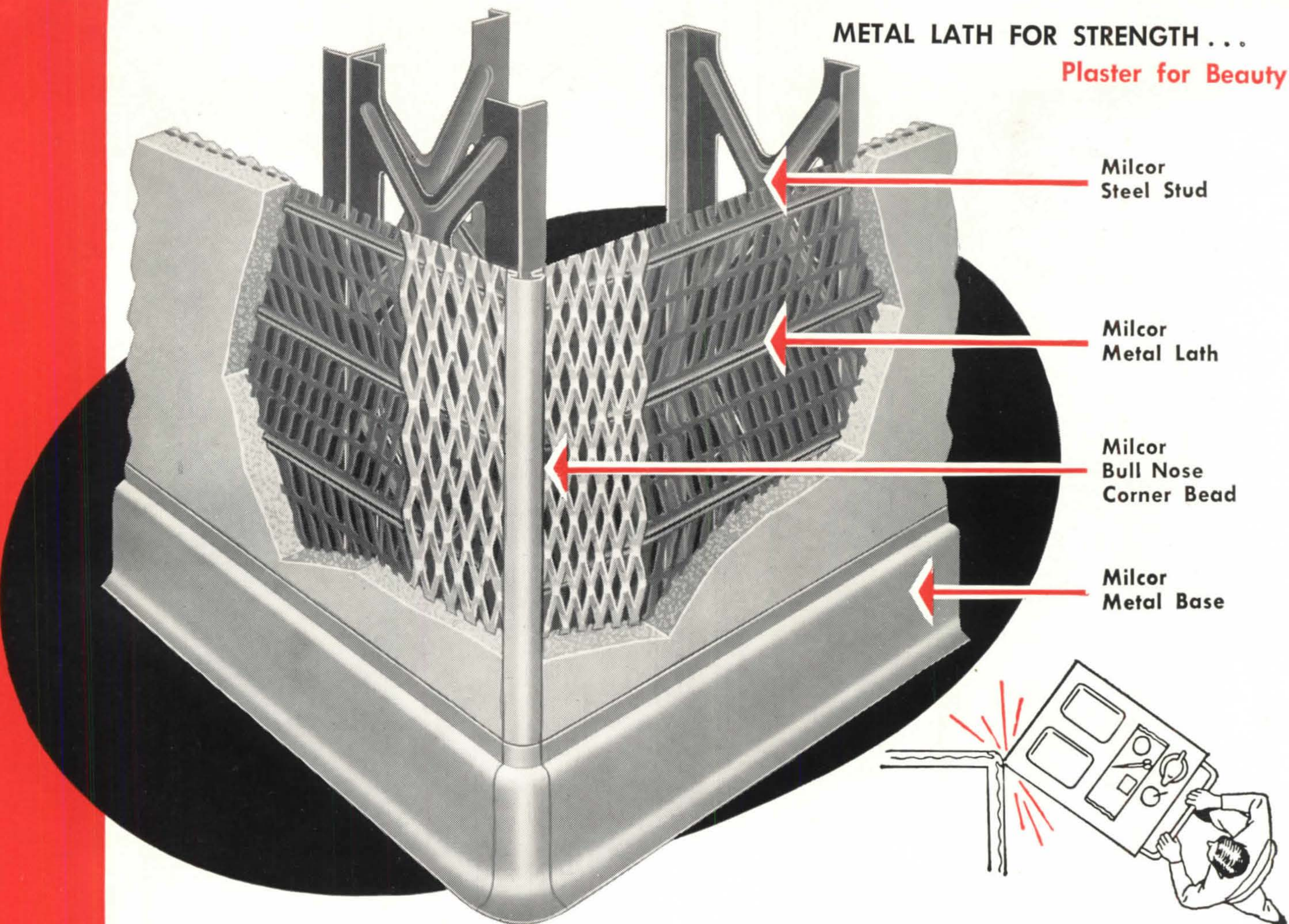
Mexican critique

11

ovember 1953



largest architectural circulation in the world



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No. 10 Bull Nose Corner Bead, shown, is made of galvanized sheet steel and has expansion wings integral with the nose of the bead. No. 10 is just one in a complete line of Milcor Corner Bead for every construction condition—and designed for application with other items in the broad line of Milcor Metal Lath and accessories.

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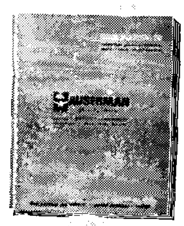

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Ottumwa, Iowa, Hospital, built 1952. Architect: Morgan-Gelatt & Associates, Burlington, Iowa. Consulting Engineers: Beling Engineering Co. General Contractor: Ringland, Johnson, Inc., Des Moines, Iowa. Mechanical Contractor: Mechanical Constructors, Inc., Moline, Ill.

WALL-to-WALL WARMTH

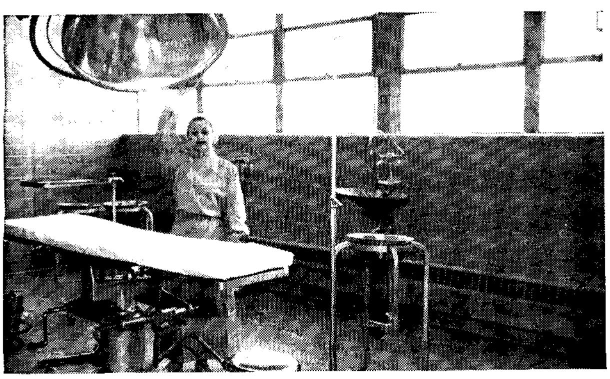
For New 133-Bed Iowa Hospital

New Ottumwa Hospital, 28th hospital design completed by Architect Dane D. Morgan of Morgan-Gelatt & Associates, has wall-to-wall warmth assured by Tru-Perimeter hot water heating using Webster Walvector.

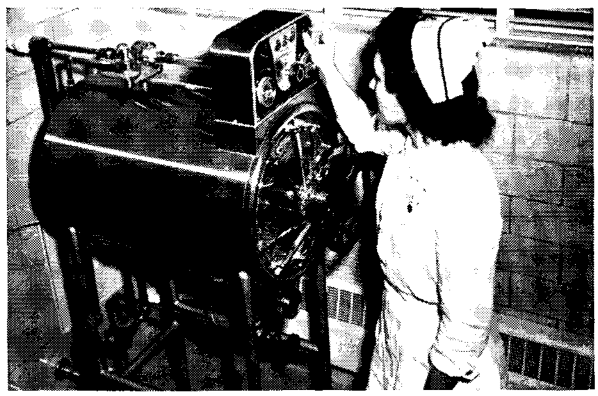
The new 133-bed Ottumwa, Iowa, Hospital, a community project built on a 40-acre tract, replaces a hospital group which for 60 years had struggled with space problems. The new hospital has 95,287 sq. ft. of floor space, 716 sq. ft. per bed, and was built at a cost of $14.88 per sq. ft. or $12,789.51 per bed. It has a maximum bed capacity of 175. Total cost of building and equipment was $1,800,000.

Beling Engineering Co., Consulting Engineers, recognized the need for wall-to-wall warmth in every room. As a result, patients and personnel enjoy the comfort of a zone-controlled hot water system with "Tru-Perimeter" Heating by Webster Walvector. Water is heated by steam converters in penthouse.

Webster Walvector heats all exposed walls, gives gentle, even warmth. No cold spots, hot spots or drafts. Heating element and piping are concealed in attractive metal enclosures. Piping is simplified, fewer risers needed.



Operating Room. Webster Walvector offsets heat loss from large glass exposures here and in nursery and obstetric suite.



Where space is limited, as in this sterilizer room, Webster Walvector conserves floor space. Assures comfortable warmth, but is never in the way. Sterilizer is equipped with special Webster Process Steam Trap for fast heating-up . . . standard on all leading sterilizers.

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PROGRESSIVE ARCHITECTURE

November 1953

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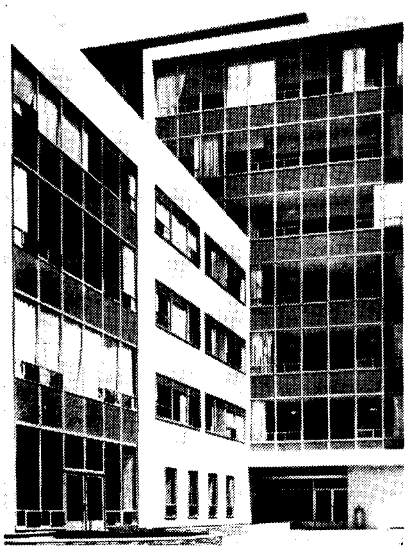

Children's Orthopedic Hospital, Seattle, Washington.
Architect: Young & Richardson, Carleton & Detlie, Seattle.
Contractor: Howard S. Wright, Seattle.

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learned the hard way

Dear Mr. Tomson: Your IT'S THE LAW column in September 1953 P/A is intensely interesting and brings up many points that need clarification. The first of next January I will complete 43 years of practice, during which time I have learned several things the hard way.

I enclose General Conditions, Contract, and Bond which indicate my beliefs and those of my attorney.

Article 37 requiring contractor to pay subcontractor proportionately as contractor is paid is reinforced by statement in Article 58, "It is further agreed by the contractor that all payments made to him for or on account of the erection and completion of the work to which this specification relates, will be received and held in trust, and as a bailee, for the express use and purpose of paying in full (less agreed credits) for all such items and that no title to any payment, nor any part thereof, shall vest in him until all such items have been paid for in full, less agreed credits."

Article 24 calling for receipts and vouchers "if required" is correct. The vast majority of transactions go through to completion without any trouble. Why assume another responsibility? You are armed with necessary weapons for use if needed.

As to what the owner expects, there are about 100 different expectations for each different owner, for which reason an explicit detailed contract with the owner is necessary.

Regarding insufficiency of the 10% withheld, if the architect exercises due diligence under Arts. 24, 25, 26, 56, the 10% (15%) is sufficient. Of course the schedule of values submitted according to Art. 24 will have to be checked against the architect's estimate and various subbids, etc., and frequently a battle follows and then a revision to squeeze the water out of items completed quickly and get a sufficient allotment for the last ones. Estimates will have to be checked on basis of "value of work done proportionate to the contract" (see Art VI of Contract), not on "*cost of work in place*" (lest the contractor has underestimated the job) nor on *percent of physical volume* completed (lest the last 10% of volume requires 90% of the expense). The time of completion will have to be checked, demurrage approximated and withheld in accordance with the next to last paragraph of Art. IV of the contract.

Regarding your statement "the 10% is intended to cover possible claims for defective work," I am afraid you have been misinformed. I cannot visualize the AIA as intending to inform the world that the products of our education, experience and labor are so inferior as to cause us to complacently contemplate in advance a 10% defective result, and to assume that the contractor should guarantee our competence.

Regarding audits: On the average, the architect is not equipped by inclination, or experience, to become a bloodhound sniffing out a possible crook amongst the contractors on his work. Most of us have all the trouble we need in making clear, complete, concise, definite set of plans and specifications that can be fairly interpreted by an intelligent mechanic without the aid of a lawyer and a mind reader. Let's leave the auditing to the contractors, their bankers, and the bonding companies.

FRED HALSEY
Texarkana, Ark.-Tex.

read with interest

Dear Mr. Tomson: I have read with interest your proposed articles in P/A having to do with the extent of an architect's duties in supervising the activities of a general contractor, particularly the use by the general contractor of the owner's payments to him in payment of amounts due under subcontracts.

I think that the points that you make in the article are well worth making at this time and hope that they will be further studied by the architectural profession. Of course they apply particularly to lump-sum contracts since the application of the owner's funds to the payment of subcontracts under a cost-plus contract is generally taken care of adequately under the current auditing procedures.

THOMAS M. GREEN, Vice President
R. H. Macy & Co., Inc.
New York, N. Y.

important subject

Dear Editor: We were very glad to attend P/A's discussion of subjects covered in Bernard Tomson's articles for P/A in September, October, and November 1953 issues, largely devoted to "supervision of the contractors"; and also to read later the articles themselves. We found this discussion very enlightening, and we believe the articles themselves can do a great deal of good by calling the attention of architects to important legal and financial matters which may sometimes be neglected.

In our office we formerly used none of the standard documents. We noted as time went on that not only were builders more acquainted with the standard documents, but also that we could generally adapt them to our use by making such modifications as we saw fit for particular jobs. Occasionally we still run into a set of conditions where we develop special documents, but this is a rare exception. Therefore, we would say, first of all, that if the standard documents should be amended, by all means refer the matter to the proper Institute Committee, but if the same are not amended, the individual practitioner will modify them as he sees fit in his practice.

As was stated at the conference, we do not see that there is any problem with contracts handled on the cost-plus systems. In such cases, we ask for all of the supporting papers; that is subcontractor's requisitions, receipts, payroll data, material bills, delivery stubs, cancelled checks, and the like, and check these documents. We reserve the right for the owner to audit the contractor's books on a monthly basis, or before the final payment, and many owners carry out such audits.

(Continued on page 10)

(Continued from page 9)

When it comes to the matter of the lump-sum form of contract, then it may be admitted that there is room for a slip-up as such jobs are usually carried out. We ask for the usual schedule of values for the various parts of the work, checking same for proper allocation to the trades. The contractor usually bases his requisitions on percentages of completion in the various categories; and we require an affidavit stating there are no liens against the job, and the contractor further stating that he has paid to all subcontractors the percentage of their contract requirements approved by us. This is followed at the end of the job by the usual release of lien of the contractor, subcontractors, and material men. We approximate the value of work done, and the value of work remaining in arriving at our certification.

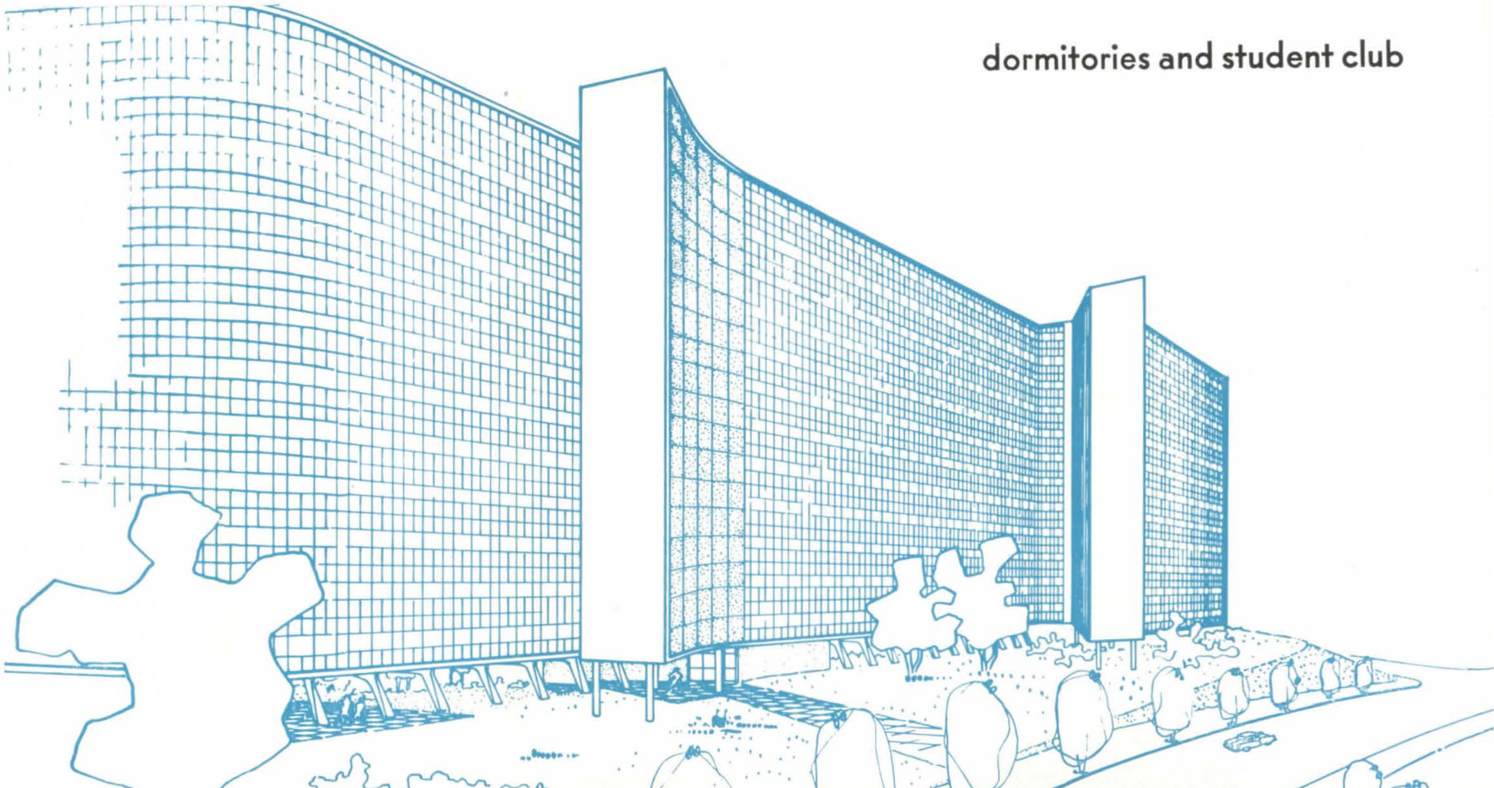
If the contractor falsifies his affidavits, and if subcontractors are stalled off for a few months, or if major subcontractors play along with a general contractor for a while, then it is true that the contractor can create an unsafe condition. Our experience has been, however, that subcontractors are pretty well posted on the conditions surrounding their contractors and they check up quite quickly. We have noticed that sometimes when a general contractor holds back a sub's money purposely to force a correction, for example, that the subcontractor has checked up to see if the general contractor has received the money. Sometimes when a general contractor's requisition has been held up for some reason or other, again the subs have checked to see if he had received his money.

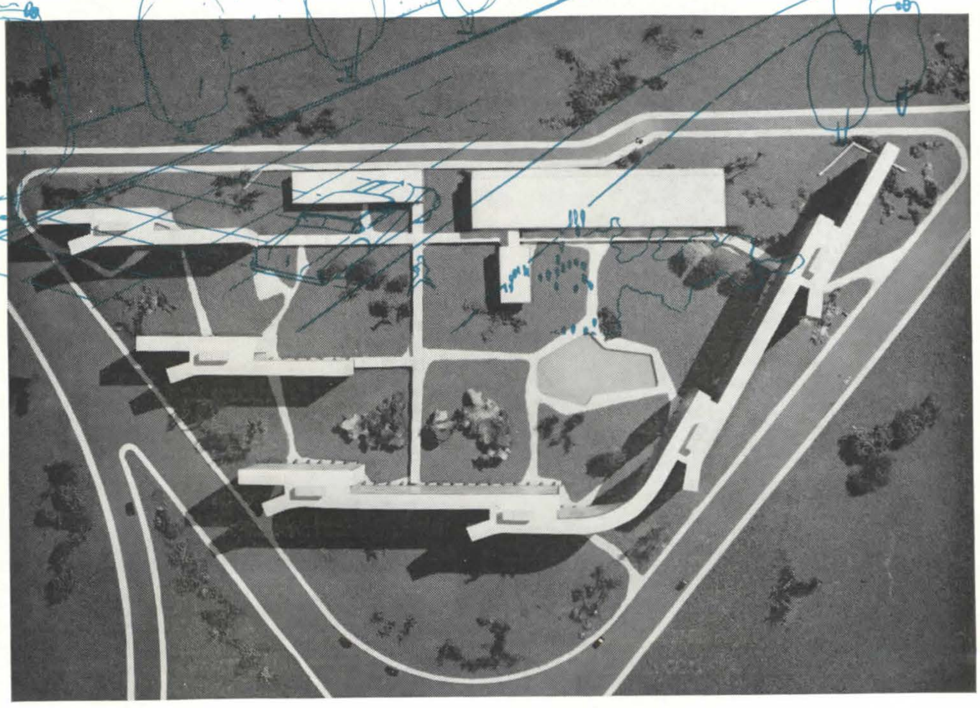
To get around the condition noted above, an audit of the books may be needed, but when a contract is carried out on a lump-sum basis, a general contractor has the right to refuse the details of what is his private business. Sometimes contractors have been willing to furnish the same data as under a cost-plus contract, but we can readily understand that under highly competitive conditions, it is unlikely. We feel, therefore, that any attempt to force through the standard documents the auditing generally of general contractors' books on lump-sum contracts will not get very far, unless the general contractors themselves are approached through their national and local bodies, and are agreeable to the same.

If general contractors should be agreeable to the proposal, then the proper auditing of their books would certainly greatly aid in the elimination of the dangers noted by you. If they are not agreeable, then the safeguards now taken, together with a study of the contractor's background represents about what can be done. An owner understands a contractor may go bankrupt, and the situation surrounding a certification without an audit must be made clear to him. An architect in this deal must primarily see that the contractor is not overpaid, based on what

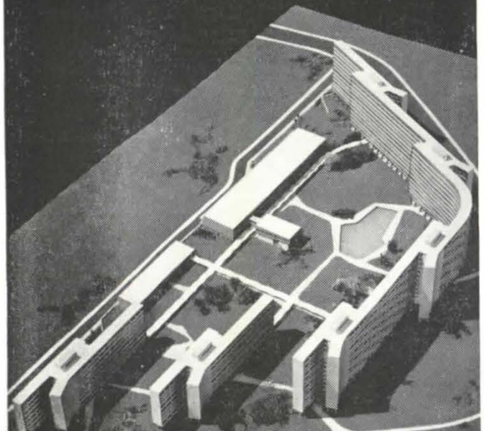
(Continued on page 12)

dormitories and student club





Representative of the buildings being built for the new University City in a hilly area outside São Paulo, Brazil, is this group of dormitories with adjacent club building, designed by Rino Levi and Roberto Cerqueira Cesar. Photos: Albuquerque

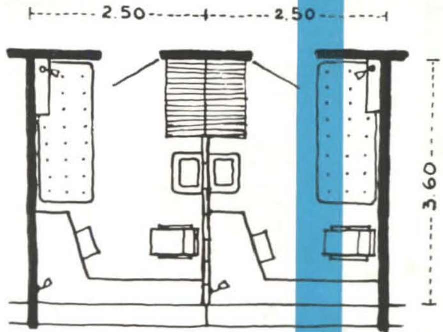


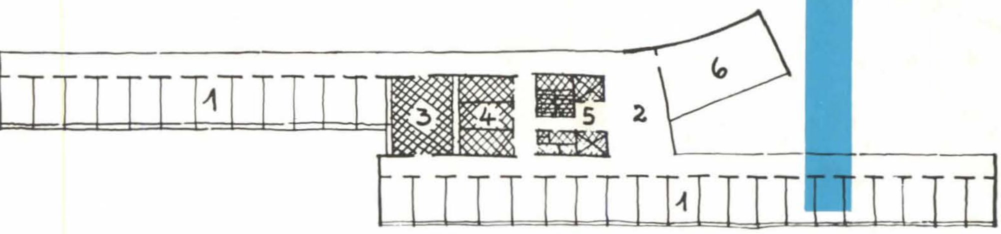
The student residence buildings now being built for the new University of São Paulo, Brazil, were designed by Rino Levi, architect, and Roberto Cerqueira Cesar, associate architect, following a general program stated by the supervising commission of the university. Located on the outskirts of São Paulo, the site of the student residence group is a hillside commanding an exceptionally fine view of the city.

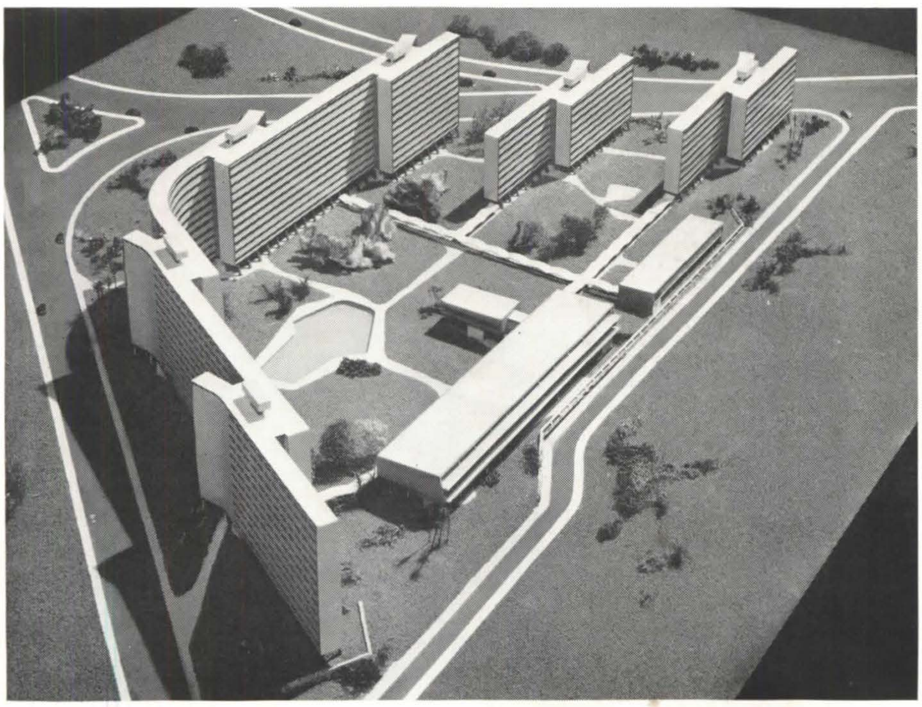
Placed near the entrance of the main university building and approximately between the teaching and recreation areas, this group consists of four 12-story dormitories for men (31 single rooms per floor) and two 8-story dormitories for women (32 single rooms per floor) form-

p/a progress preview

The student rooms (right) *are ranged along the glass walls facing north-northeast, for maximum sunlight which is controlled on hot days by rolling blinds. Other elements of the typical dormitory floor* (below) *are: 2. lobby; 3. baths; 4. service; 5. vertical circulation; and 6. study.*







ing a crescent around a landscaped court in which there will be a small administration building and infirmary as well as a student club building containing lounges, library, meeting and recreation rooms, a restaurant to seat 700, bar, and laundry and storage rooms. A kitchen in a separate building will serve both the restaurant and the infirmary.

An important point in the planning stage was the decision to provide only single rooms for the students. Levi cites three reasons for the solution:

"For the development of the personality of the student, it is important that he can have isolation for concentration at times. In a group building, such as a dormitory, this is possible only in a private room.

"The student in a private room is fully responsible for the property therein.

"It was proved that the private room as developed is more economical than a three-bed scheme. The two-bed room was not considered."

Appreciable economies were effected by centralizing bath and toilet facilities (each student room is equipped with wash basin, to alleviate washroom congestion), and by centralizing vertical circulation. Except for a small area on the ground floor, enclosed for janitor's room, baggage storeroom, and a bicycle garage, the buildings are open for free circulation and lightness of appearance.

Vehicular circulation is around the residence group and the garden court affords a pleasant meeting place, linking the dormitories and related structures.

The club building provides for group activities.

we still need hospitals

After about five years of unusual activity in hospital design and construction, we seem to be bogging down in that important field. It is hard to understand why, because the need is still obvious to anyone who even glances at the statistics, and is even more sharply realized by the citizen who finds it difficult to arrange hospital accommodations and by the doctor who can't find beds for all patients who require them. We now have less than 10 beds per thousand of population, even counting many beds unacceptable by good standards and also the government hospitals, where accommodations are not available to all the civilian population. By minimum standards, we should have about 12 beds per thousand. In the meantime, more hospitals are becoming obsolete each year, our population is growing by about 1.5 million a year; and the rate of new hospital construction seems, right now, to be decreasing. We are losing ground.

Are the architect and engineer concerned with this problem? We think that they are. P/A's surveys indicate that hospital work is considered highly desirable by the average practitioner. It is an interesting and a satisfying commission; the client is usually a good one to work with; and fees are generally adequate for the work involved. Despite certain difficulties that this building type involves—occasional trouble with hospital consultants who can't keep their hands off architecture, the pre-eminence of the "specialist," and the continued existence (even though it is no longer publicized), of a list of architects "recommended" by the American Hospital Association—the spread of hospital work in recent years has brought many new designers into the field. And they have enjoyed the experience.

What can the architectural and engineering men do about the present slow-down? One thing has been done effectively, but it is a job that will have to be repeated each year—that is support of the Hill-Burton Act. This Federal-aid program has had universal approval from hospital people, as a means of assistance to states that avoids interfering with states' rights or private activity. It is now extended to 1957, but appropriations must be made each year. Last summer, support from the architectural profession was most helpful in saving a large part of the appropriation that had been asked for, despite cuts proposed by Congress. Hill-Burton provisions and money are largely responsible for the activity in private, voluntary hospital construction, and have been the means of bringing hospital commissions to many architects and their consulting engineers.

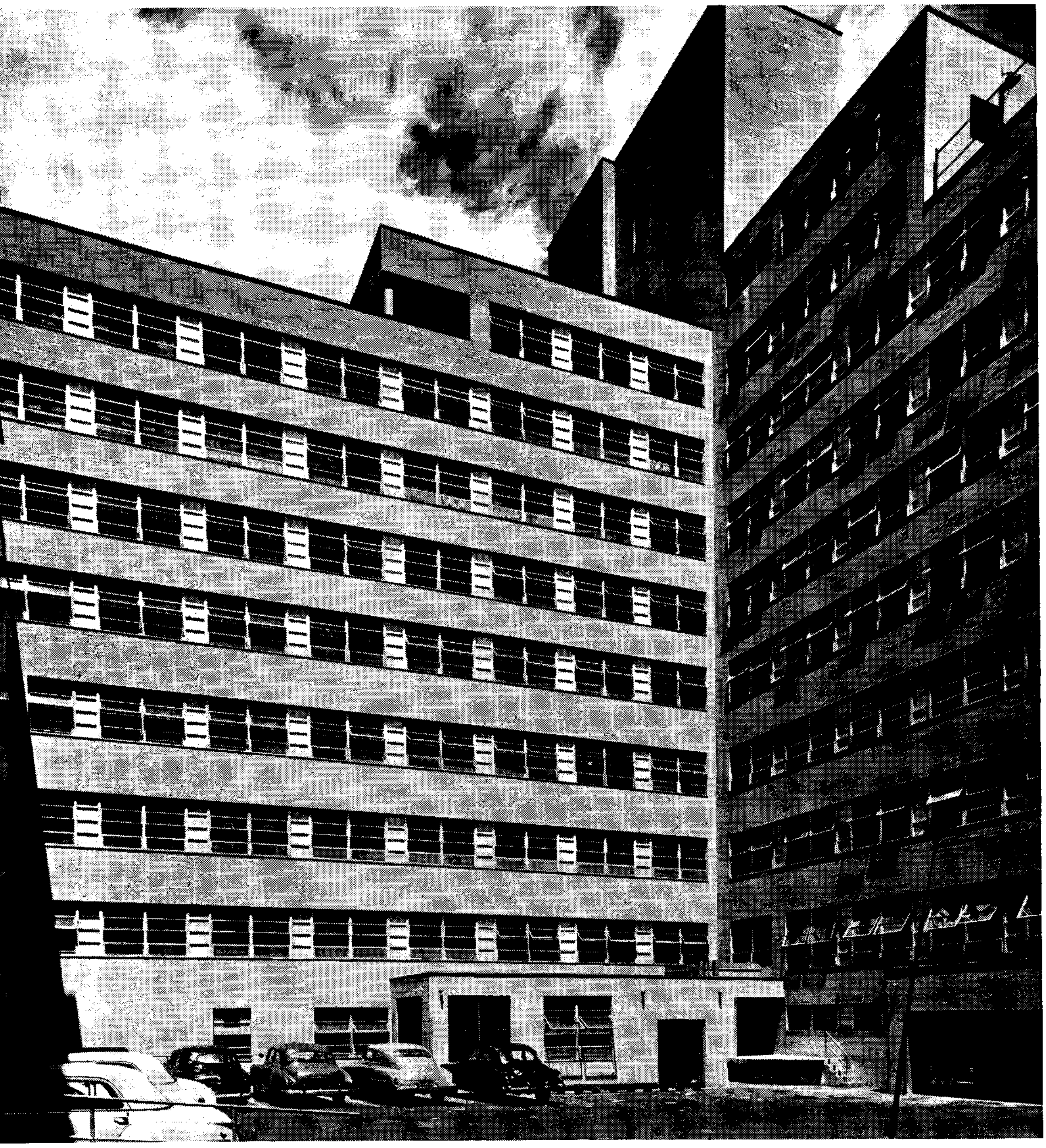
Another thing the forward-looking practitioner can do is to become more familiar with the field—in his own community, and in its wider implications. A good active architect can be of great help to a good active hospital administrator, hospital board, and promotion agency, in "selling" the community on the need for funds for better hospital facilities. This helps everybody. With a greater perspective, he might study trends in medical care, and find building-type activity in line with the current thinking in the medical and hospital professions. Briefly, this includes: greater emphasis on group medical practice, in the hospital and out (office buildings, clinics, medical offices in hospitals); health insurance plans (New York's H.I.P. is producing a number of interesting new buildings to house its activities); increased interest in old-age problems (geriatrics structures, chronic-disease buildings); greater knowledge of and interest in community disease problems (health clinics in schools, in factories, in office buildings); the growth of the small local hospital, despite disclaimers as to its efficiency a few years ago (community "health facilities," combining sanitation offices, clinics, private doctors' offices, minimum hospital facilities).

We recommend to our readers that they peruse the article in this issue on the curriculum of the new Albert Einstein College of Medicine. There are made clear the emphases in medical practice which will be important in the coming period; how doctors are going to be trained to practice. There will be much work involved for architects, in newly developed building types, as well as in hospital design, as we understand it now. Large city hospitals, county hospitals, semi-rural hospitals—such as the ones illustrated in this issue—are needed now, more than ever before. The pressures will become too great to resist. And when the new surge of work comes, designers must be prepared to meet it with knowledge as well as interest.

location	New York, New York
architects-engineers	Lorimer & Rose
project manager	William E. Jeffrey
structural engineers	Roberts & Schaefer Company
mechanical consultants	Karsunky, Weller & Gooch
general contractors	Cauldwell-Wingate Company

hospital construction: metropolitan

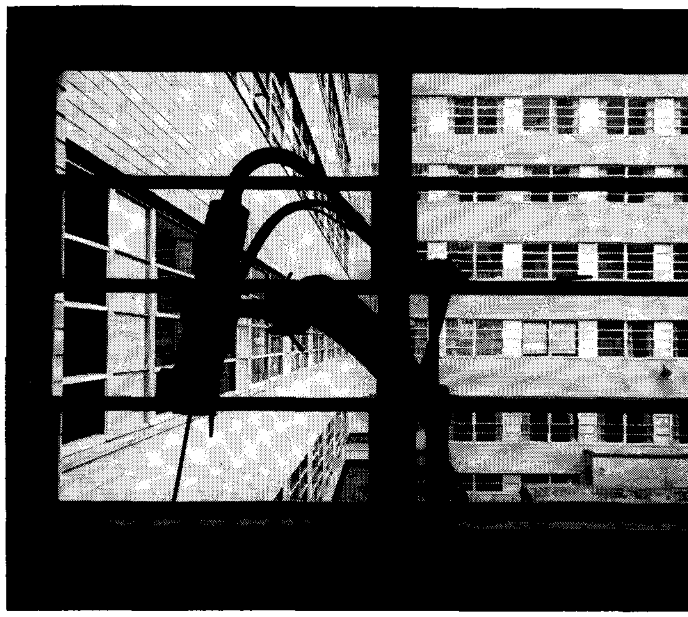
hospital construction: metropolitan



The (lower) ground floor occurs at the rear of the hospital, which is arranged in a U shape around an ambulance, trucking, and staff-car-parking courtyard. Most patients' rooms face the south and southeast.
Photos: Lionel Freedman

The Beekman-Downtown Hospital is in one of the most motley and congested areas of Manhattan's lower east side. A maze of blocks of old-law tenements and huge, low-rent housing projects crowd the site on the north; the noisy waterfront, with its turmoil of ship traffic and trucking, lies to the east; and, almost as near on the south are the overbearing skyscrapers of Wall Street.

To serve the diverse daytime population of the area, needed health-care facili-

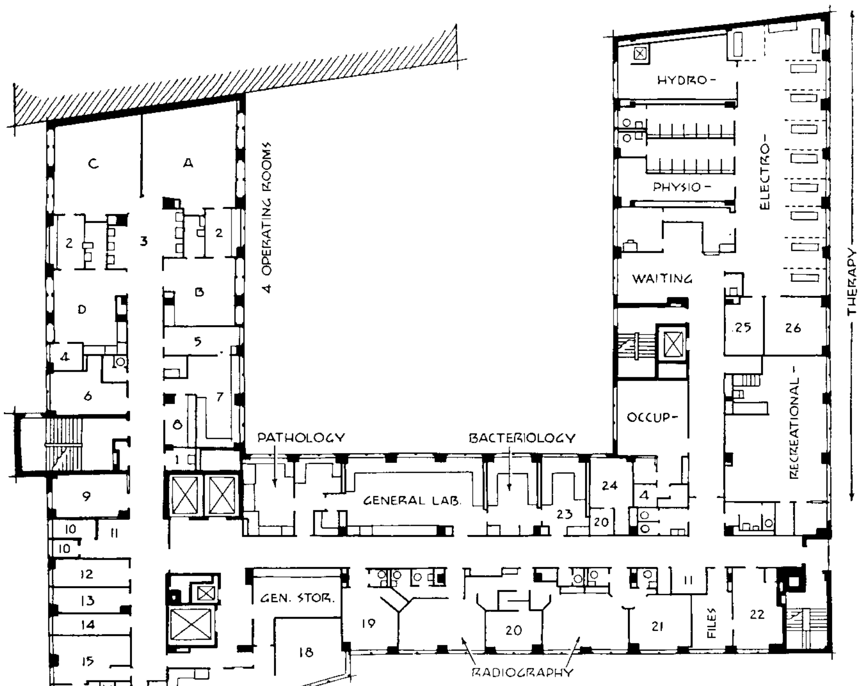


Front-entrance detail (below) *highlights the exterior wall treatment—4" x 12" glazed, light-gray brick for outer withe of cavity-wall construction (inner withe of 4" cinder block); anodyzed aluminum sash of projected type, with column surfacing and spandrel areas made up of standard-sash elements that are "glazed" with aluminum sheets and backed with glass-fiber insulation.*

ties range from unusual services for accident and emergency cases, to large public wards for those with little money, to handsome private rooms for top business executives. This also implies both an exceptionally equipped out-patient department and a suite of doctors' offices where private consultations can take place.

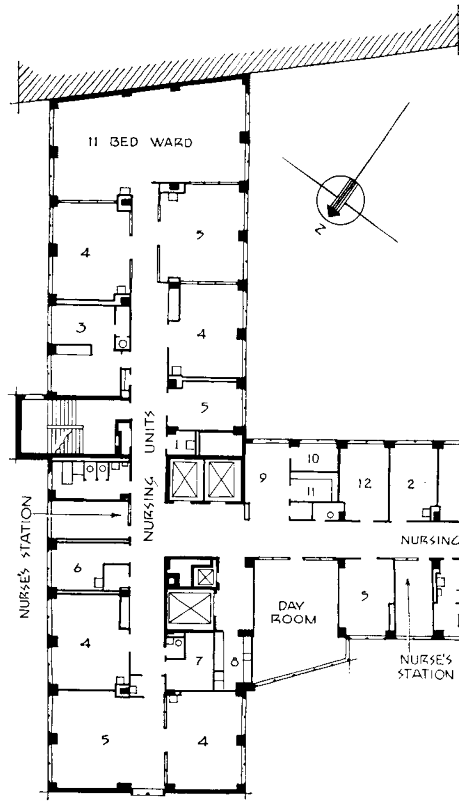
In addition to patient-care facilities, there also had to be unusual residence quarters for nurses, internes, and other staff members, to attract and maintain a first-rate staff. And, with the heavy incidence of emergency cases—office workers with all sorts of minor ailments and accidents; street cases; longshoremen with bailing hooks impaled in arms or legs—it was essential to have a full ambulance complement.

The result is a $5½ millions, 8-story, 170-bed hospital arranged in a combined U- and T-shaped plan. A fortunate aspect of the limited site, surrounded on three sides by city streets, is an 11-foot difference in levels, allowing two floors of the building to come at grade. In effect, this almost doubles the site area, with regard to providing necessary lower-floor functions. At the main entrance level are public lobby, administrative offices, doctors' staff lounge, and a complete wing of outpatient-screening facilities. At the lower ground level (to the rear of the hospital) is ambulance garage, emergency department, general goods receiving, main kitchen, and employes' cafeteria.



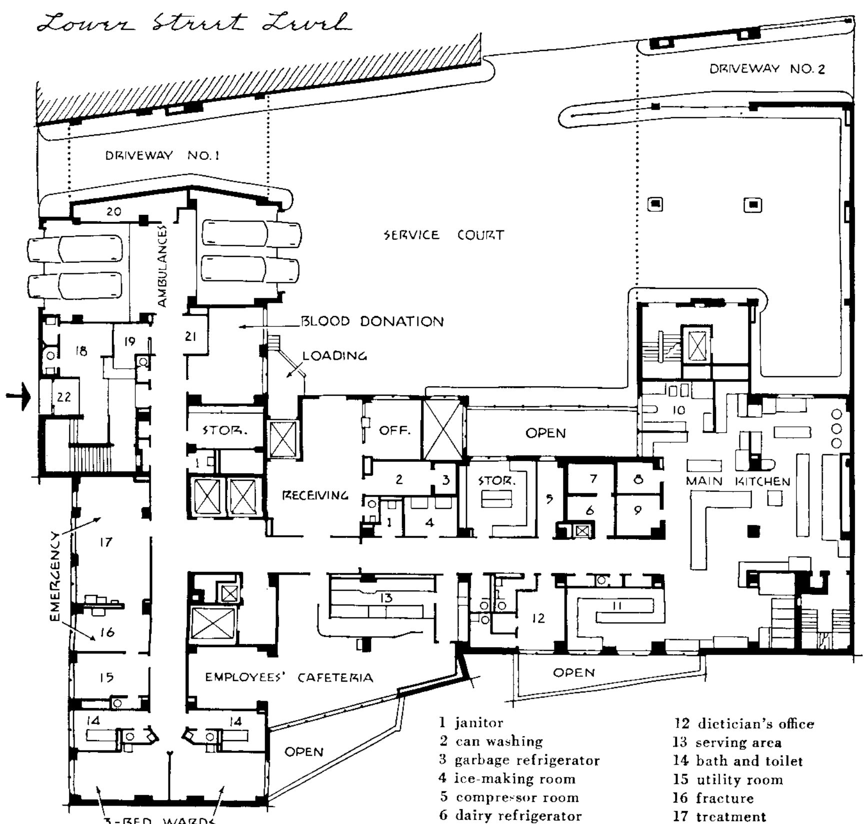
Third Floor

1 janitor
2 sterilizing
3 scrub-up
4 plaster room
5 instrument storage
6 anesthesia room
7 nurses' work room
8 clean-up room
9 surgical supervisor
10 anesthetic storage
11 stretcher space
12 sterile supply
13 unsterile supply
14 linen supply
15 nurses' locker room
16 doctors' locker room
17 glove room
18 central sterile storage
19 cystoscopy
20 dark room
21 photo fluoroscope room
22 office & viewing room
23 sterilizing room
24 photography
25 treatment room
26 stimulator room



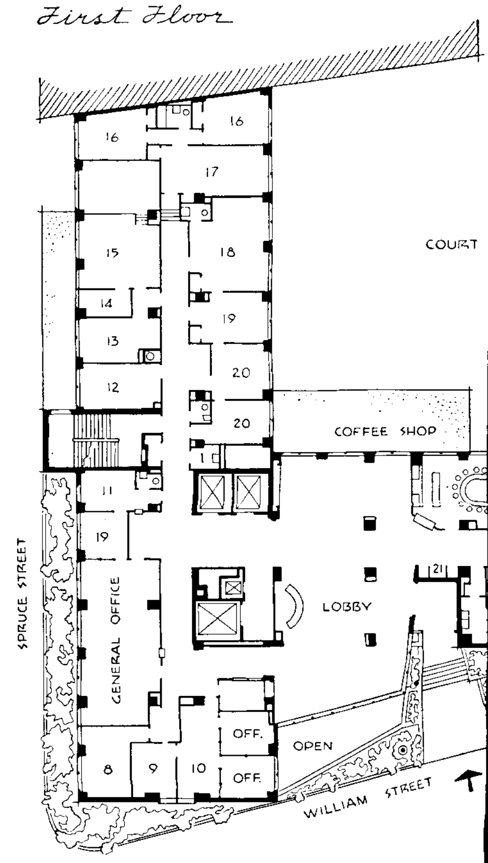
Fourth Floor

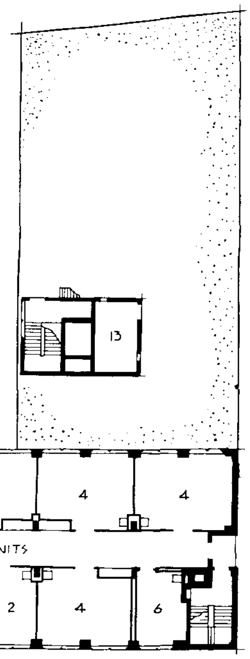
Lower Street Level



1 janitor
2 can washing
3 garbage refrigerator
4 ice-making room
5 compressor room
6 dairy refrigerator
7 freezer
8 meat refrigerator
9 vegetable refrigerator
10 bakery
11 dishwashing
12 dictician's office
13 serving area
14 bath and toilet
15 utility room
16 fracture
17 treatment
18 waiting
19 control
20 emergency equipment
21 stretcher alcove
22 emergency entrance

First Floor





1 janitor
2 2-bed room
3 bed pan & utility room
4 4-bed ward
5 treatment room
6 quiet room
7 storage room
8 pantry
9 stretchers & wheelchairs
10 flower room
11 linen room
12 consulting office
13 fan room

The plan in general takes the form of a U surrounding the wide, rear courtyard, on which most facilities face, receiving south or southeast sun. The two court driveways open onto one-way streets at either side. In the 4-ambulance garage, two ambulances are parked facing Spruce Street, and two facing Beekman. Thus, encircling the block is avoided, and service is as fast as possible.

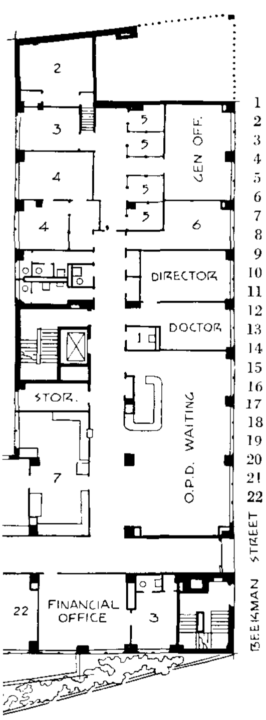
Below the lower street level is a basement which contains mechanical equipment, storage and maintenance facilities, morgue and autopsy room, and employes' lockers, toilets, and lounge. The building is heated by purchased steam; hence, no boiler plant was required. Construction is based on a 22-ft module, exactly accommodating the typical 4-bed wards. The plumbing and mechanical services are vertically and horizontally co-ordinated to this module.

The main kitchen (on the lower street level) has latest stainless-steel equipment. To assist sanitary maintenance, flooring is mosaic tile; walls have glazed-tile surfaces; and an aluminum-pan acoustical ceiling is used. A specially developed exhaust system for ranges and steam tables insures safety from grease fires. Food portioning is handled by a mecahnical, conveyor-type steam table to govern diet accuracy with minimum supervision. And meals are distributed to patients in individual, preheated, hot-plate containers. Diet kitchens on each floor are eliminated.

Because of the two street levels, the main entrance lobby is remarkably spacious. A separate entrance from Beekman Street to the three-story outpatient department eliminates traffic confusion.

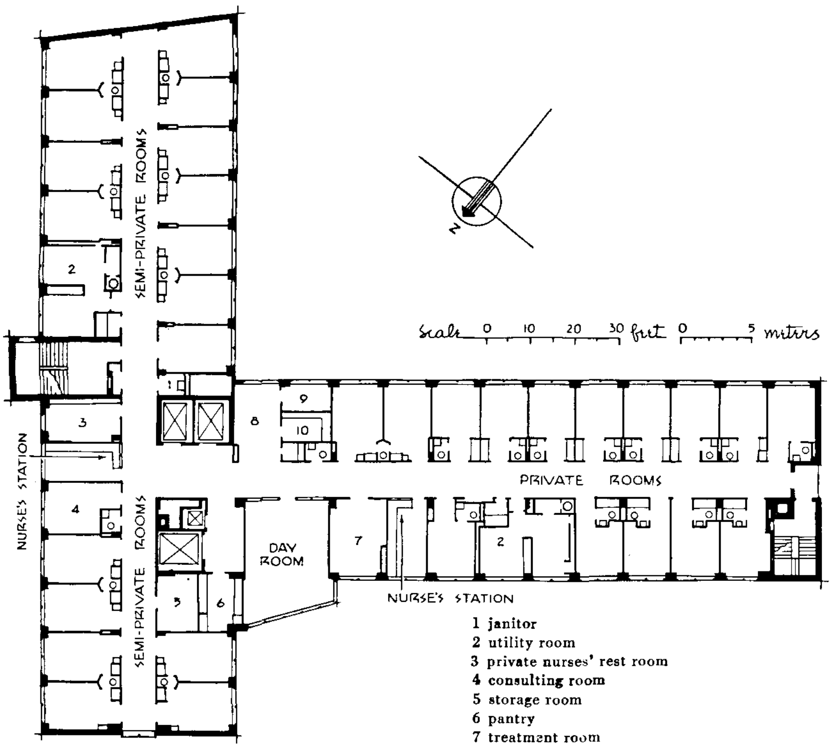
All facilities serving the four operating rooms on the third floor have special, carbon-impregnated terrazzo floors that permit controlled dissipation of static electricity and protect against anesthetic explosions; walls of the operating suite are sheathed with impervious, porcelain, nonglare mosaic tile; instrument cases and auxiliary equipment are of stainless steel.

Very similar in plan to the fourth floor, the fifth has three major elements—a 24-bed wing for male medical patients; a pediatric wing of 12 beds with a nursery for 3 cribs; and a women's wing of 15 beds. Private and semiprivate rooms occupy the sixth floor, while the seventh is made up of unusually commodious rooms for nurses *(plans overpage)*. The eighth floor consists of two major wings —the one toward Spruce Street, living quarters for 10 internes, plus a recreation deck; the other, composed of suites for the superintendent and assistant superintendent. In addition, there is a patients' solarium and sun deck.



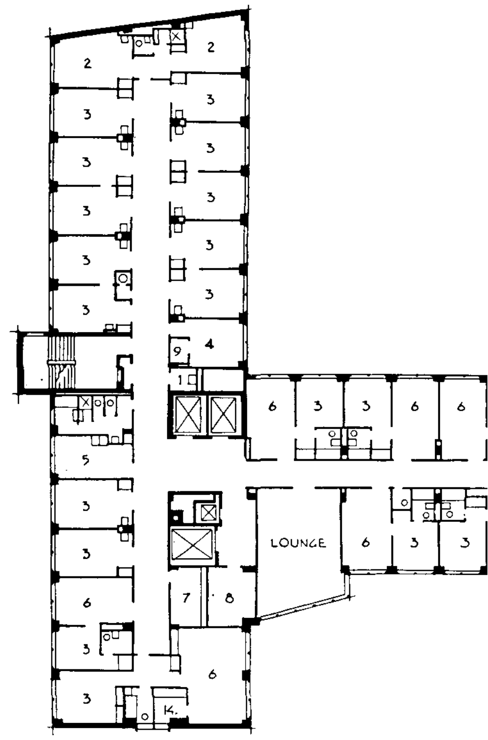
1 janitor
2 clothing
3 private office
4 compensation
5 interview
6 investigation
7 pharmacy
8 retiring
9 city investigator
10 admitting office
11 comptroller
12 director of nurses
13 history
14 study alcove
15 record room
16 bed room
17 chauffeurs' room
18 superintendent
19 secretary
20 assistant superintendent
21 telephones
22 doctors' lounge

1 janitor
2 treatment room
3 exam & treatment room
4 doctor's office
5 work room
6 fluoroscopy
7 record room
8 men's lounge
9 men's locker room
10 women's lounge
11 women's locker room
12 ante room
13 serving area
14 control & waiting room
15 audio room
16 basal metabolism
17 electrocardiograph
18 dark room
19 superficial therapy
20 dermatology
21 minor operating
22 utility room



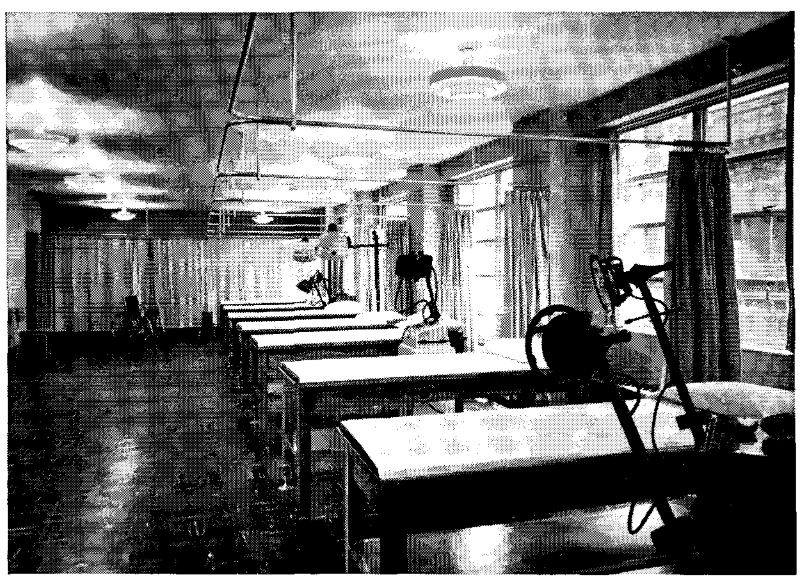
Sixth Floor

1 janitor
2 utility room
3 private nurses' rest room
4 consulting room
5 storage room
6 pantry
7 treatment room
8 stretchers & wheelchairs
9 flower room
10 linen room

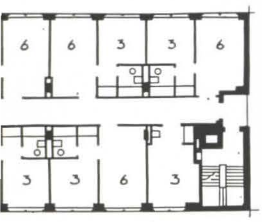


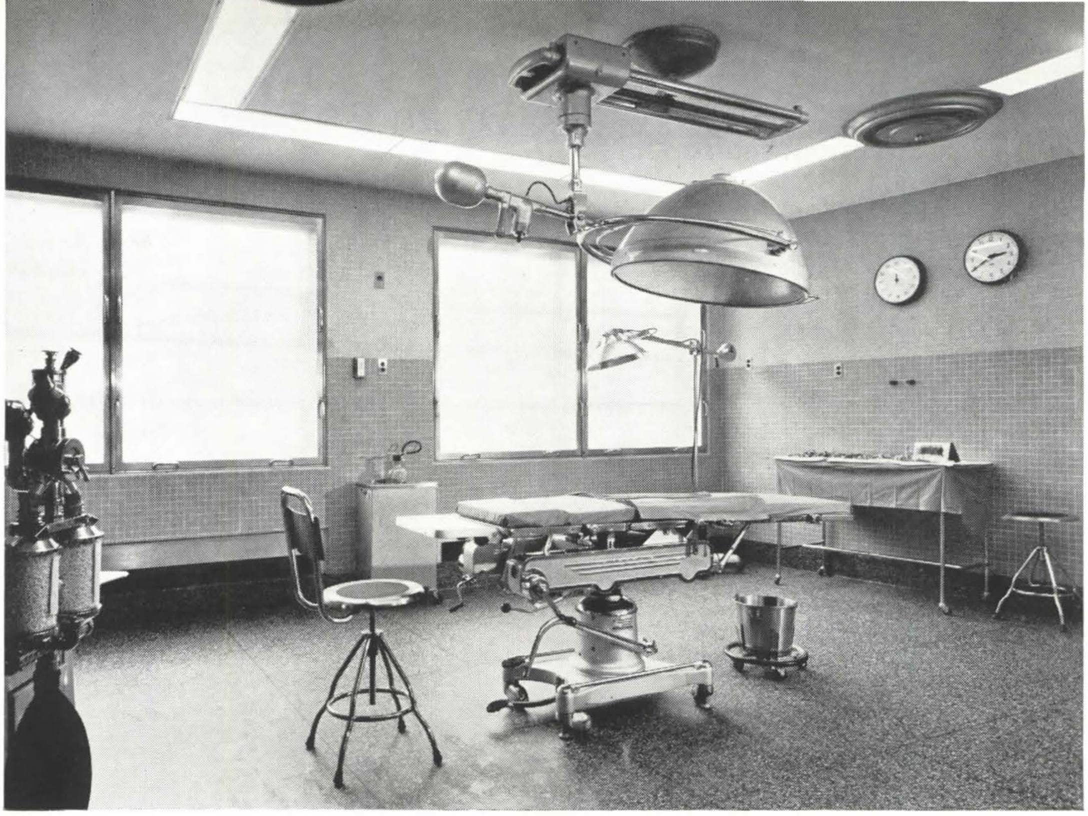
Seventh Floor (NURSES' RESIDENCE)

Treatment stations in the second-floor outpatient area (above) *are all equipped with rotational dressing facilities and are so interconnected as to permit great flexibility of clinical assignments on various days. On the third floor, electrotherapy units along the south wall* (right) *may be curtained for privacy.*



1 janitor
2 female interne
3 bed room
4 nurses' sitting room
5 laundry
6 living room
7 linen room
8 storage room
9 pantry



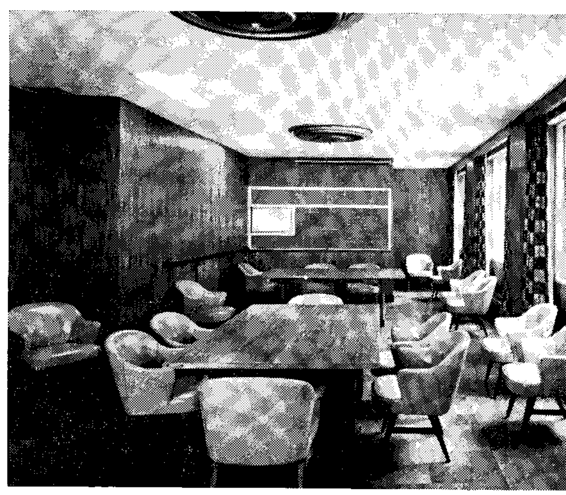


Typical of all operating rooms, the one shown (above) *is fully air conditioned and has walls of ceramic mosaic tile to facilitate cleaning. Conductive terrazzo floors provide controlled drain-off of static charges. The rooms receive daylight, but to maintain temperature and humidity conditions there are inner glass screens, with temperature air streams creating a pressurized barrier, to prevent dust infiltration.*

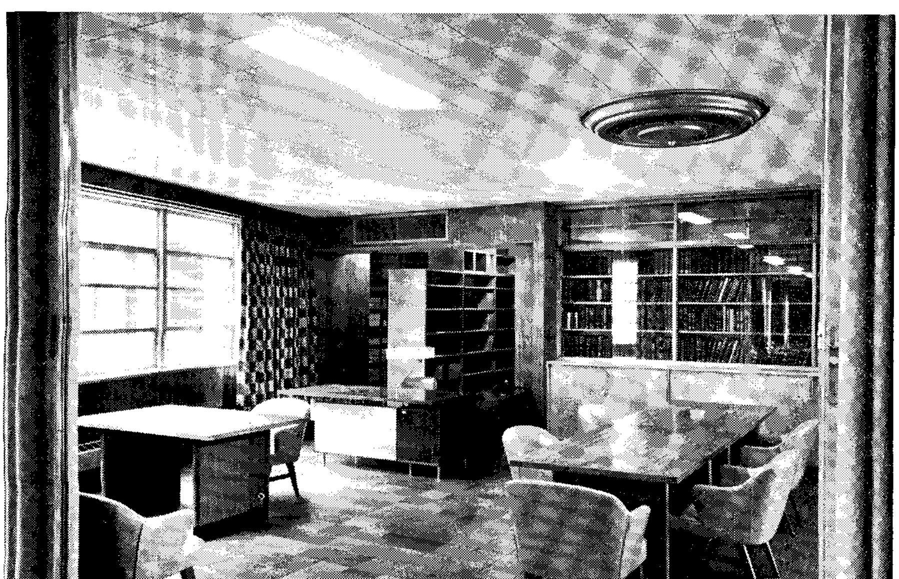
A general laboratory on the third floor (right) *overlooks the rear courtyard; other diagnostic facilities adjoin.*

Traction beds occupy an 11-bed ward (below, left) *at the rear of the fourth floor. The typical four-bed ward* (center) *is bright, with a wall of colorful, scrubable wallpaper. Semiprivate rooms* (right) *are equally cheerful. In the pediatric wards* (bottom) *gay activity murals of washable wallpaper are used.*

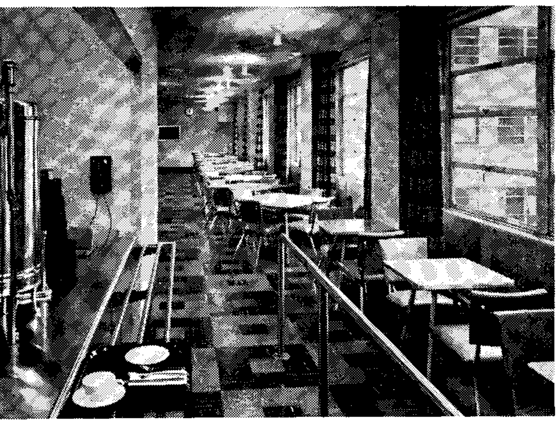
The ample public lobby provides comfortable waiting space for visitors. Opening directly off the lobby is a visitors' coffee shop; the elevator lobby; and the entrance to the administrative offices.



The combined library-conference room (separable by an accordion partition) occurs on the second floor, just above the main entrance area.



Colorful day rooms (right), *with wall-to-wall strips of windows occur in the vertical element above the main entrance. A nurses' lounge and internes' recreation room occupy this same position on the seventh and eighth floors. The staff cafeteria* (below) *overlooks the rear court along the southwest wall of the building.*



construction

Foundation, frame, floors, roof: foundation piles—Raymond Concrete Pile Co.; reinforced-concrete frame, floors, roof—Lone Star Cement Corporation; brick and cinder-block cavity walls. **Wall surfacing:** exterior: glazed brick—Hanley Company, Inc.; interior: generally plastered; wallpaper—Salubra Sales Corp. and Joanna Western Mills Co.; toilets: ceramic mosaic tile—National Tile & Marble Corp. **Floor surfacing:** asphalt and vinyl-plastic tile—The Mosaic Tile Company; conductive terrazo in operating area—V. Foscato, Inc. **Ceiling surfacing:** kitchen and corridors: accoustically-treated ceilings—Simplex Ceiling Corp.; offices and laboratory: hung plaster, painted; patients' rooms: exposed concrete, painted (plywood forms—Georgia Pacific Plywood Company). **Roof surfacing:** 20-year built-up roofing, gravel surface—Johns-Manville Corp.; recreation terrace: asphalt-treated cane-fiber board—Metropolitan Roofing Supplies Co., Inc. **Waterproofing and dampproofing:** membrane waterproofing — Johns-Manville Corp. **Insulation:** acoustically-treated ceiling — Simplex Ceiling Corp.; thermal: glass fiber—Libbey-Owens-Ford Glass Company; wood-fiber slabs—SK Insulrock Corporation. **Roof drains:** Josam Manufacturing Company. **Partitions:** cinder block, plastered; toilets: marble—John Cullo Marble Co., Inc. **Windows:** aluminum projected sash—J. S. Thorn Company; glass—Libbey-Owens-Ford Glass Company and Pittsburgh Plate Glass Company. **Doors:** interior: hollow-metal doors—Superior Steel Door & Trim Co., Inc.; flush hardwood doors—Hardwood Products Corporation; steel rolling door—Cornell Iron Works, Inc.; elevator doors—The W. S. Tyler Co.; polished plate-glass entrance doors with extruded-aluminum frames — Pittsburgh Plate Glass Company. **Hardware:** lock sets, door closers—Russell & Erwin Division, The American Hardware Corporation; hinges—The Stanley Works. **Paint and stain:** paint—Devoe & Raynolds Co., Inc. and National Chemical & Mfg. Co.

equipment

Kitchen and laundry: food distribution units—Mealpack Corp.; stainless-steel kitchen equipment—Straus-Duparquet, Inc.; refrigeration—York-Shipley, Inc.; clothes chute — Haslett Chute & Conveyor Co. **Intercommunication:** nurses' call system—Auth Electric Company, Inc. **Laboratory:** X-ray filing cabinets—Picker X-Ray Corp.; X-ray protection—Bar-Ray products, Inc.; laboratory equipment—Hamilton Manufacturing Company. **Elevators:** hoisting equipment — Westinghouse Electric Corporation; cabs—The W. S. Tyler Co.; dumbwaiter combination—John W. Kiesling & Son, Inc. **Lighting fixtures:** desk and floor lamps with glass-fiber shades—Koch & Lowy Mfg. Co.; office area: fluorescent fixtures—Globe Lighting Products, Inc.; lobby area: nondust catching fixtures—Litecraft Manufacturing Corp.; hospital ward area: dual-purpose wall bracket lamps—Kurt Versen Co. **Electrical distribution:** service entrance switch—Federal Electric Products Co.; panelboards, multibreaker—Lexington Electric Products Co., Inc.; cable—Crescent Insulated Wire and Cable Co.; conduit—Spang-Chalfant Division of National Supply Co.; wiring devices—The Bryant Electric Company. **Plumbing and sanitation:** water closets, tubs, lavatories—Crane Co.; toilet seats—C. F. Church Mfg. Company; water generator—The Patterson-Kelley Co., Inc.; flush valves—Coyne & Delany Co.; bathroom accessories and medicine cabinets—Kaytel, Inc.; incinerator—Sargent Incinerator Co.; sterilizing equipment—American Sterilizer Co.; sprinklers—Automatic Sprinkler Corp. of America; city water supply system. **Heating:** serviced steam—New York Steam Corporation; fin-tube radiation—Kritzer Radiant Coils, Inc.; steel piping—Wheeling Steel Corp.; controls—The Powers Regulator Company. **Air conditioning:** (operating suite) unit and compressor—Carrier Corp.; Freon refrigerant; grills — Tuttle & Bailey, Inc.; diffusors — Connor Engineering Corporation; blowers—American Blower Corporation; filters—American Air Filter Co., Inc.; controls—The Powers Regulator Company; cooling coils—Kennard Corporation.

hospital construction: county

location	Lawton, Oklahoma
architect	Paul Harris
hospital consultant	Paul H. Fesler
mechanical-electrical engineers	Carnahan & Thompson
structural engineer	Edgar B. Wilson
general contractor	J. J. Bollinger Construction Co.

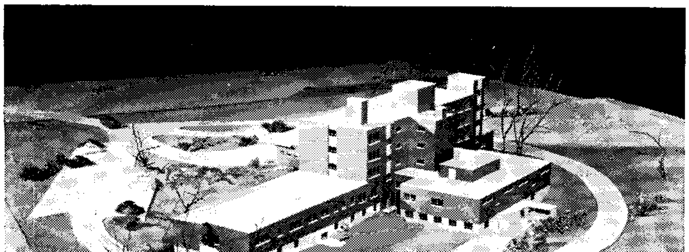
Planned, in the words of the hospital consulant, "to render complete service with minimum personnel," this 100-bed hospital serves the 1080 square miles of Comanche County (current population: 60,000). The 10-acre site is prairie land on the western edge of Lawton, the county seat. Funds for construction were obtained by a county bond issue that covered two-thirds of the estimated sum, and federal assistance provided the remainder. Total cost, including all equipment: $900,000.

The hospital is ideally oriented, facing the prevailing southeastern breezes, and most patients' rooms are aligned along this front. Facilities provide for care of medical, surgical, obstetrical, and pediatric patients. The maternity nursing unit occupies the northeast wing of the first floor; surgical patients are on the second floor; the medical nursing unit, on the third; and a combination of medical and pediatric patients, on the fourth, or top, floor. The three upper floors are identical in plan, though some rooms differ in function.

Basis of the planning was the wish to store all medical supplies in one central area and to provide simple and direct distribution to those units using them. From this central area (on the first floor) supplies go up by electrically operated dumbwaiter directly to the utility rooms of each nursing unit. All other supplies reach the nursing floors by a double-access elevator, the rear door of which allows supplies to be delivered to the floor pantries, utility rooms, or nurses' stations without interfering with traffic or causing disturbance in the corridors.

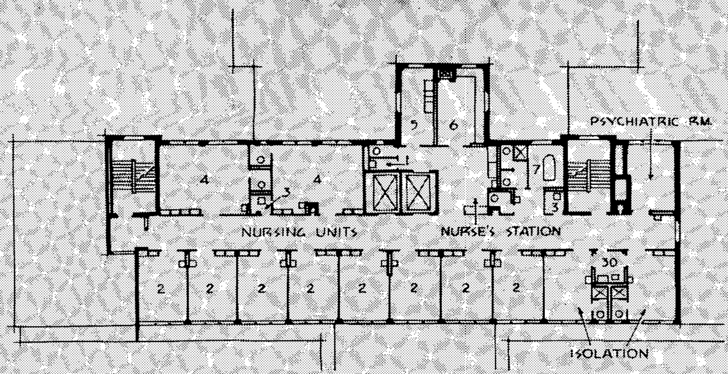
The arrangement of the surgical and obstetrical suites, at either side of the first-floor central-sterilizing room, eliminates the need for separate substerilizing and supply rooms, as cleanup rooms for the two suites have pass windows that open directly to the central sterilizing room.

The laundry is planned for continuous flow of linen. Soiled linen chutes into the dirty-linen section, where it is sorted to go into the laundry and thence into the clean section, which also serves as the housekeeper's headquarters.



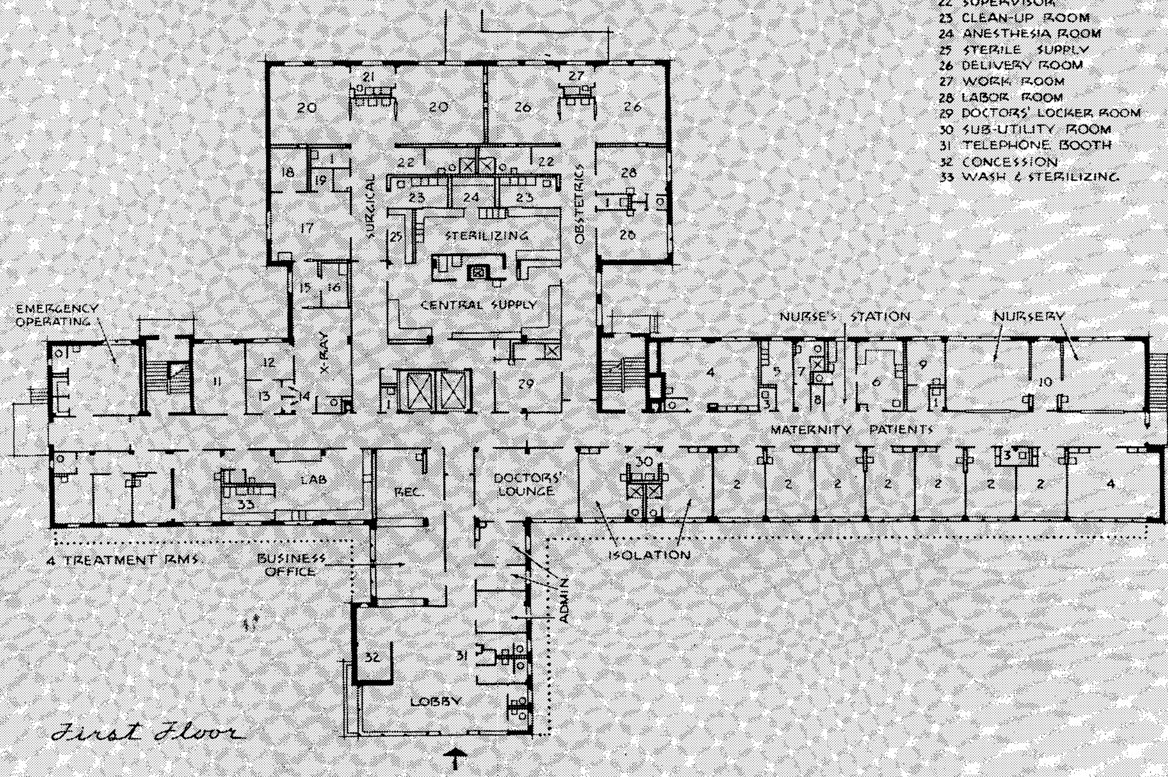
Main highways and truck lines in the area make it possible to reach the hospital directly from all sections, without passing through Lawton. The circumferential driveway (model photo, left) *provides easy access to all major areas of the hospital. The public parking area (left of photo) is balanced at the other side by staff parking space.*

Photos: Julius Shulman



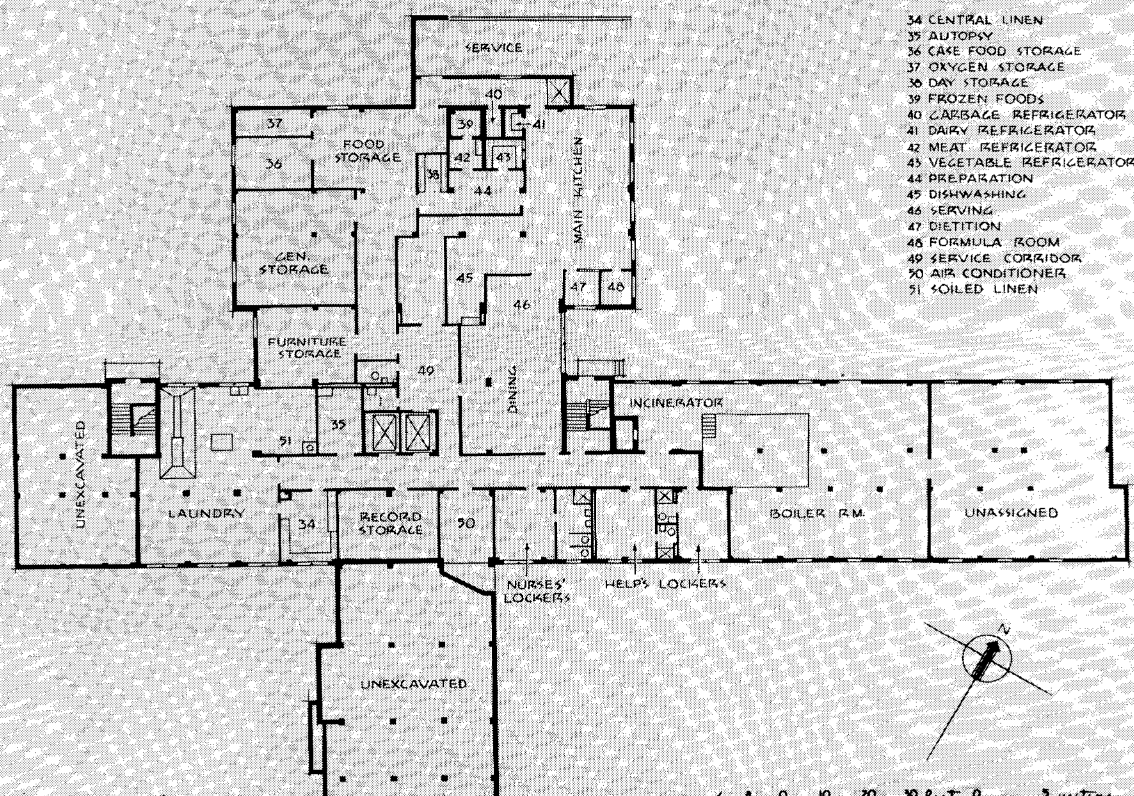
Second Floor

1 JANITOR
2 1 OR 2 - BED ROOMS
3 BED PAN WASHING
4 4-BED WARDS
5 PANTRY
6 UTILITY ROOM
7 PATIENTS' BATH
8 STRETCHER STORAGE
9 SUSPECT NURSERY
10 NURSERY WORK ROOM
11 PHYSICAL THERAPY
12 X-RAY OFFICE
13 X-RAY WAITING
14 DRESSING
15 X-RAY CONTROL ROOM
16 DARK ROOM
17 CYSTOSCOPY & FRACTURE
18 SPLINT CLOSET
19 PLASTER CLOSET
20 OPERATING ROOM
21 OPER. WORK ROOM
22 SUPERVISOR
23 CLEAN-UP ROOM
24 ANESTHESIA ROOM
25 STERILE SUPPLY
26 DELIVERY ROOM
27 WORK ROOM
28 LABOR ROOM
29 DOCTORS' LOCKER ROOM
30 SUB-UTILITY ROOM
31 TELEPHONE BOOTH
32 CONCESSION
33 WASH & STERILIZING



First Floor

34 CENTRAL LINEN
35 AUTOPSY
36 CASE FOOD STORAGE
37 OXYGEN STORAGE
38 DAY STORAGE
39 FROZEN FOODS
40 GARBAGE REFRIGERATOR
41 DAIRY REFRIGERATOR
42 MEAT REFRIGERATOR
43 VEGETABLE REFRIGERATOR
44 PREPARATION
45 DISHWASHING
46 SERVING
47 DIETITION
48 FORMULA ROOM
49 SERVICE CORRIDOR
50 AIR CONDITIONER
51 SOILED LINEN



Basement

scale 0 10 20 30 feet 0 5 meters

The main entrance to the hospital, like the majority of patients' rooms, faces southeast. The building is on the highest point of the 10-acre prairie site.

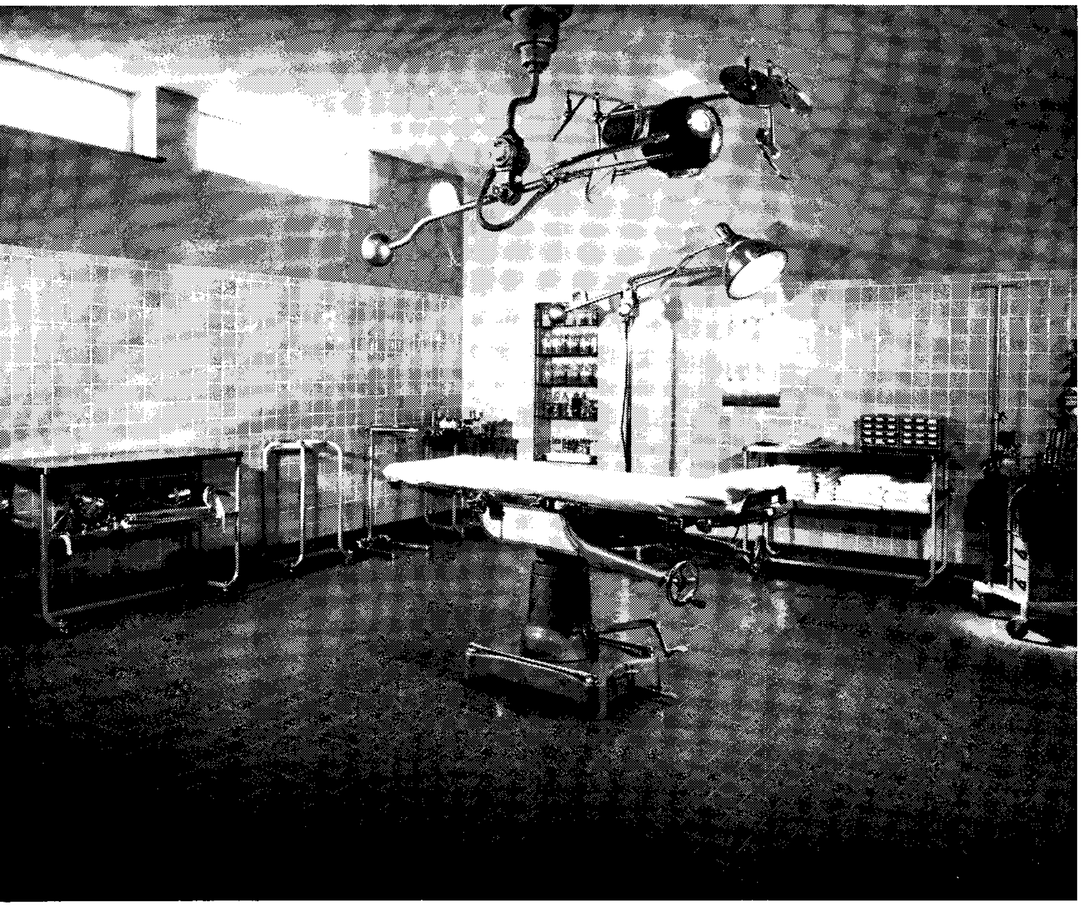
The windowed main lobby (above) *provides comfortable waiting space for visitors; the counter (extreme right of photo) opens through to the business office.*

The doctors' lounge (right) *occurs on the first floor, toward the rear of the entrance corridor.*

The hospital has a reinforced-concrete frame and flat-slab concrete floors and roof. Exterior walls are of brick and tile (hollow-wall construction) or of concrete. Partitions are 2″ solid plaster. Board-type insulation is used on roof slabs, while 4″ glass-wool batts occur above furred ceilings. The windows are made up of architectural projected steel sash, cast-stone sills, and marble stools; double glazing used in operating and delivery rooms.

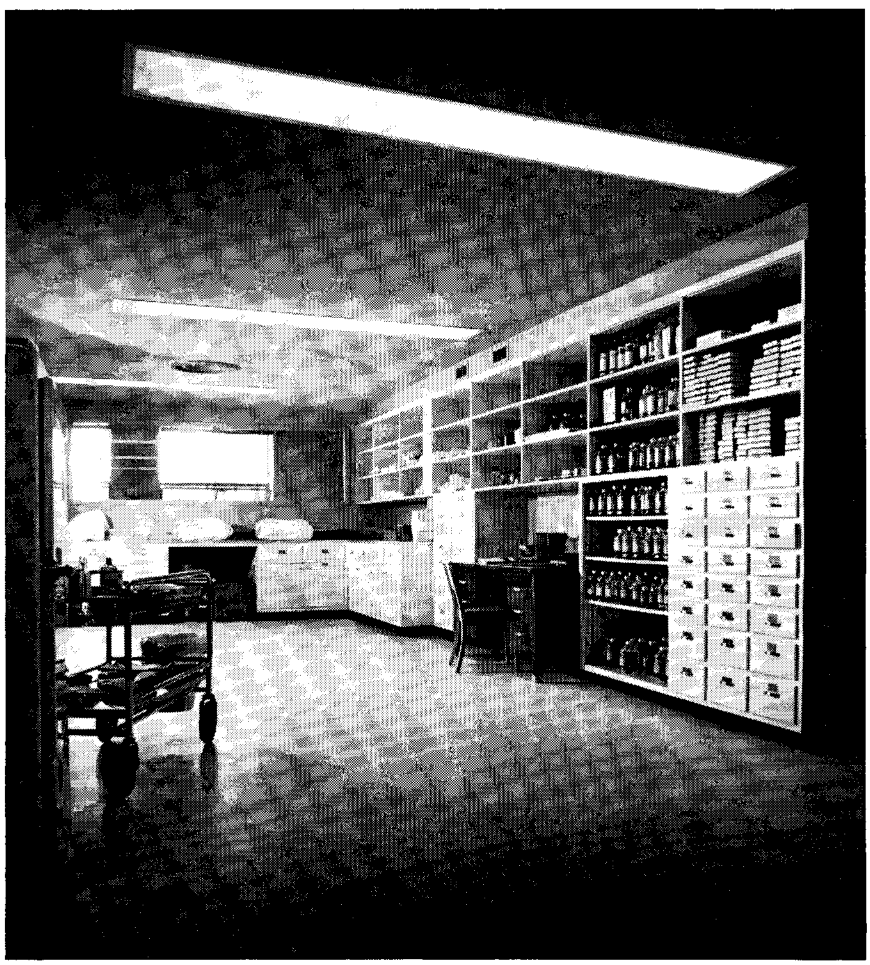
Floor finishes include terrazzo (operating and delivery suites, X-ray, cystoscopy, emergency operating); quarry tile (kitchen areas); concrete (storage rooms, laundry and boiler rooms); rubber tile (pantries, utility, toilet, and other service rooms); and asphalt tile (elsewhere).

On the ground floor, most walls are finished with glazed tile. Ceramic-tile wainscots with plaster above is the wall surfacing in corridors, delivery and operating suites, treatment rooms, toilet and



Walls of the operating rooms have ceramic-tile wainscots and terrazzo floors.

In the central sterilizing and supply storage area (right), *the walls are plaster, and floors are of rubber tile.*

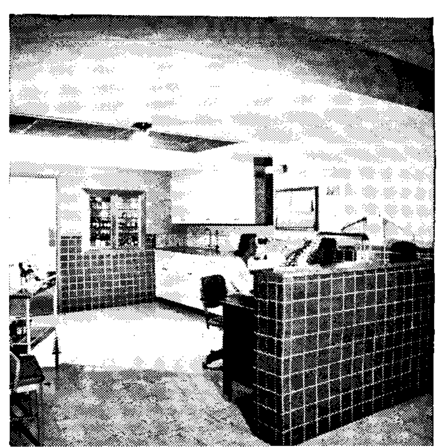


locker rooms, pantries, janitor's closets, and utility rooms—while plaster is used for all other rooms. Ceilings are of acoustical plaster in all areas except toilets and storage and basement rooms, where plain plaster is used.

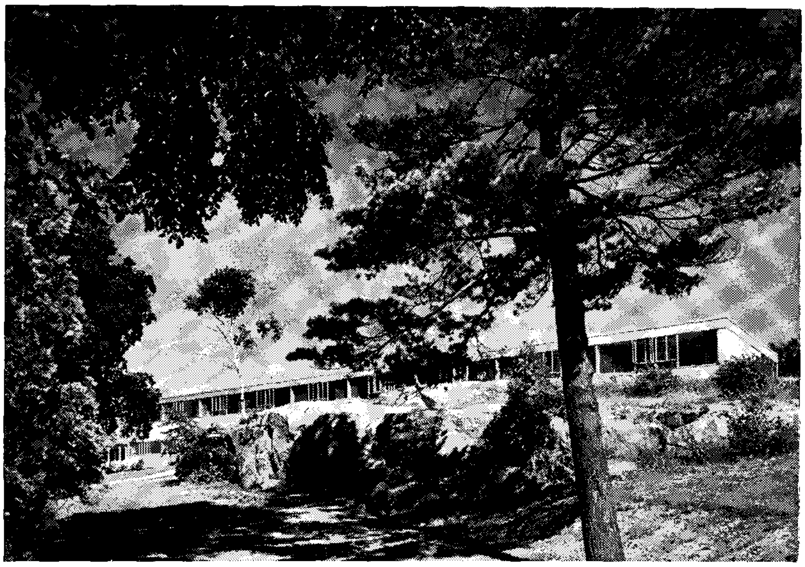
The hospital is heated by a hot-water radiant system, employing wrought-iron pipe embedded in the floor slabs. In addition, the north and south wings and the nurseries have year-round air conditioning.

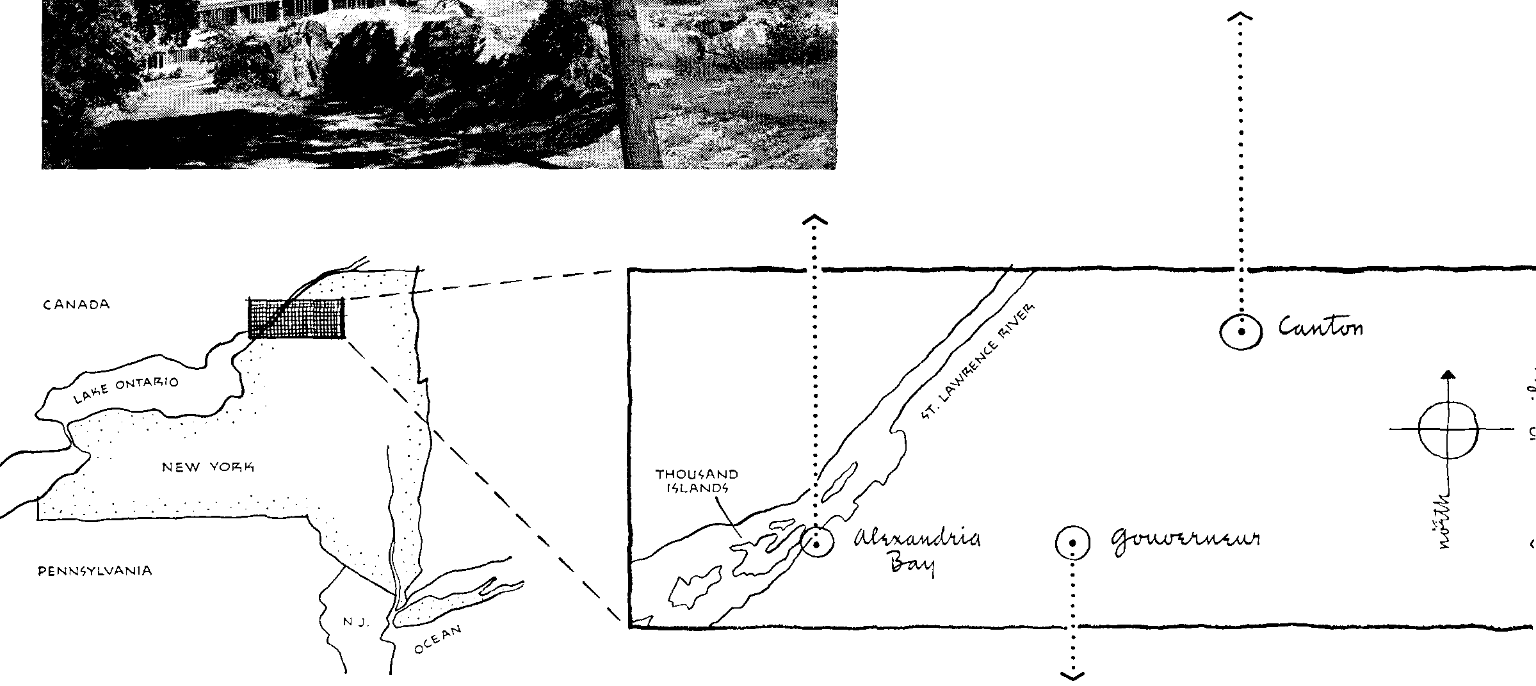
Typical patients' accommodations (above) *include a four-bed ward and a private bedroom —large enough for a second bed when this is desirable.*

Each nurse's station (right) *is centrally located; doors at the rear open into the floor pantry and clean utility room. In this rear area, all supplies come to the floor (by either dumbwaiter or elevator) entirely separated from corridor traffic.*



hospital construction: rural



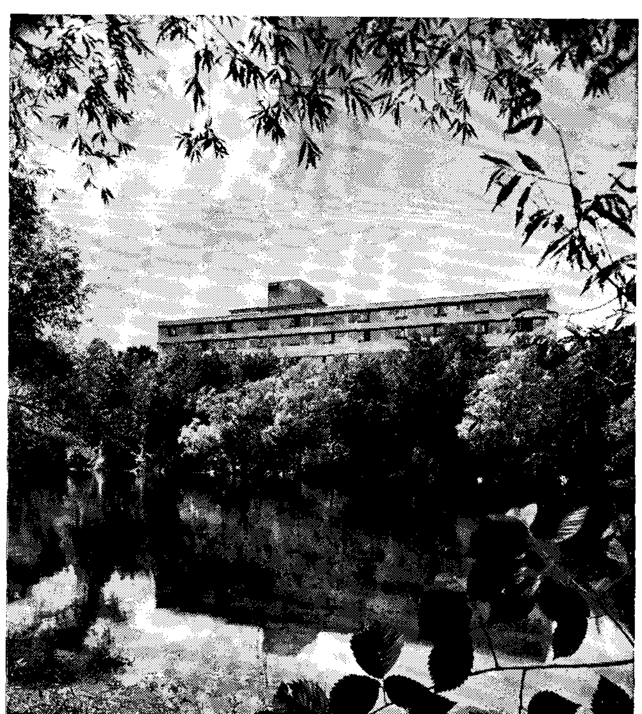


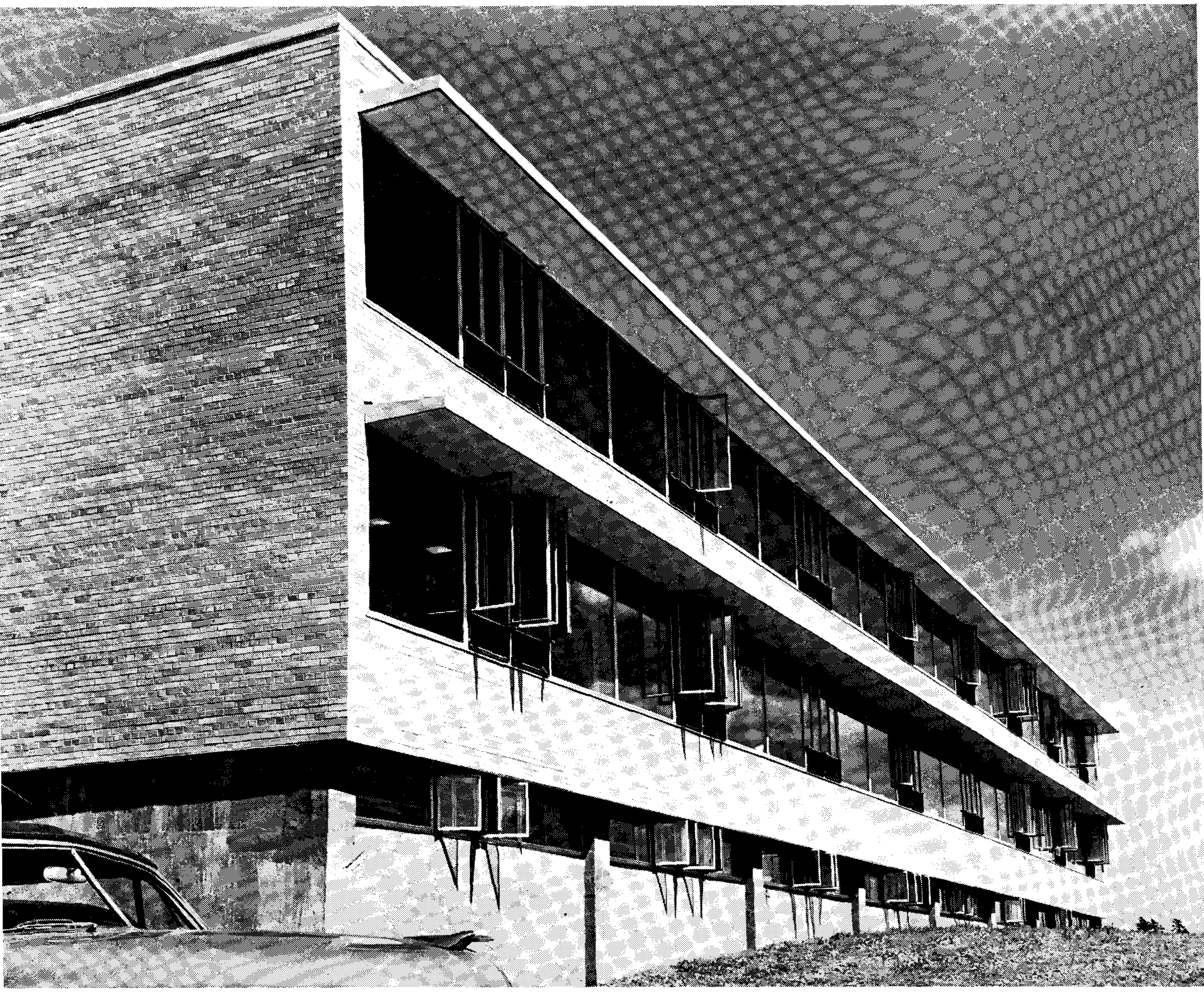
These three small hospitals in upstate New York—Canton, Alexandria Bay, and Gouverneur, west of the Adirondacks, in the St. Lawrence River Valley—are unique in many ways. Not only are they excellent hospitals in themselves, but (located approximately 30 miles apart in towns of less than 5000 residents each) they constitute a single, health-care facility, sharing a top administrator, central purchasing, laundry, etc. Collectively these "North Country Hospitals" have 142 beds and serve a 50,000 population area.

Bringing to the rural area metropolitan standards of hospital service, they were made possible through the generosity of a Greenwich, Connecticut, businessman, Edward John Noble, a native of Gouverneur, who donated one-third of the $1,940,000 cost. The other two-thirds derived equally from the Federal Government through the Hill-Burton Act and from contributions of the people in the region.

Photos of Canton: S. C. Valastro
Other Photos: Torkel Korling

three integrated facilities





Canton, New York

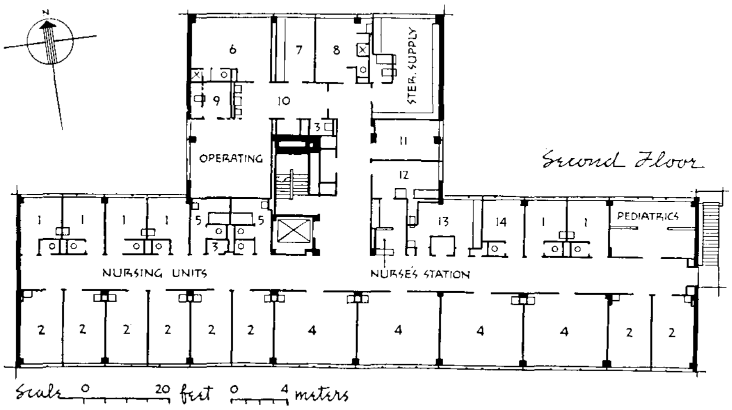
Newest of the three integrated hospitals, the one at Canton offers 51 beds and serves not only its immediate community but also as the infirmary for St. Lawrence University, which is also in Canton. In addition, it contains the community's pathological laboratories.

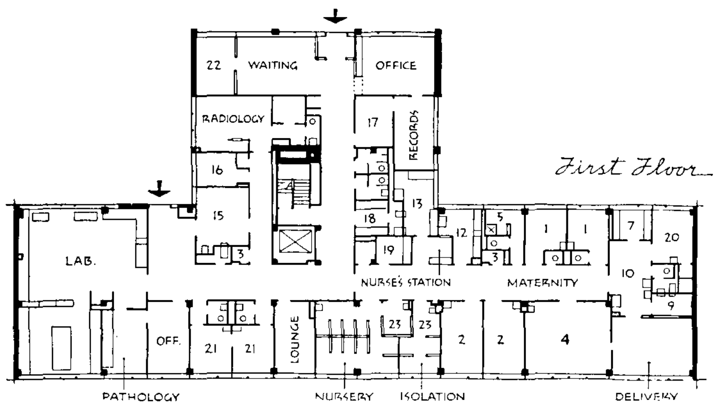
While each of the hospitals has its own governing board, there is a superior board whose membership consists of representatives from each of the individual boards. The integrated plan includes exchange of doctors and specialists, as demand requires. Each hospital, however, has its own independent staff to handle routine care.

A conscious effort was made to standardize elements, to effect economies in construction and also reduce maintenance costs. Hence, construction of all three is very similar. All have foundations of reinforced concrete; steel frames; and walls of light-gray face brick on cinder-block backup. Both floor and roof systems are composed of concrete slabs on open-web steel bar joists. All sash are steel, intermediate, projected type, glazed with double insulating glazing. Interior wall surfaces are either of plaster on masonry or glazed, ceramic tile. Ceilings are finished with plaster or acoustic tile, and roofs are of built-up tar and gravel. For thermal control, there is a 2-in. layer of fiberboard underneath the roofing.

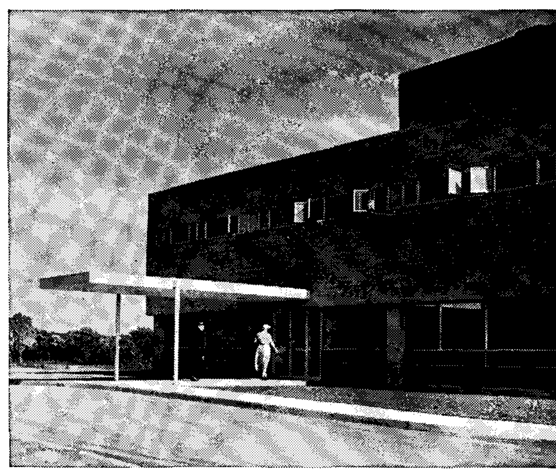
Oil-fired boilers serve two-pipe modulating steam-heating systems equipped with outdoor electric zone control, with individual radiator controls provided in the operating and nursery rooms. Operating and delivery rooms and nurseries also have pneumatically controlled air-conditioning units.

architects	Skidmore, Owings & Merrill
partner-in-charge	Robert W. Cutler
associate architects	Sargent, Webster, Crenshaw & Folley
consulting mechanical engineer	Harry H. Bond
general contractors	A. Friederich & Sons

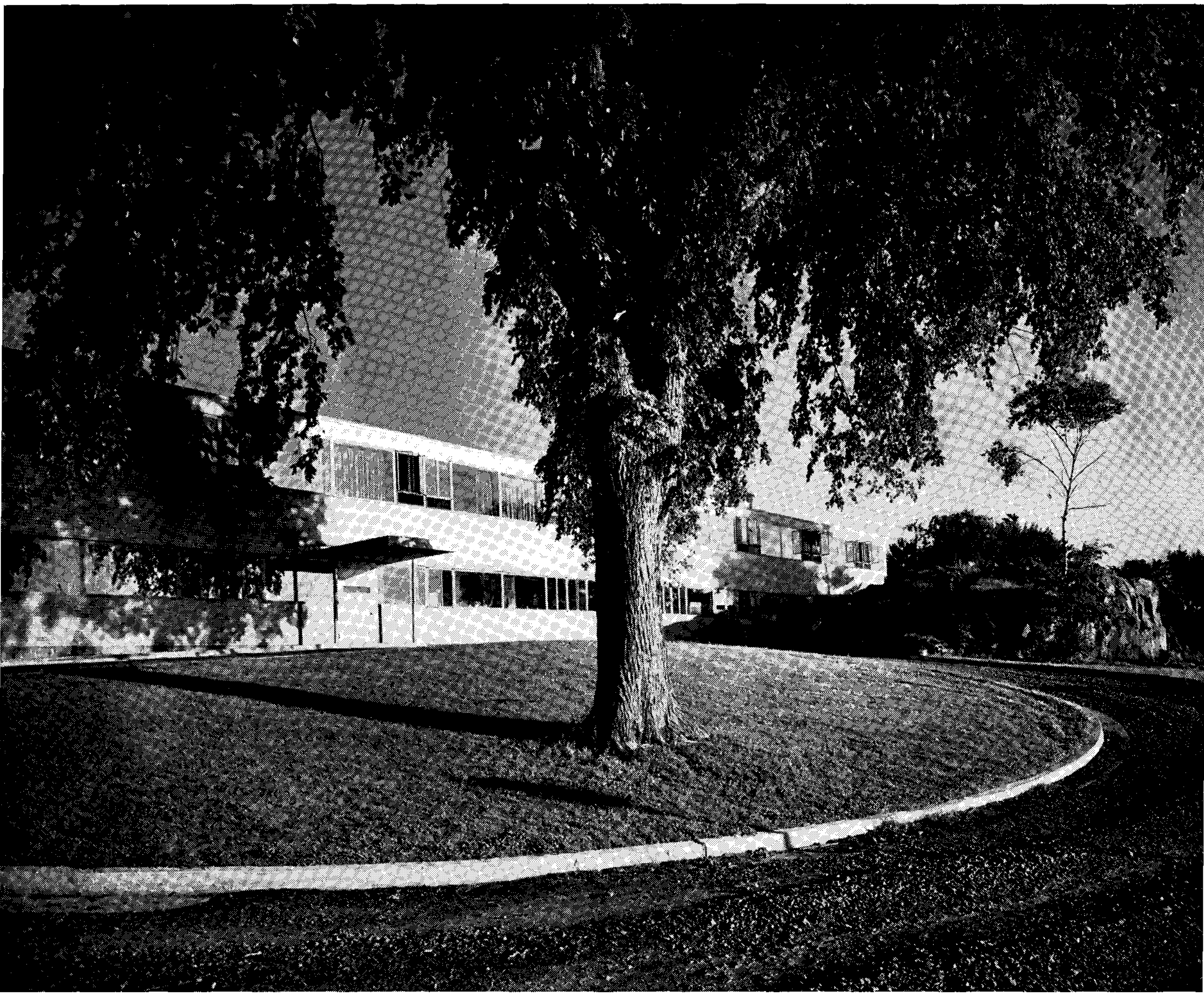




1 1-bed room
2 2-bed room
3 janitor
4 4-bed ward
5 patients' bath
6 doctors' locker room
7 clean-up room
8 nurses' locker room
9 sterilizing
10 scrub-up
11 treatment room
12 pantry
13 utility room
14 psychiatric
15 emergency
16 viewing room
17 doctors' lounge
18 drugs
19 formula room
20 labor room
21 doctor
22 canteen
23 examination

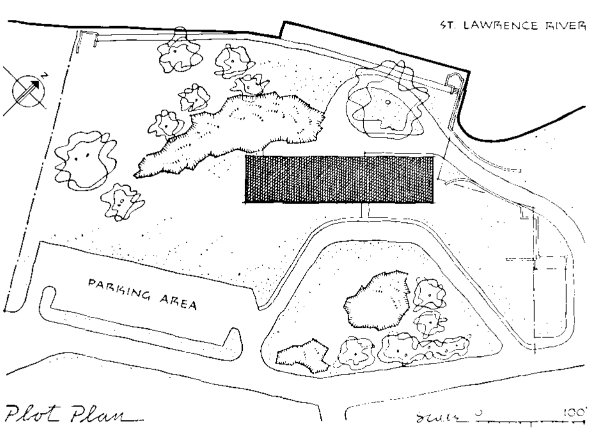


The main entrance to the hospital (above) *faces due north. Most patients' rooms are lighted by continuous window strips along the south side of the building* (left and across-page). *Unusual is the plan scheme of delivery room and operating room on separate floors, immediately adjacent to the pertinent nursing units. Notice that there is no laundry in the building, as laundry for all three hospitals is handled at the central unit in Gouverneur.*



Alexandria Bay, New York

architects	Skidmore, Owings & Merrill
partner-in-charge	Robert W. Cutler
associate architects	Sargent, Webster, Crenshaw & Folley
consulting mechanical engineer	Harry H. Bond
general contractors	Deline, Charlebois & Wager Bros.



Plot Plan

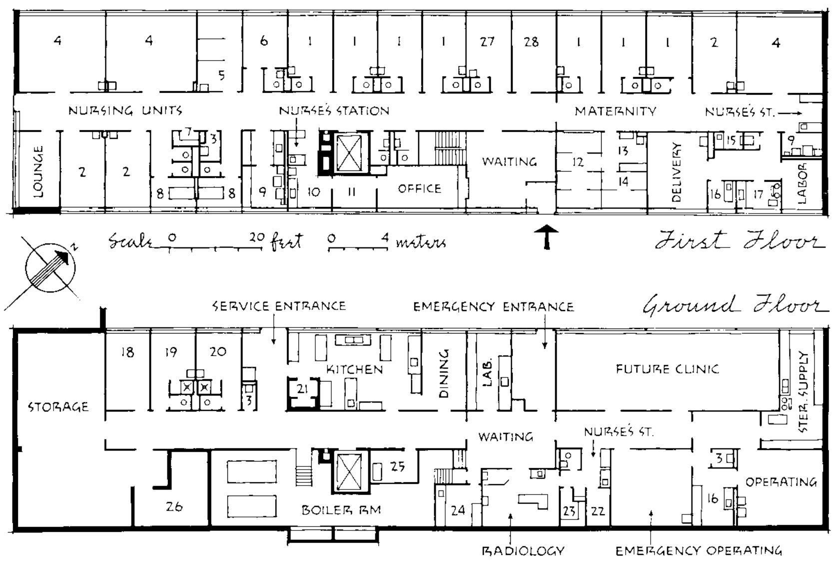
A magnificent site—a beautiful slope overlooking the St. Lawrence River and the Thousand Islands—was selected for this smallest of the North Country Hospitals, a facility with but 29 beds. Like the Canton hospital, the Alexandria Bay unit is complete, with the exception of a laundry, as laundry for all three facilities is handled in the Gouverneur hospital.

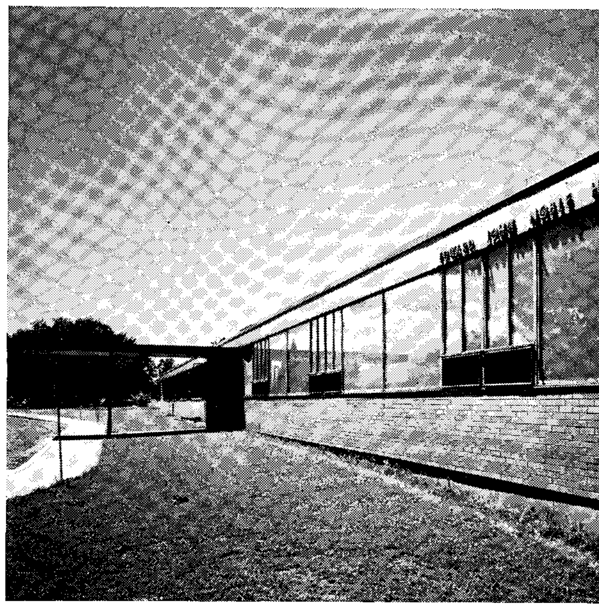
Built on solid granite on the site of the old Thousand Islands House, the structure takes advantage of the slope to provide two above-grade floors on the view or northwest side. Most patients' rooms occur on this front, on the upper floor. While hardly the ideal orientation for patients' rooms, all concerned felt that the therapeutic and psychological benefits that would derive from enjoyment of the eye-filling view more than outweighed the consideration of having south exposure. Continuous windows make the most of the outlook. In the south corner is a patients' lounge, with a terrace adjoining.

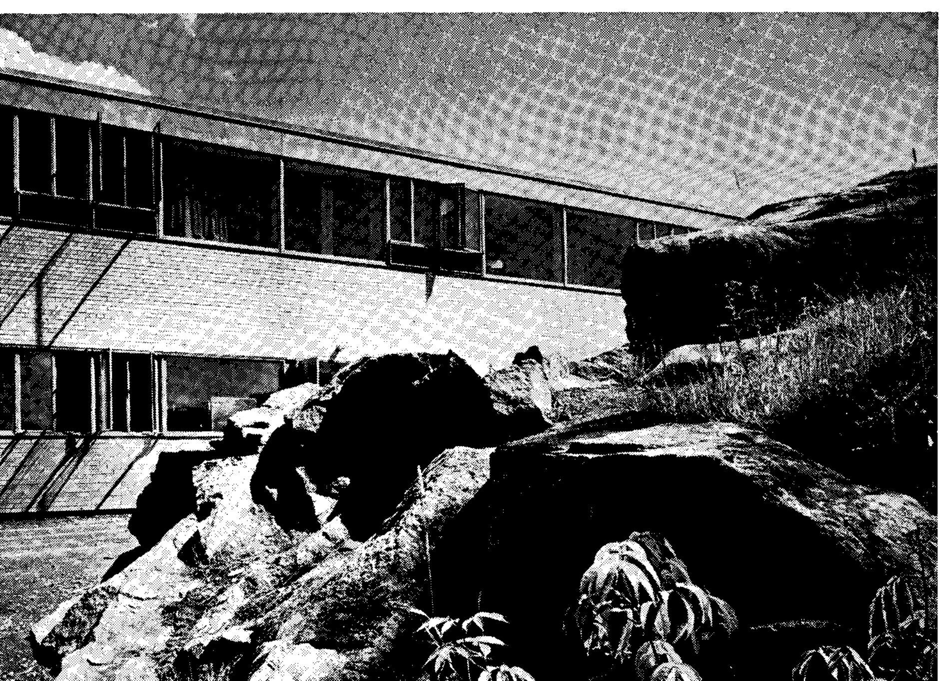
On the lower floor, on the view side, are the daylighted kitchen, dining room, laboratory, sterile supply, and other work areas. In the underground, rear portion of this floor, artificial light and ventilation serve storage spaces, boiler room, pharmacy, radiology suite, and emergency and operating rooms.

An interesting detail of the structural-steel frame is the use of lally columns within the partitions so that perfectly smooth wall surfaces result. The building is heated by a low-pressure steam system; electric units serve the sterilizers and kitchen equipment. Otherwise, construction of the Alexandria Bay hospital is almost identical with that of the Canton hospital.

1 1-bed room
2 2-bed room
3 janitor
4 4-bed ward
5 pediatrics
6 psychiatric
7 linen
8 patients' bath
9 utility
10 pantry
11 records
12 nursery
13 examination
14 premature
15 formula
16 clean-up
17 sterilizing
18 volunteers
19 women's locker room
20 men's locker room
21 refrigerator
22 files
23 dark room
24 drugs
25 machine room
26 transformer
27 doctors
28 director



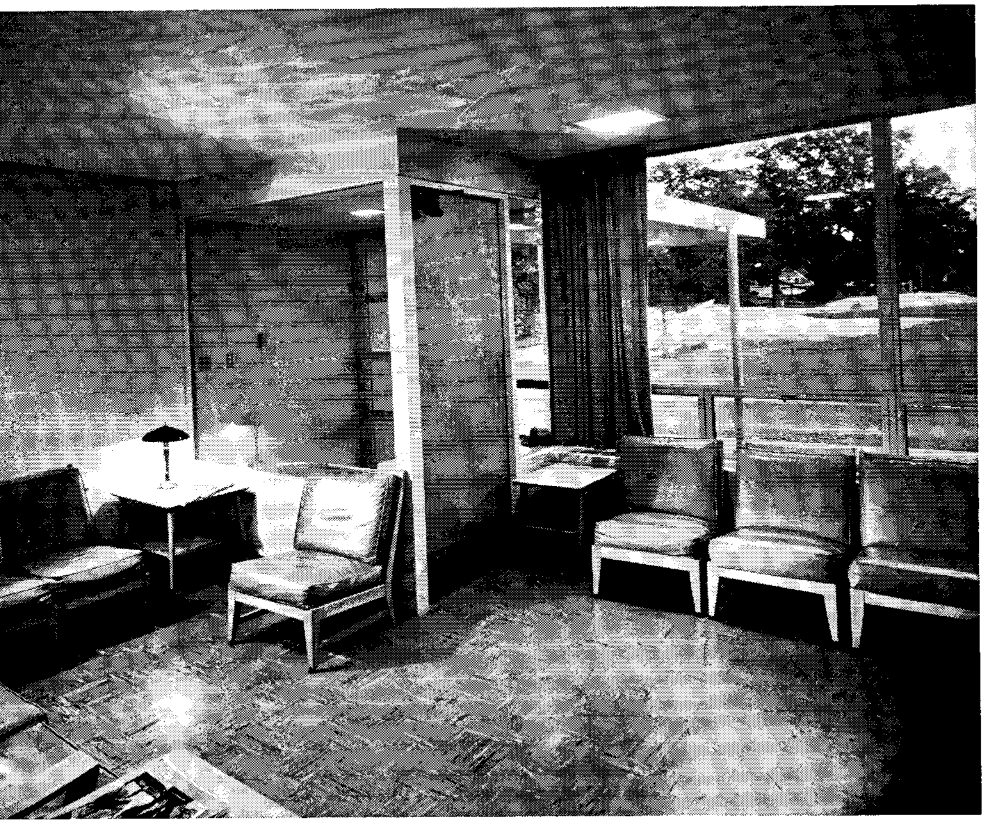




Both the one-story, southeast front, and the two-story side facing the river are lined with continuous windows, made up of alternating fixed and operable units.

Photos: Torkel Korling

hospital construction: rural

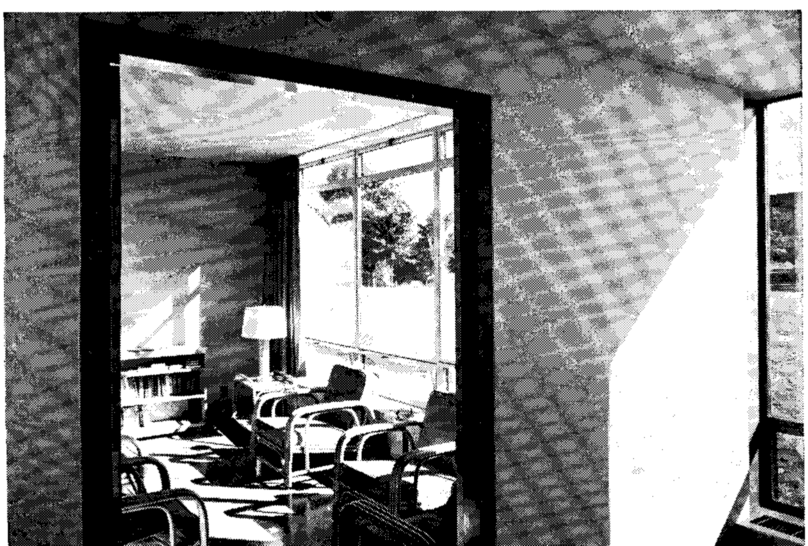


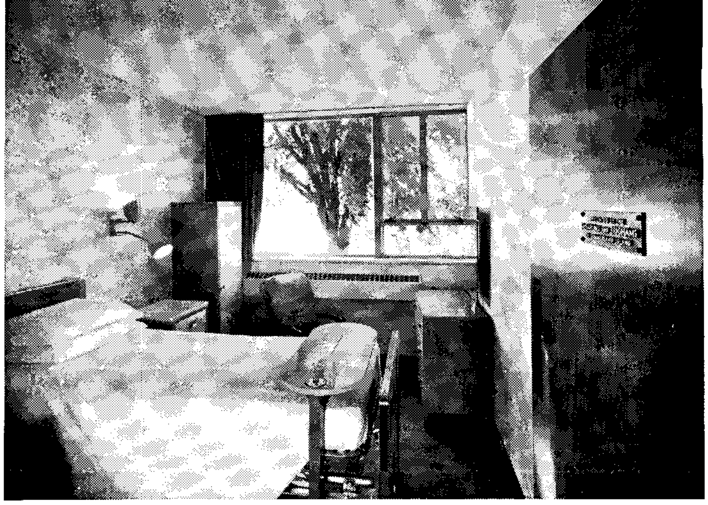
Alexandria Bay, New York

The entrance and waiting room (top) *occur on the southeast wall of the upper floor.*

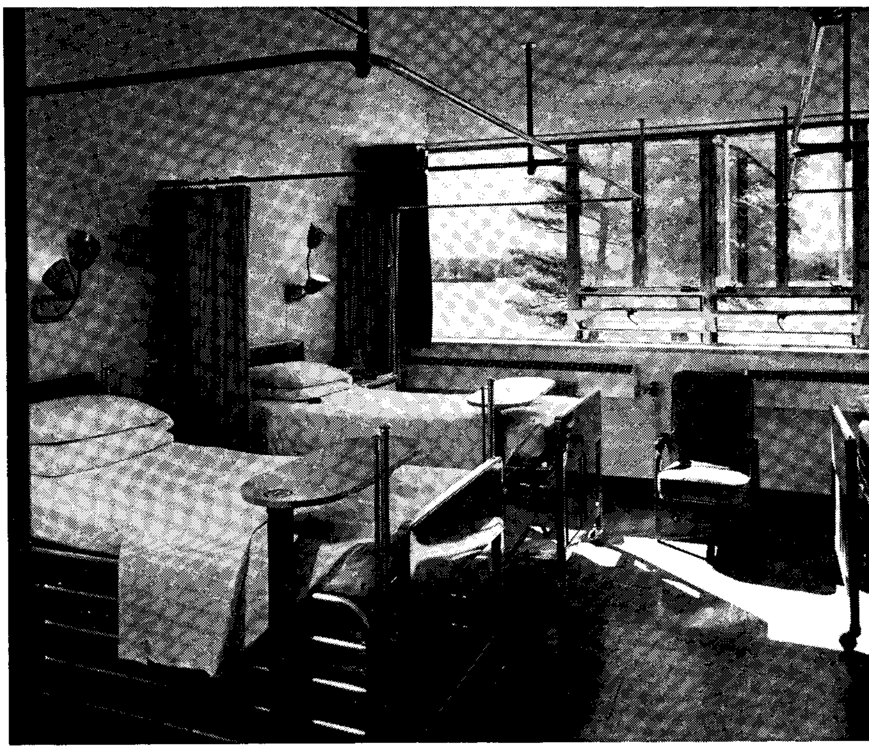
In the upper-floor corridor (right) *a large, fixed window on the left-hand wall permits a clear view of the nursery.*

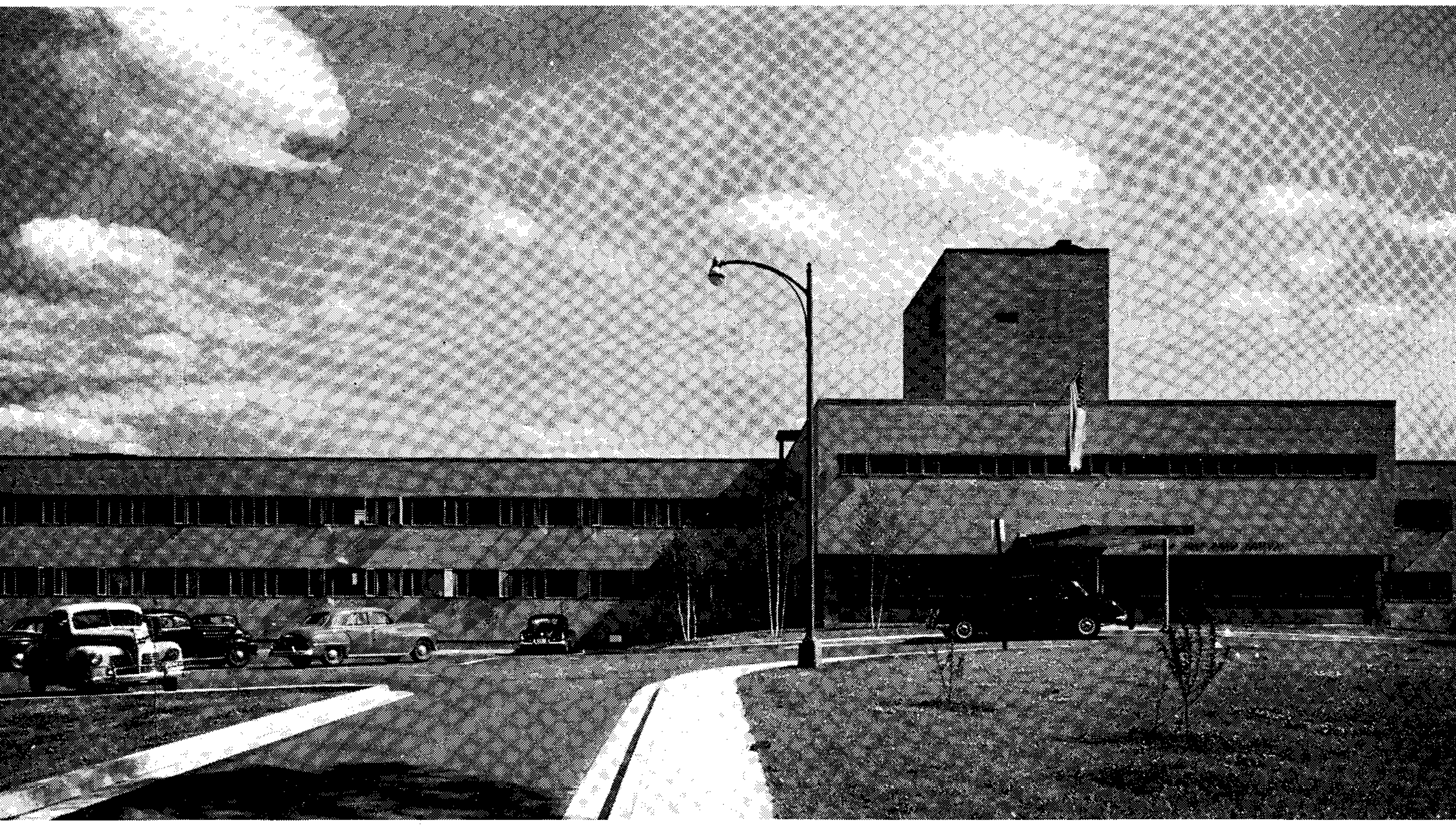
A sun-flooded lounge for patients (below) *is located in the south corner of the main floor.*





In addition to the nursery and a room for a psychiatric patient, there are seven single-bed rooms (top) ; *three 2-bed rooms* (photo above, at right) ; *and three 4-bed wards* (right). *All except two of the 2-bed rooms command the river and island view.*



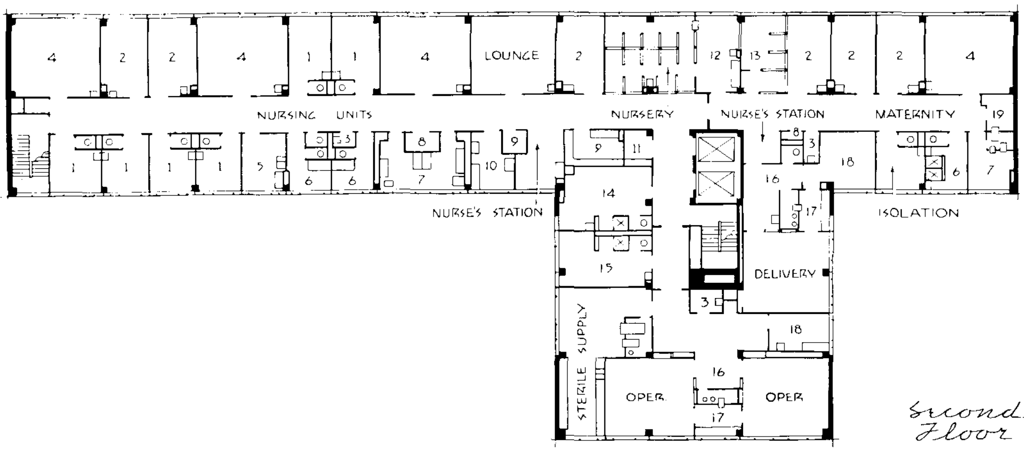


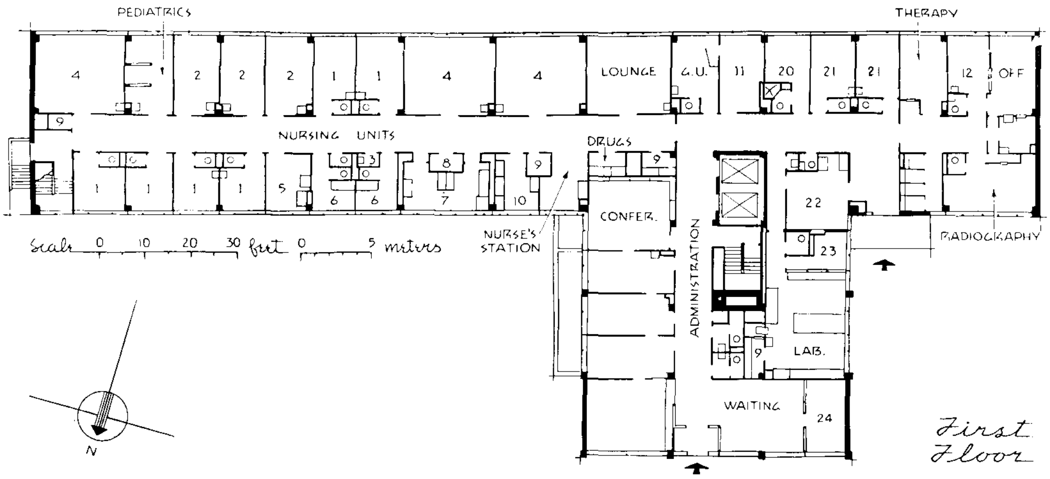
Gouverneur, New York

architects	Skidmore, Owings & Merrill
partner-in-charge	Robert W. Cutler
associate architects	Sargent, Webster, Crenshaw & Folley
consulting mechanical engineer	Harry H. Bond
general contractor	House-Putnam

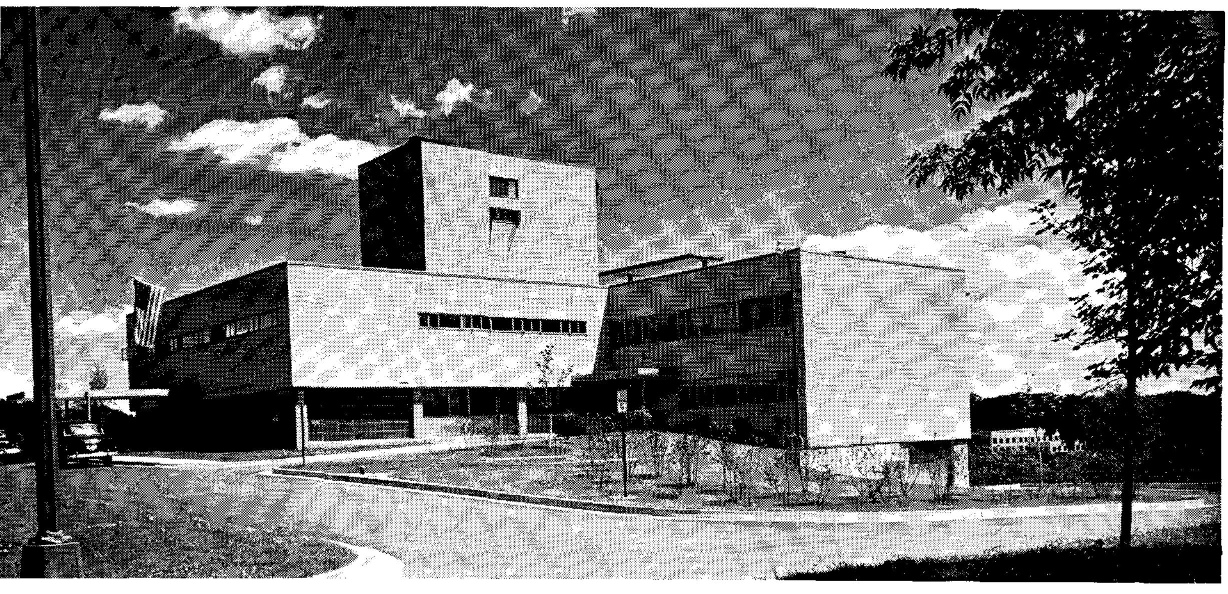
This 92-bed, "headquarters" hospital faces north; most patients' rooms are on the south, where they enjoy a view of the Oswegatchie River. Off the U-shape approach drive is ample parking space; a secondary drive (acrosspage) *leads around and down to the garage at the west end of the ground floor.*

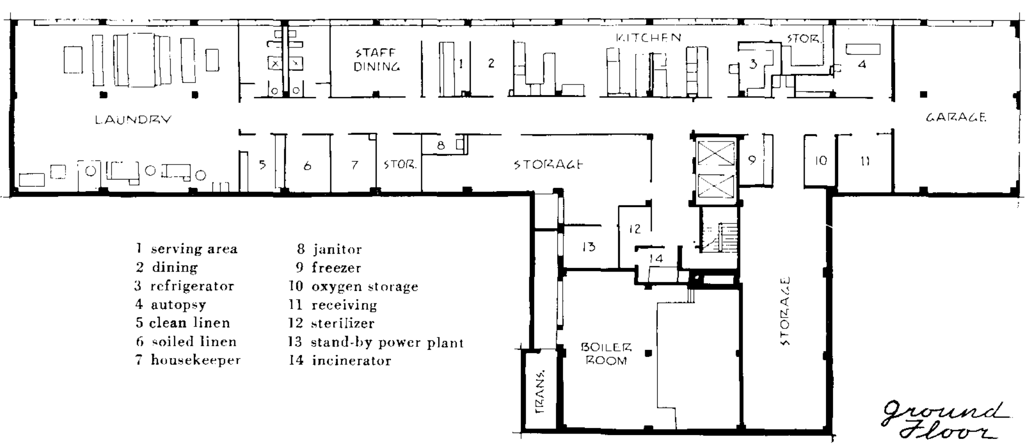
Photos: Torkel Korling



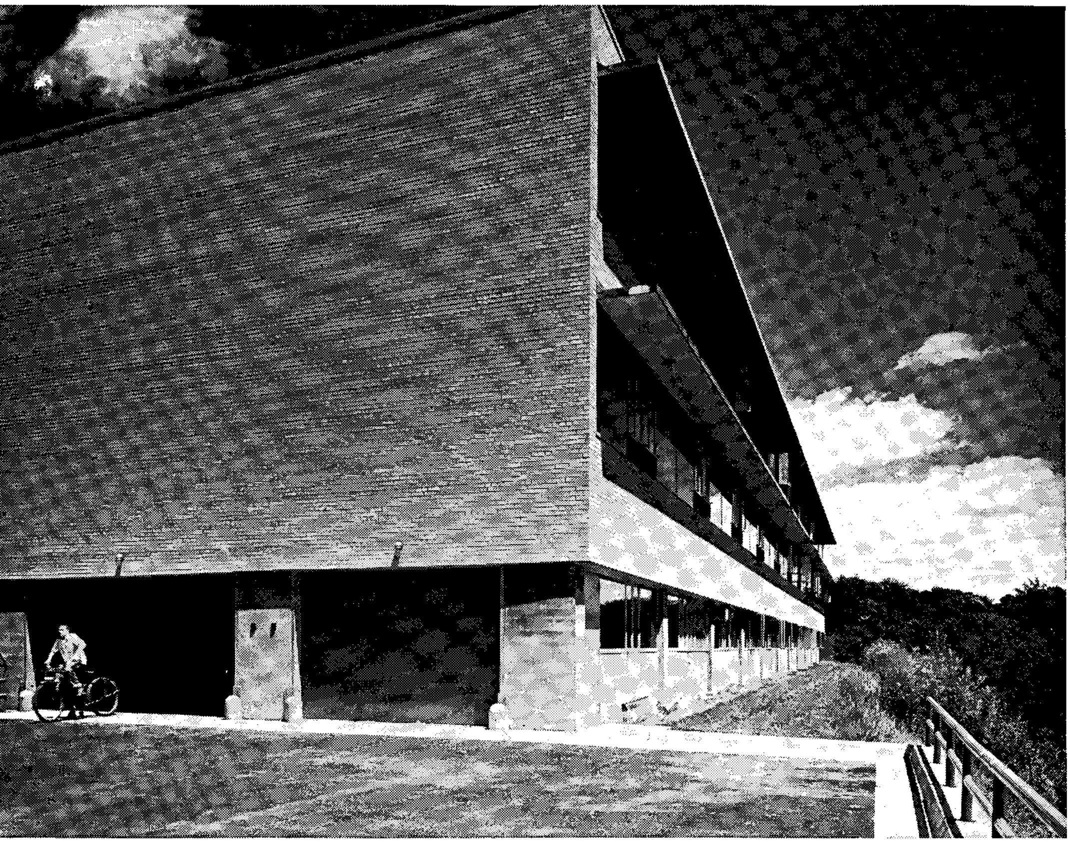


1 1-bed room
2 2-bed room
3 janitor
4 4-bed room
5 treatment
6 patients' bath
7 utility room
8 linen room
9 storage room
10 pantry
11 x-ray
12 examination
13 premature
14 nurses
15 doctors
16 scrub-up
17 sterilizing
18 clean-up
19 formula room
20 interne
21 doctor
22 emergency
23 pathology
24 canteen





1 serving area
2 dining
3 refrigerator
4 autopsy
5 clean linen
6 soiled linen
7 housekeeper
8 janitor
9 freezer
10 oxygen storage
11 receiving
12 sterilizer
13 stand-by power plant
14 incinerator

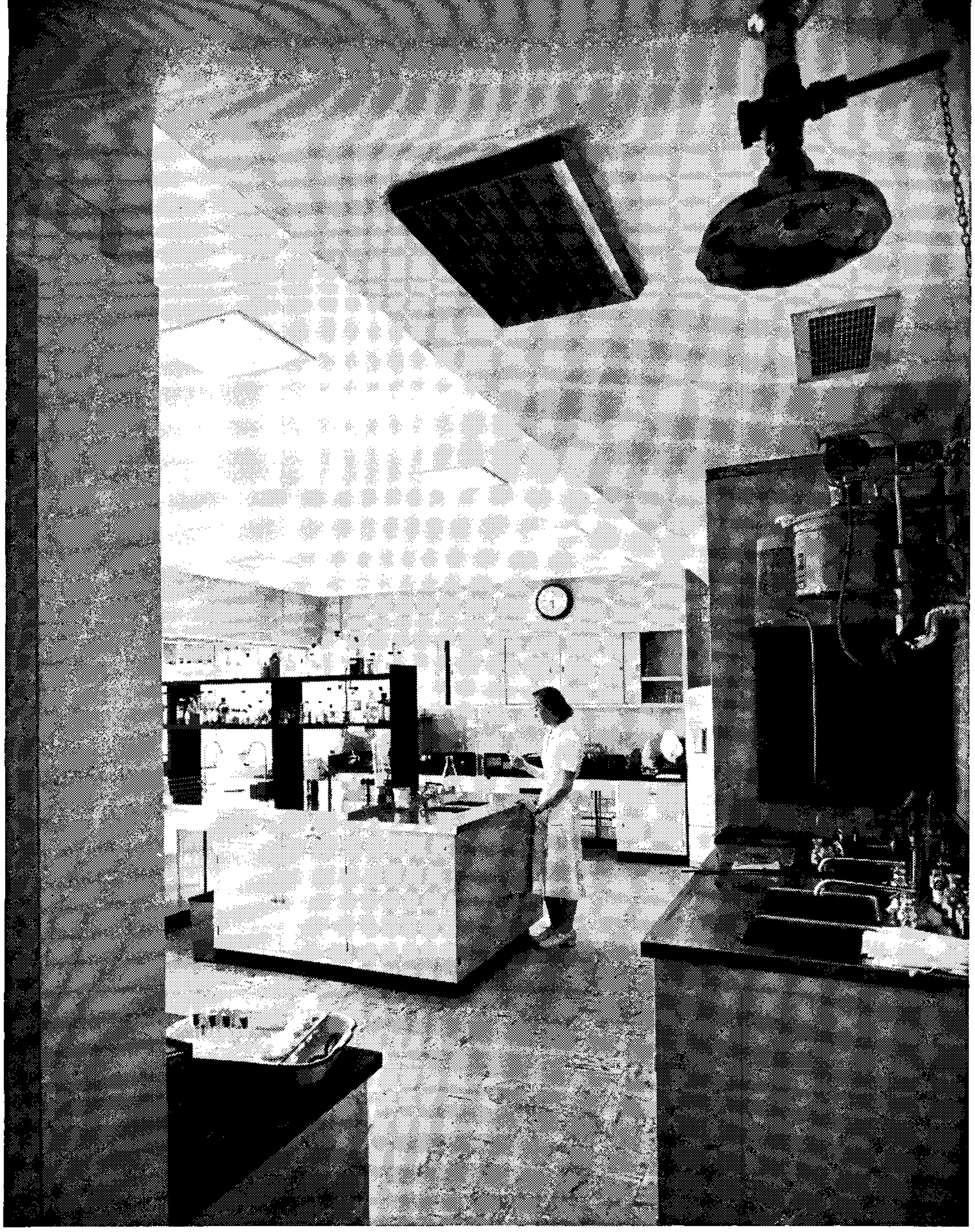


Gouverneur, New York

The largest of the three Edward John Noble hospitals, Gouverneur has 92 beds and is so constructed and equipped that another nursing unit may be added on the roof, to form an eventual 100-bed facility. It is at Gouverneur that the centralized elements of the North Country Hospitals are located—the top medical direction and administrative activities; the central laundry; and bulk storage facilities that supply the other units. The unusually sizable radiographic department works with the local talc, zinc, lead, and iron-mining and milling industries to research the related occupational hazards.

The lordly site is a promontory 85 feet above the Oswegatchie River, and the majority of patients' bedrooms face south, overlooking a bend in the river. On the ground floor (the north half of which is below grade) are the boiler room, receiving and storage rooms, kitchen, dining rooms, laundry, autopsy room, and garage. On the first floor, in addition to administrative offices, there is the out-patient department, including diagnostic facilities of radiology and pathology, doctors' offices, and a 24-bed medical nursing unit. Here also is the radiographic department that co-operates with local industries. The second floor contains the operating and delivery rooms, surgical and obstetrical nursing units, and nurseries.

Like the other two hospitals of the group, the Gouverneur unit is steel framed with exterior walls of light-gray face brick over cinder block. The continuous, insulated-glass windows on the south front have structural cantilevered strips above them, so designed that they exclude unwanted summer sunlight but will admit winter sunlight. The elevators are duplex, collective, completely automatic, and operate as a team. The operating and delivery rooms and nurseries are fully air conditioned.



The west end of the nursing-unit wing (across page) *is devoid of openings, except for the garage doors on the ground floor; continuous, structural eyebrows shade the southern window bands.*

The hospital laboratory (top, left) *is located in the forward wing of the hospital, on the first floor.*

Glazed ceramic-tile surfaces walls of the fully equipped operating suite (bottom): *floor is terrazzo.*

heating design for future cooling

by Robert H. Emerick*

When a client tells his architect, "please design my new home for *future* summer cooling," the problems created can be more than strictly technical. They can involve, for example, the question of extra fees.

To illustrate, an engineer is quite likely to point out that allowing for summer cooling at some future date obliges him to compute the summer load, to locate the ultimate plant, at least tentatively, and to particularize his specification beyond the normal requirements for heating alone. He might even feel compelled to make rough sketches of his dual-purpose design in order to verify the accuracy of the pattern.

Usually his first reaction in such circumstances is to ask who will pay for the extra engineering. As this question is disturbing to all concerned, the writer has developed a method for determining the summer load with sufficient accuracy to meet all initial design requirements, and yet avoid the expense of a detailed engineering analysis. To see the procedure in action, we must tabulate first the factors that shape a cooling design. They are:

(1) Sensible heat that enters the building through the walls, roof, windows, etc.

(2) Solar heat, impinging on the structure, with perhaps some direct rays entering certain rooms through the window glass.

(3) Sensible heat emitted by the room occupants. Each human being releases approximately 180 Btu per hour when seated and at rest.

(4) Latent heat from the room occupants, with an approximate value of 100 Btu per person per hour. This heat is present in the form of water vapor, rejected in exhaling, and as moisture evaporated from the skin.

(5) Sensible heat from lights.

Sensible Heat Through Structure

In order to achieve an estimate of summer cooling, we must develop approximate values for each of these factors and in the details of normal calculating this is a very lengthy procedure. Our short cut method starts with the sensible heat that enters the building. Happily, this answer is easy to come by since the building cooling load bears a direct relationship to the heating load. Both of these loads are calculated with the same set of heat-transmission coefficients so that only the temperature difference between winter and summer conditions sets the results apart. Thus, with a computed heating load already in hand, we need merely pick up a slide rule and with two settings of the runner, determine the sensible heat gain through the structure. The formula is:

$$S = \frac{W \times td_2}{td_1}$$

S = Summer sensible heat load by transmission, Btu/hr

W = Winter sensible heat load by transmission, Btu/hr

td_1 = Temperature difference winter, degrees F

td_2 = Temperature difference summer, degrees F

To illustrate, assume we have a living room that shows a heating load of 20,000 Btu per hour when calculated on a temperature differential of 0 F — 74 F. Then the summer cooling for a temperature difference of 80 F — 95 F will be $\frac{20{,}000 \times 15}{74}$ or 4054 Btu per hour.

This transmission load is merely the first factor but it provides us with a basis on which to erect values for the solar, fresh air, and latent heat loads, each of which is computed by a system of ratios which are themselves subject to variations in the light of particular conditions.

Solar Load

The first ratio concerns the solar load. Sunlight calculations are always generously leavened with judgment, even if we endeavor to reach a scientific value based on latitude, sky reflections, solar angles, etc. This must be so because a single cloud at the critical hour, or the fall of a tree in a storm, or the carelessness of a maid in failing to wash windows has the power to invalidate these scientific estimates, not merely for one season, but again and again. Consequently, an analysis of many relationships between the solar load and the building transmission load indicates to this writer the reasonableness of assuming the solar load to be 1¼ times the transmission value, provided this fraction is used as the *basis for further consideration.*

* *Consulting Mechanical Engineer, North Charleston, S. C.*

Determination of Total Cooling Load

Room	Heating Btu/hr	Cooling bldg. factor td_2/td_1 Btu/hr	Human load Btu/hr	Solar* load Btu/hr	Lighting load Btu/hr	Total load Btu/hr
Living	20,000	4054	2160	5068	——	11,282
Dining	10,000	2027	1440	2534	——	6,001
Bed. #1	7,000	1419	360	1419	——	3,198
Kitchen	12,000	2433	360	2433	500†	5,726
Bath. #1	1,500	304	180	380	——	864
Bath. #2	1,500	304	180	——	200	684
Bed. #2	5,500	1115	180	——	200	1,495
						29,250

* Solar load has been sized on the 1¼ fraction or on the 100 percent basis to demonstrate application of the principle.

† The kitchen load for lighting should be expanded to include the load from cooking appliances.

Note: Total air circulated = 29,250 x 0.0585 = 1711 cfm.

By further consideration is meant the common sense readiness to increase the fraction if the room being weighed is heavily exposed to the sun, and conversely, to decrease it in cases of extensive shading. The range suggested is 5 percent for minimum exposures and up to 175 percent for maximum exposures.

The Human Load

For the sensible and latent factors of the human load some understanding of the kind of people who will occupy this house will be our best guide. For example, suppose there are sociable people and they are likely to enjoy afternoon bridge or evening canasta. We therefore study the dimensions of the living room and assume it will accommodate X number of card tables. If we then allow four persons to each table, we can approximate the number of individuals who will produce 180 Btu per hour each of sensible heat. The total, of course, becomes the expected human load for that room. We do the same thing for the bedrooms, allowing one or two persons in the room as the living habits of the family suggest to be likely.

The latent heat created by these people will not affect duct design which is the outstanding structural problem when allowing for future cooling, but it must be included when sizing the machinery. How this is done will be discussed in the later paragraphs on the sizing determinations for the cooling compressors. Meanwhile, we can safely neglect it.

Lighting Loads

Our final factor, the burden which night lighting places on the cooling system, need only be considered in those rooms which do not receive sunlight. The reason is that even a small hourly solar impress tends to approximate, and often exceeds, the output of Btu from the night lighting system. In addition, as further compensation for the evening, the building transmission load usually falls steadily after sunset. Our cooling design peak, therefore, is likely to occur in the late afternoon, and we should include those lights which might be turned on at that time, perhaps in heavily-shaded rooms.

assembling a useful answer

Since the basic responsibility in the problem was to design a winter heating system and we have the Btu for such a system room by room, the cooling burden is quickly determined if we follow the table (*top of page*), filling it in as appropriate.

While we now have a dependable approximation of the cooling load, room by room, the answer we really need for sizing the ducts is the cubic feet of air per minute. This determination, in a detailed engineering analysis, involves the use of psychrometric charts and careful recirculation calculations but for our present purpose, the procedure requires but a few moments and a slide rule. The steps are these:

(1) We assume a temperature differential between the air leaving the cooler and the air in the cooled room. Experience has shown 16 degrees to be a good average (64 F and 80 F in this case), although some designers have used 20 degrees without complaint.

(2) We multiply the temperature difference by 0.24, which is the specific heat of air, and observe that each pound of the cooler discharge will pick up 16 x 0.24, or 3.84 Btu.

(3) One other item is needed, in this example the volume of air at 64 F, and the standard tables show its value to be 13.47 cubic feet per pound.

(4) All the data are now set down in an equation designed to produce the desired information in cubic feet of cooling air per minute. The solution is achieved with a few moves on the slide rule. Here is the way it works out with the living room figures:

$$\frac{11{,}282 \text{ (Btu/hr)} \times 13.47 \text{ (cu ft/lb)}}{3.84 \text{ (Btu/lb)} \times 60 \text{ (min/hr)}} = 660 \text{ cu ft/min}$$

These steps have been demonstrated in some detail in order to make clear the reasons for doing what we do. In practice, we actually shorten the procedure by developing a multiplying factor which is applied directly to the cooling load for each room. This factor is simply the solution of the foregoing equation *except for the room load in Btu per hour.* In this case it would be: $\frac{13.47}{3.84 \times 60} = 0.0585$; and, 11,282 x 0.0585 = 660 cfm (living room); 6001 x 0.0585 = 351 cfm (dining room); 3198 x 0.0585 = 187 cfm (bedroom #1). Each room is considered in the same fashion.

Arriving at a useful answer, therefore, requires us to complete two journeys by slide rule. The first, starting from the winter heater load, ends with the determination of the summer cooling load. By means of the second, we convert the summer cooling load to cubic feet of air per minute. The time to complete both journeys should not take an engineer longer than a single hour.

sizing the ducts

The importance of knowing the volume of cooling air that a room requires lies in the fact that more air is needed for cooling than for heating. If we size a duct for cooling, therefore, we can expect it to accommodate warming air most satisfactorily but we cannot speak so confidently of the results when this design basis is reversed.

The preponderance of air on the cooling cycle is made necessary for the comparatively small number of Btu picked up by each pound of the cooler discharge. In the example discussed these totaled 3.84, whereas heating air with an assumed register discharge of 150 F bears 150 F = 74 F x 0.24 = 18.24 Btu.

At 150 F a pound of dry air occupies 15.37 cubic feet and if we substitute this volume, together with the Btu value in the simplified formula, the multiplier comes out to:

$$\frac{15.37}{18.24 \times 60} = 0.0145 \text{ (approximately).}$$

Applying this multiplier against the living room winter load of 20,000 Btu per hour produces a calculated air movement of 290 cfm. Since this is less than half the requirements for the summer cycle, the controlling effect of the cooling operation is obvious.

Our cooling calculations, therefore, will be the figures to be used for duct design when making allowance for summer cooling and the specifications and drawings will present these facts to the contractor. In order to hold down costs, summer velocities may be set at the top acceptable limit; on the heating cycle the oversize of the heating ducts will then be less marked.

size of the cooling machinery

The architect who has provided a heater room in his plan always hopes that the summer-cooling plant can be squeezed into the same space. One possibility is to use a suspended type of horizontal heater, then when the future becomes the present and the owner is prepared to install his cooling compressor, the floor space beneath the heater is available. As an alternative, the suspended heater might be mounted under the roof in the carport, garage, or in the attic above the house proper. Any of these alternatives will increase the cost of the duct system and complicate the arrangement.

The size of the cooling plant is not the simple summation of the cooling loads as we have already observed them. Fresh-air make-up, which may be established at any desired volume but usually is projected from 10 to 15 percent of the total air circulated, introduces a substantial load, both sensible and latent. Compensating to some extent is the factor of diversity, which means that the maximum load is not the same for all areas of the house simultaneously.

To observe the relative effect of the fresh-air intake on the size of the plant, suppose we assume a 10 percent make-up based on the total air circulated to the seven rooms already indentified on the load chart. This means 10 percent of 1711 cubic feet per minute—approximately 171 cfm.

Converting into pounds, we have 171 ÷ 13.47 (the volume of air at 64 F) or 12.69 pounds per minute. These 12.69 pounds are brought in from the outside and their temperature, of course, is not 64 F but 95 F. Chilling them down these 31 degrees imposes a load on the cooling machine of 31 x 0.24, or 7.44 Btu per minute per pound. Thus, in one hour the sensible load alone is 5664 Btu.

The moisture in this incoming air is what imposes the major latent heat load on the machine for most residential installations, rather than the exhalations of the occupants. In this case, with an outdoor temperature of 95 F and 53 percent relative humidity (80 F wet bulb), a condition frequently encountered in many sections of the country, the lowering of the air's temperature to 64 F in the cooler squeezes out approximately 42 grains of water vapor from each pound. This figure is obtained from the psychrometric chart.

Since we are bringing in 12.69 pounds of fresh air each minute, at the end of an hour's operation $\frac{12.69 \times 42 \times 60}{7000 \text{ (grs/lb of water)}}$ equals about 4.57 pounds of water removed from the incoming fresh air in the cooler. While in the vapor state, this water represents an investment in heat of approximately 4570 Btu, since 1000 Btu are incorporated in the evaporation of one pound of water and all of these Btu must be spent in the cooler.

At this point we will consider the humidity created by the persons present in the house. Twelve bridge players, breathing water vapor into the air at a rate of about 700 grains of moisture per hour each, are producing a burden on the cooling machinery of 1200 Btu per hour, more or less, depending on the excitement of the game. Tabulating the fresh air and latent heat situation, all of which affects the sizing of the cooling machinery but not the room distributing system, we have:

(1) Fresh air sensible heat removed in cooler.......	5664 Btu
(2) Fresh air latent heat removed in cooler.........	4570 "
(3) Human latent heat removed in cooler.........	1200 "
Total	11,434 Btu

If we now add the 29,250 Btu per hour for the other cooling items previously calculated, the future allowance in machinery for this particular case totals 40,684 Btu per hour, or 3.4 tons of refrigeration.

This is the maximum gross load but it is not likely to occur because of the influence of diversity. Incidentally, to obtain the greatest advantage through diversity operating, a rather complete system of controls is needed and the average residence lacks this benefit. Therefore, a diversity allowance factor of no less than 90 percent is recommended by this writer as a general safety rule, since any more optimistic allowance might result in an undersized installation.

sizing by short cuts

Humidity calculations along the psychrometric highways involve considerable time; consequently, doing them is not pleasing to an engineer who sees no extra pay for his work. However, there does exist a byway to the same end, its foundation secure on what we already know, and it is very easy and quick to follow. Here it is:

Step 1: X number of persons x 100 Btu/hr = Total human latent heat

Step 2: Total human latent heat x 4 = Latent heat in fresh air

Step 3: Building transmission load x percent fresh air x t_1/t_2 = Fresh air sensible heat

Step 4: Add 1, 2, & 3 to building transmission load = Gross machinery load

Step 5: Gross machinery load x diversity = Net machinery load. This is the proper size.

Most of these steps are obvious but some explanation of 2 and 3 is in order. First, there is an indirect relationship between the number of persons in a building and the volume of fresh air needed. As in the case of the solar conclusions, analysis of numerous jobs suggests that a 4 to 1 ratio is a good average starting point. Individual practitioners referring to their own experiences may desire to change it, either up or down.

The fresh air sensible heat load is developed by means of a direct ratio between the *outside* temperature-to-cooler differential and the *inside* temperature-to-cooler differential. Thus t_1 is, in this case, 31 degrees and t_2 is 16 degrees; $t_1/t_2 = 1.94$ approximately. Knowing the total inside sensible load as we do, multiplying by the 10 percent of outside air and then by the temperature differential ratio becomes a clear road to the outside load's value.

Translating these ideas into a working demonstration of the short cut produces the following results:

Step 1: 12 persons x 100 Btu/hr = 1200 Btu/hr

Step 2: 1200 x 4 = 4800 Btu/hr

Step 3: 29,250 x .10 x 2 (approx.) = 5850 Btu/hr

Step 4: 29,250 + Steps 1, 2, and 3 = 41,100 Btu/hr

Step 5: 41,100 x .90 diversity = 36,990 Btu/hr

Tonnage = 3.09 tons of refrigeration.

Residential refrigeration machines are fairly well standardized at 2, 3, and 5 tons (or horsepower); consequently in this case we would recommend a 3-ton machine. For in-between sizes, judgment must be exercised with particular care being taken not to undersize. A wise memory is one that tells us to consider the reduction in capacity that follows the appearance of algae and scale in the condensing system and reminds us that machinery efficiency naturally decreases with time.

space for the physical installation

With the size of the cooling machinery determined, space must be found in which to station it. In a normal arrangement, the heater is set at one side of the heater room, thereby leaving space for the cabinet cooler. Unfortunately, this does not solve the whole problem. Condensing equipment remains to be accommodated somewhere. A cooling tower on the roof is not an admirable sight and if we set it on the ground instead, neighborhood children will delight in throwing toys, stones, and pet rabbits into its watery cascades.

The alternative is to place it in the heater room with duct connections for circulating the outside air which serves it. But, is there space for this rain-closet, which is more than 5 ft high, and occupies a floor area of about 2 ft by 2 ft? If not, the architect faces an irritating problem. Possibly the house plans are drawn before the request to provide for future cooling comes in and thus, revisions of the design can be quite costly.

For self-protection, architects should make a point of discussing possible future cooling with their clients at the very beginning of a project. Waiting for the client to bring up the subject is a mistake.

Occasionally, local water supplies are plentiful and cheap and in those circumstances the client might be willing to condense the refrigerant vapor with water that runs thereafter to waste. Space requirements are benefited by the omission of the evaporative condenser but these instances are the exception. Incidentally, a 3-ton machine will use about 5 gallons of condensing water, more or less, every minute it operates and this quantity can create municipal problems. To illustrate, some communities will not permit the cooling water to be discharged into the house sewer because of the extra burden this water places on the sewage-disposal plant. From the supply standpoint, areas contending with critical water shortages or overloaded distribution systems are almost certain to deny water from their lines to air-conditioning condensers.

the register situation

In one-story houses, conventional practice locates the warm-air registers high in the wall. This location needs no change for summer cooling as the point of cold-air discharge is properly high above the floor.

With multistory buildings, the best positions for the warm and cold registers are in conflict. Due to the building's stack effect, which is a way of acknowledging the nature of warm air to rise, heating registers produce best results when set in baseboards, or nearly that low. However, cold blasts emerging from these same low registers and impinging on the ankles of the building occupants will be appreciated by no one. The treatment of this situation is to go up with the cold-air registers, to extend the wall stacks to high wall positions, or alternatively to carry the ducts to ceiling diffusers.

Under some conditions, ceiling diffusers may prove satisfactory for both cold- and warm-air service but the design of the diffuser is critical and a mischoice produces alternate cold or hot blasts, depending on the season of the year.

Allowing for summer cooling, therefore, means providing extended wall stacks or rearranging ducts to serve ceiling outlets at the time the heating system is installed, even if these extra lengths of duct and extra registers will not be used for years, perhaps never. The engineer will benefit a little by the extra construction cost if his fee is based on a percentage of the job and he will not, therefore, grumble very persistently about it.

future cooling and wet heat

If the new house is to be heated by either steam or forced-circulation hot water, we have two basic alternatives to consider for future summer cooling allowances.

First of these is the obvious scheme of employing two entirely unrelated systems. The heating system is simply a conventional layout of steam or hot-water convectors and the summer cooling is an equally conventional design of forced-circulation chilled air, distributed through ducts.

This arrangement of two unrelated systems is perhaps suggested most often by the client because this is the way he sees it. As for the engineer, he is in exactly the same position he would occupy if the heating were to be accomplished by warm air. On the basis of his heating load, he applies the short cuts that develop for him the duct *dimensions* and the equipment sizes and he reports to the architect whether there is sufficient space for everything in the heater room. There is even some additional cost of installation for the ducts, bringing a modest increase to the design fee.

The second alternative, unfortunately, is one over which our short cuts have no power. In this scheme, each room enjoys a special type of conditioner cabinet, wherein piping elements are supplied with hot water during the winter, and cold water during the summer. Behind the elements is a fan, so that air circulation through the cabinet and over the elements is positive, and each cabinet is connected to the outdoors for fresh-air intake as desired.

Since all the piping must be installed to supply heating water, there is nothing to postpone for future cooling except the cooling machinery itself which chills the water for summer circulation, plus a fairly complex arrangement of three-way valves with their automatic controls. A system of this kind requires complete designing from the start and both the architect and the engineer are entitled to request the entire fee, whether the summer equipment goes into the new building now or never.

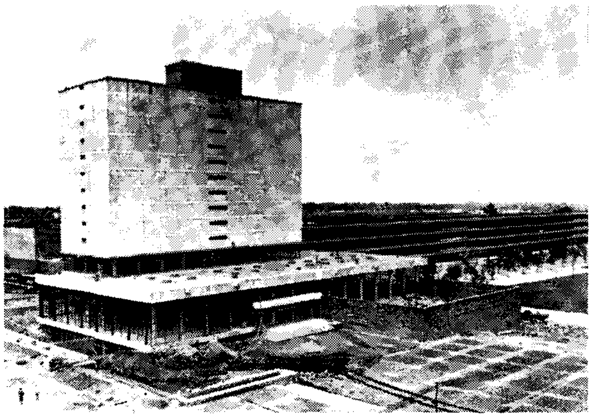
This system is intended primarily for hotels and apartment houses and is rarely justified for anything smaller, at least for the present.

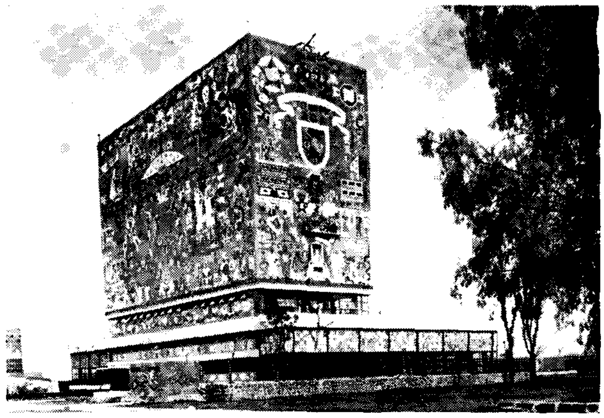
summing up

The client who asks for a heating system that allows for future cooling is taking cognizance of a trend. By means of the short-cut methods described, the designing engineer can determine, at a negligible cost to himself, the size of the ducts for the cooling cycle and the size of the cooling machinery.

The figures so developed are not exact but for the purpose intended they are well within practical tolerances. To enjoy the maximum of accuracy for any given job and location, users of these short-cut methods should modify the ratios and basic values to meet their own experienced estimates for the solar exposure, fresh air make-up, persons present, and so on.

The normal time-labor investment, from start to satisfactory answer, is less than two man hours.





"The windowless concrete box of the university library is covered with a continuous mural that leaves not a square inch of the building material free to breathe its own texture."
Photos: Saul Molini

Mexican Critique

by Sibyl Moholy-Nagy

The much-publicized Ciudad Universitaria complex in Mexico City teaches many lessons. Most of all, it refutes the myth that photography is a true record of three-dimensional reality. The important factors deciding the character of a building development—site, light, and scale—go unrecorded in two-dimensional reproductions. Of the three, it is the site that is most unlike the impressions derived from published pictures. The mountain range surrounding the wide, flat plateau of Mexico City on all sides is of such height and modulations that it seems to ridicule man-made verticality. In these peaks and volcanoes there are both sheltering and menacing qualities that might have influenced the horizontal emphasis of traditional Mexican buildings. The skyscraper dimensions of some of the University City buildings jar the eye that has become accustomed to the vertical-horizontal rhythm of landscape and structure; and it seems justified to ask: "Why build high on unlimited grounds, when horizontal forms and horizontal communication seem to correspond both to tradition and practical needs? Must the unhappy example of Pittsburgh's Cathedral of Learning, with its chocked elevators and jammed stairs, be repeated?"

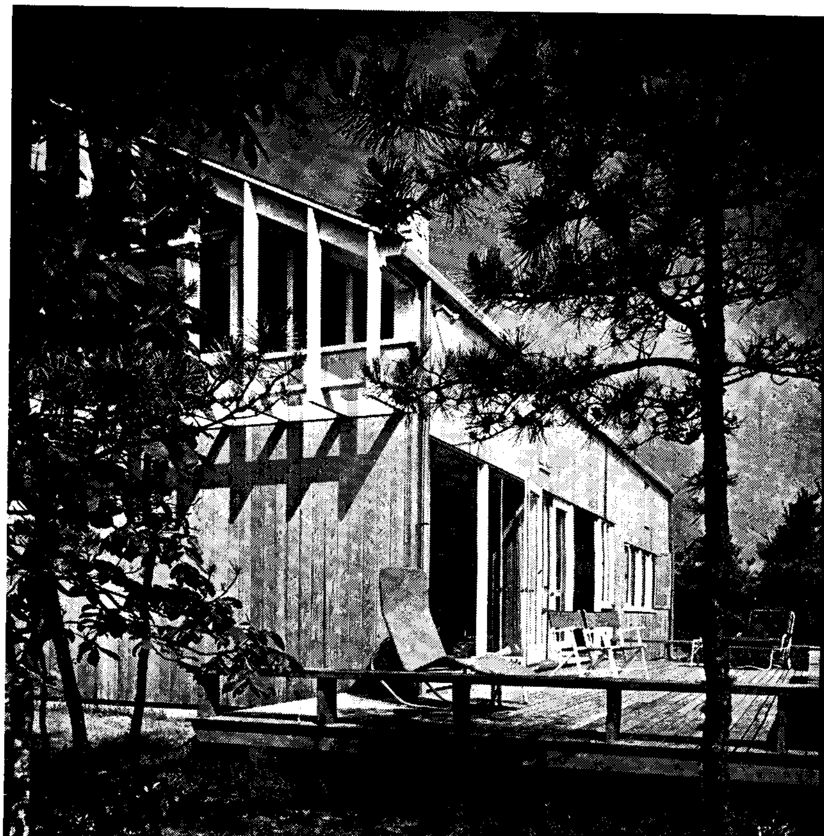
The second surprise unhinted by the photographic record is the effect of light. The plateau of Mexico has an altitude of 7400 feet. Even

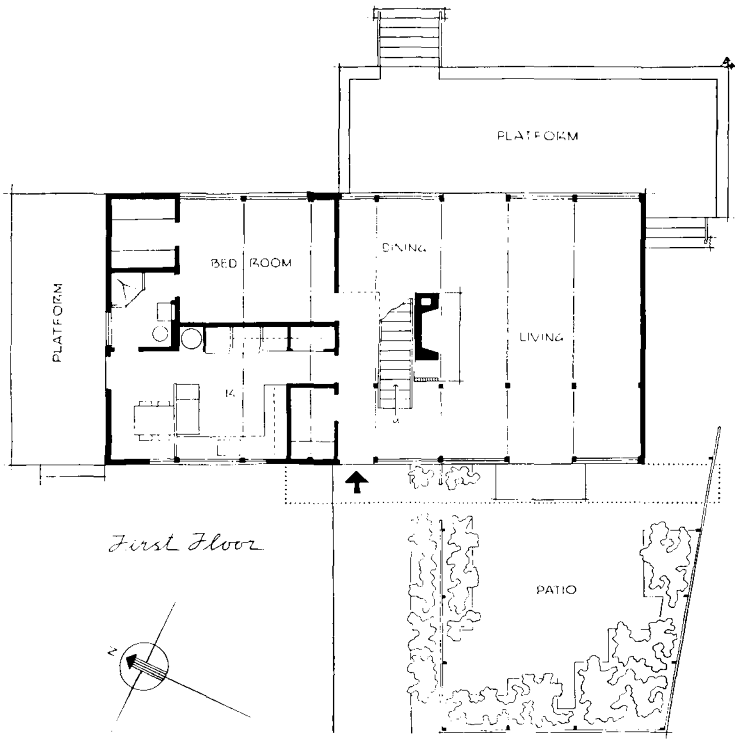
(Continued on page 170)

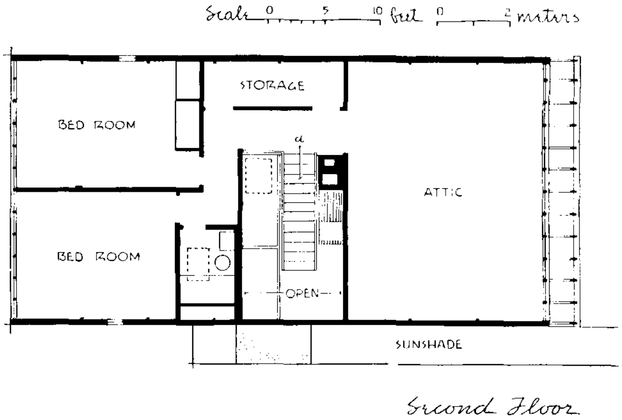
". . . an unrelated mass of high and low, long and short, vaulted and flat forms . . . the backdrop seems to ridicule man-made verticality."
Photo: Compañia Mexicana Aerofoto

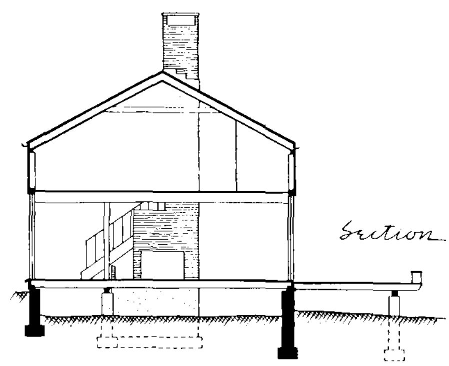
house

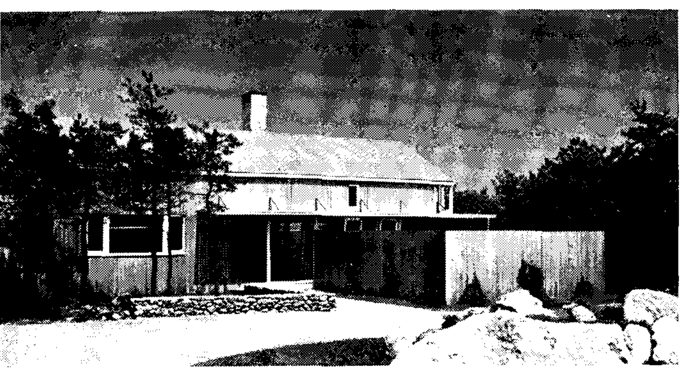
location	Marion, Massachusetts
architect	Hugh Stubbins, Jr.







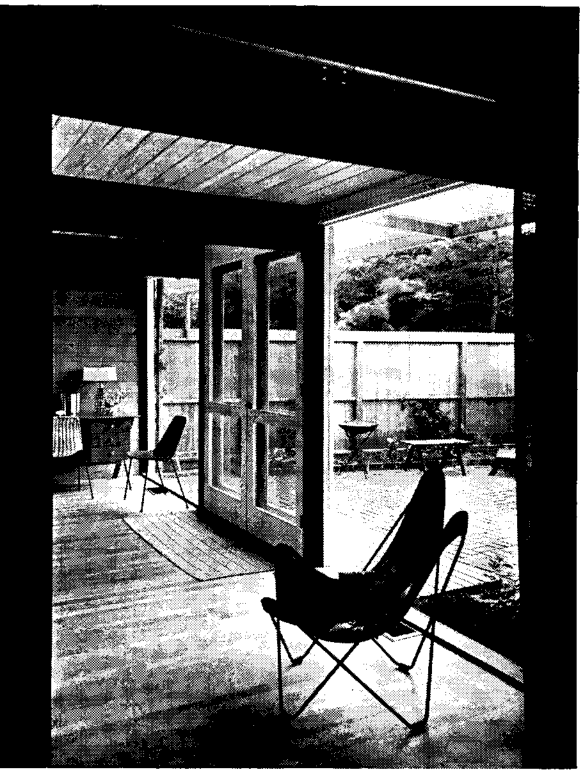




Regionalism and traditionalism, in the best sense of those words, imply a contemporary use of forms that have developed for good economic and social reasons, and have therefore become rooted in the tradition of the region. The New England "story-and-a-half" house is such an architectural form. Its high eave line, raised enough to gain a usable second floor, accounts for much of the beauty of many old New England houses—and barns.

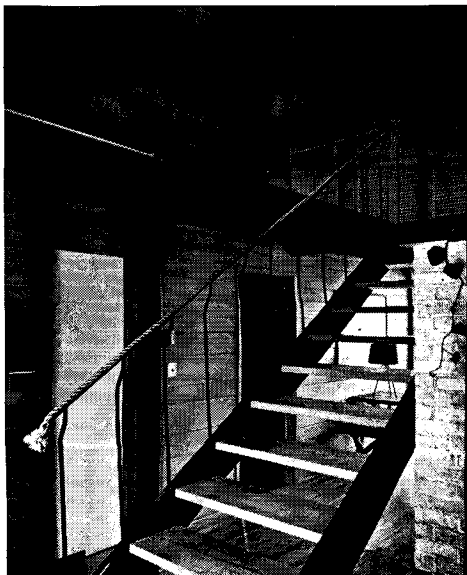
In this house on Buzzard's Bay, Hugh Stubbins has translated the form into a 20th Century expression. The device is simple: the top of the eaves plate is raised 3′-8″ above the second floor line (just high enough to use a divan along the outside wall) and the gable ends are opened. The result is an entire floor gained, at very low cubic and square foot cost—33% lower, the architect says, than any other house his office has done since 1948. Plans and section (*above*) show how this works. Stubbins knows the advantages and limitations of the scheme; he had been playing with it for some years, before carrying it out in this house. The length is limited, he points out, because upper-floor rooms get their light and ventilation from gable ends. (An intermediate dormer would complicate construction; baths and halls have simple "push-up" skylights.) The house sits on a point of land sloping to a rocky beach, toward which the east side opens. Gable ends, protected by a sun device, get good views to south and north (*photos on facing page*). As the west approach view shows (*above*), the plot is protected from adjoining properties by trees.

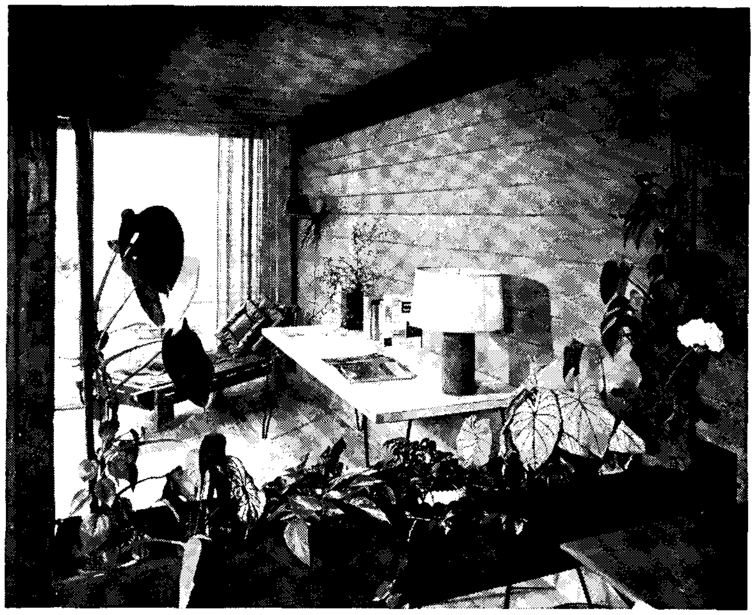
house



The house, now a summer cottage but planned for future year-round use, is based on a simple plan concept. The entrance is screened from living room by the fireplace; and from it an open stair leads to second-floor spaces (right). *The living room itself flows into the dining area* (top) *and opens both to the Bay toward the east, and to a screened garden toward the west* (left, above).

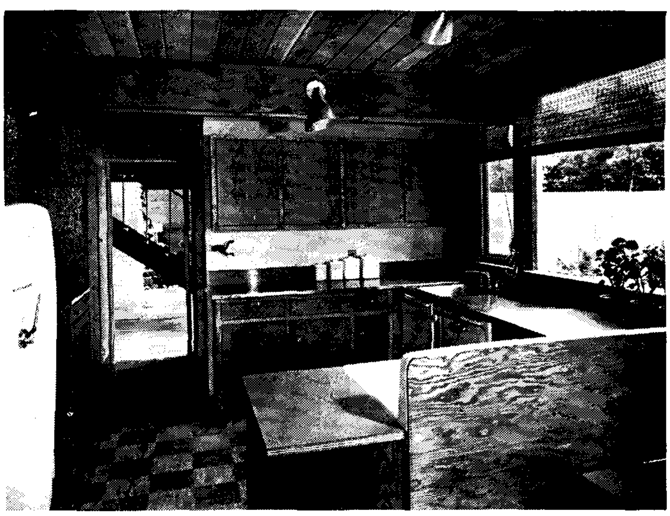
Photos: Gottscho-Schleisner





Structural posts, on a six-foot module, are two 2" x 6"'s, separated by a 1" x 4" tongue which carries to roof plate for stiffness. Exteriors are silver-gray, weathered siding; interior wood walls and ceilings, as in living room walls pictured (above), *are white or gray stained and waxed.*

Wood deck-terrace forms transition between house and sandy beach. Exposed structural beams and columns are stained black, to minimize imperfections and contrast with muted walls and more colorful furniture and plants. In kitchen (below) *other colors are used.*



new curriculum: new structure

program for Albert Einstein College of Medicine

by Harry M. Zimmerman, M.D., Director
Abraham White, Ph.D., Associate Director
Joseph Blumenkranz, Consulting Architect to the University

A new medical school has a unique opportunity to benefit from past experience and present practice in medical education, both in its curriculum and in the structure that houses that curriculum. The Albert Einstein College of Medicine, in New York City, is planned to take advantage of such opportunities.

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The site is in the Borough of the Bronx, adjacent to two new city hospitals—a general hospital and a tuberculosis hospital—which will serve as clinical teaching center for the college. The site of the college will be developed as a comprehensive medical center, which will ultimately include a dental school, a graduate school, student dormitories, a training school and dormitory for nurses, a university hospital, and a doctor's office building—all to be grouped around the college campus. The college, the first of the buildings scheduled for erection, is planned to be closest (geographically) to the municipal hospitals.

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The functions of the college, allowing it to take full advantage of its opportunities as a well-balanced institution, will be:

1. To impart to students the theoretical and practical knowledge which is essential to the practice of medicine. Training for general medical practice will be stressed.
2. To train investigators and teachers.
3. To contribute to patient care.
4. To provide facilities for the training of paramedical personnel: nurses, social workers, medical technicians.
5. To provide medical teaching and scientific opportunities to the physicians in the area in which it is located, as part of a larger program of post-graduate medical education.
6. To provide lay education in certain fields of medicine.

The above functions will be dependent on the structural organization of the school. This structural organization in turn must necessarily be dependent on the academic philosophy and objectives of the school's program, implemented through its faculty and its curriculum.

•

The curriculum will make some departures from traditional practice. The current pattern of medical education has developed over a period of years into a fairly rigid, uniform program followed essentially by most medical schools in the country. The early instruction in the disciplines which comprise the study of medicine has been didactic, and restricted largely to classroom lectures, with or without patient demonstration, supplemented by practical instruction in the laboratory. In the third and fourth years, experience is provided in the study of the patient in the hospital, generally with inadequate reference to the work of the previous two years. The curriculum in general has been characterized by increasing de-emphasis of practical laboratory exercises. Departures from this pattern (some of which are already in practice in a few medical schools) which are planned at the new college, fall into three principal categories:

1. An initial, short, formally scheduled period of instruction will be devoted to orientation in the medical school's curriculum, including subjects of the following nature: Literature and History of Medicine, Human Biology and Behavior, Introduction to Medicine, Medicine in Modern Society. This introductory period, of about four weeks, would also initiate the course in Gross Anatomy.

2. The introduction of the student to certain aspects of medical care in the community and the relationships of medical care to society, including:

A community medical apprenticeship. It is proposed that each first-year student be assigned the responsibility—at first to a limited extent—of participating in the community, whether this care is provided in the home or in hospital or school clinics.

Training in a hospital. This will take place during two periods between the first and second, and between the third and fourth years of the curriculum.

Urban community apprenticeship. This assignment of fourth-year students calls for a four-week period of making house calls with a physician.

Group medical practice. This will take the form of seminars and practical experience with voluntary health insurance programs.

Community factors in health and disease. The student will study the impact on health and disease of socio-economic factors, housing, old age, sanitation, industrial hazards, etc.

Instruction in legal medicine.

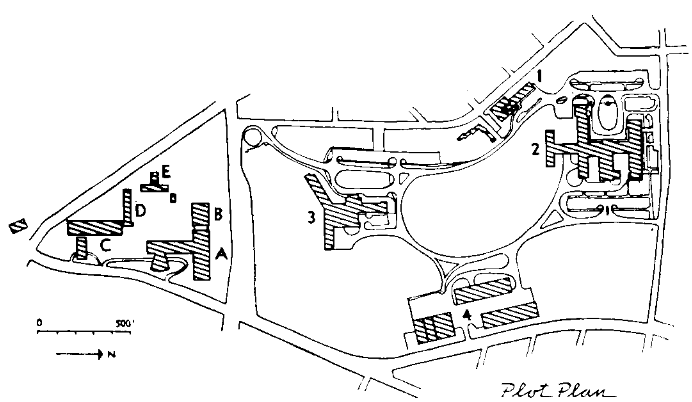
3. Marked emphasis on the integration of the various disciplines of the curriculum:

The basic plan of the College as it was developed meets the demands of this dynamic concept of medical education; and it is planned to accommodate changes which might occur in the as-yet-untried curriculum, and will provide flexibility for unlimited experiments in curriculum.

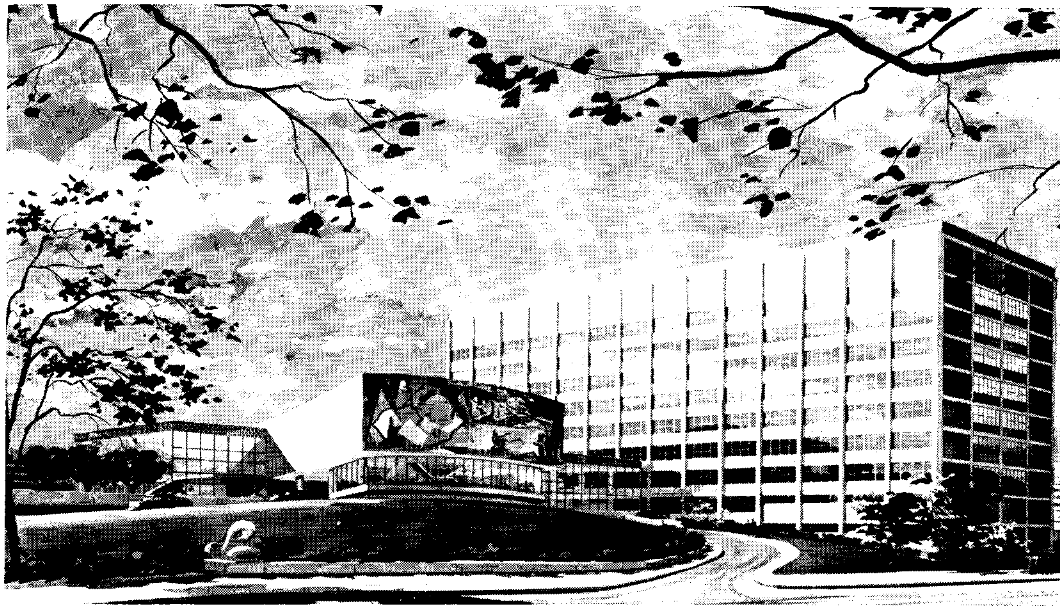
Detailed discussion of the plan concept which resulted from this curriculum, and description of the individual laboratories is continued on page 180.

YESHIVA UNIVERSITY GROUP
A Albert Einstein College of Medicine
B dental school
C hospital
D nurses' residence
E students' dormitories

MUNICIPAL HOSPITAL GROUP
1 staff quarters
2 general hospital
3 t.b. and chronic hospital
4 service buildings



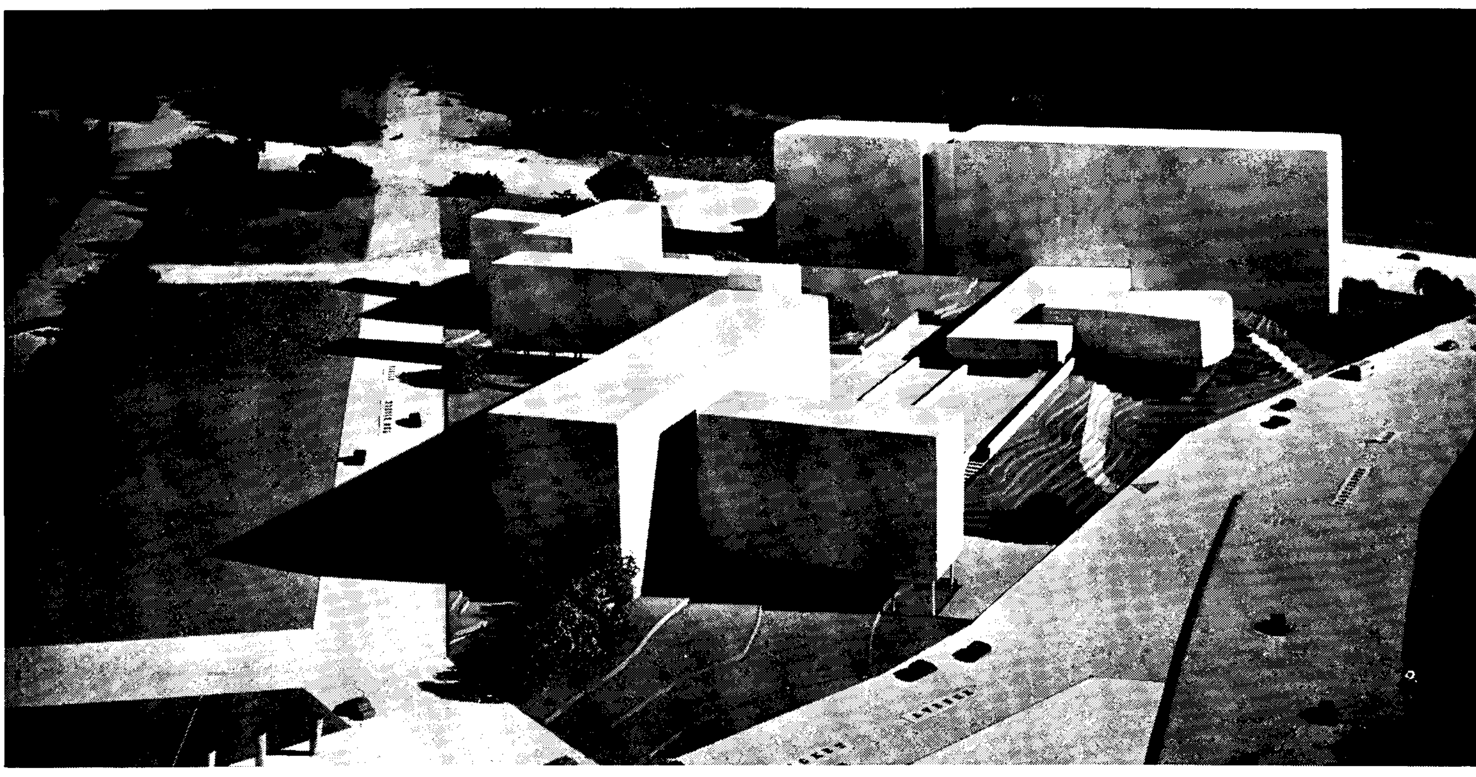
Plot Plan



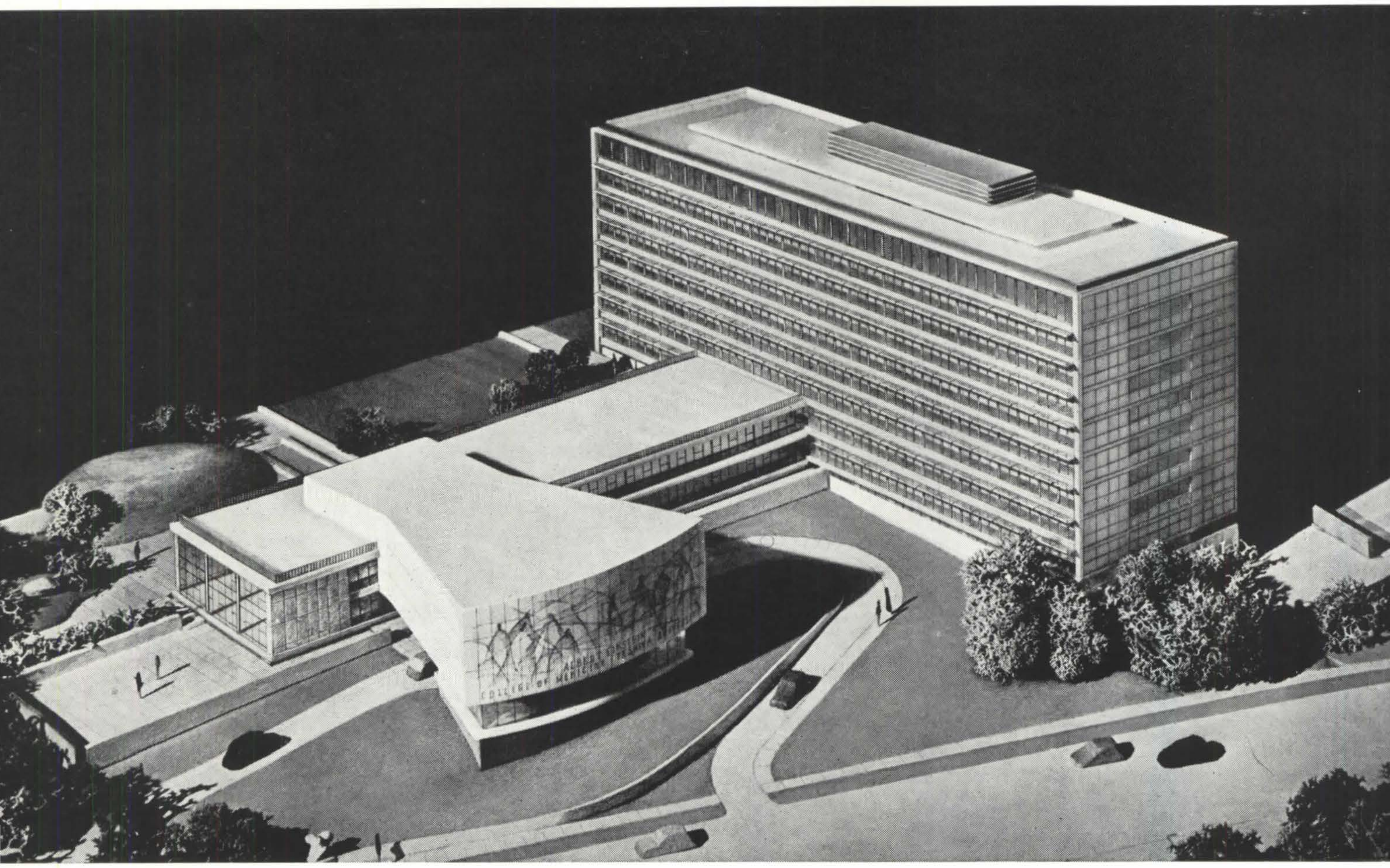
college of medicine

location	Bronx, New York
architects	Kelly & Gruzen
associate-in-charge	Joseph A. Cashdan
mechanical engineers	Jaros Baum & Bolles
structural engineers	Strobel & Salzman

Stages in the design of the Albert Einstein College of Medicine are shown in the block model below (College at the rear; future hospital and boiler plant in the foreground), *and in the early rendering above. Wall system shown here, with columns on the exterior, was abandoned in favor of a continuous aluminum-panel system, with eyebrow sun shades, shown in the model photograph on the* ***next page.***



college of medicine

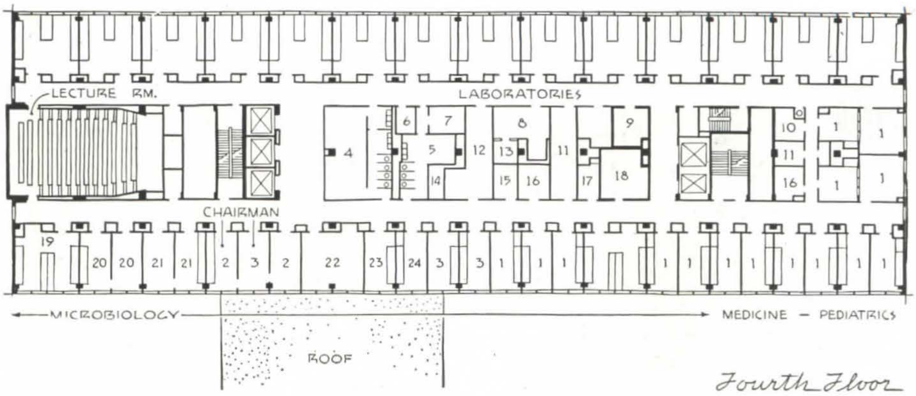


Named for the world-famous physicist, Albert Einstein College of Medicine, sponsored by Yeshiva University, will soon begin rising in the upper area of the city of New York. It will be the first unit in an ultimate "campus" of medical education buildings, and is a very direct translation of a program worked out by the Planning Board of the College. The structure, shown above in model photographs, consists of a 10-story building which is the school section, and a three-story administration and library wing, from which projects a 750-seat fan-shaped auditorium. The approach to the building at the administration wing, is by means of a driveway passing under the auditorium, which thus acts as a shelter for the unloading cars. An over-all mosaic, 30′ x 100′, will act as a huge mural across the end of the auditorium.

The planning criteria called for a series of individual student laboratories, which enable the students to have a "home" workroom, to which the faculty will come. Traffic will thus be reduced, and the unusual curriculum facilitated. Student laboratories will generally be on the north side of the building; the south side will house research laboratories, instructors' offices, and such spaces.

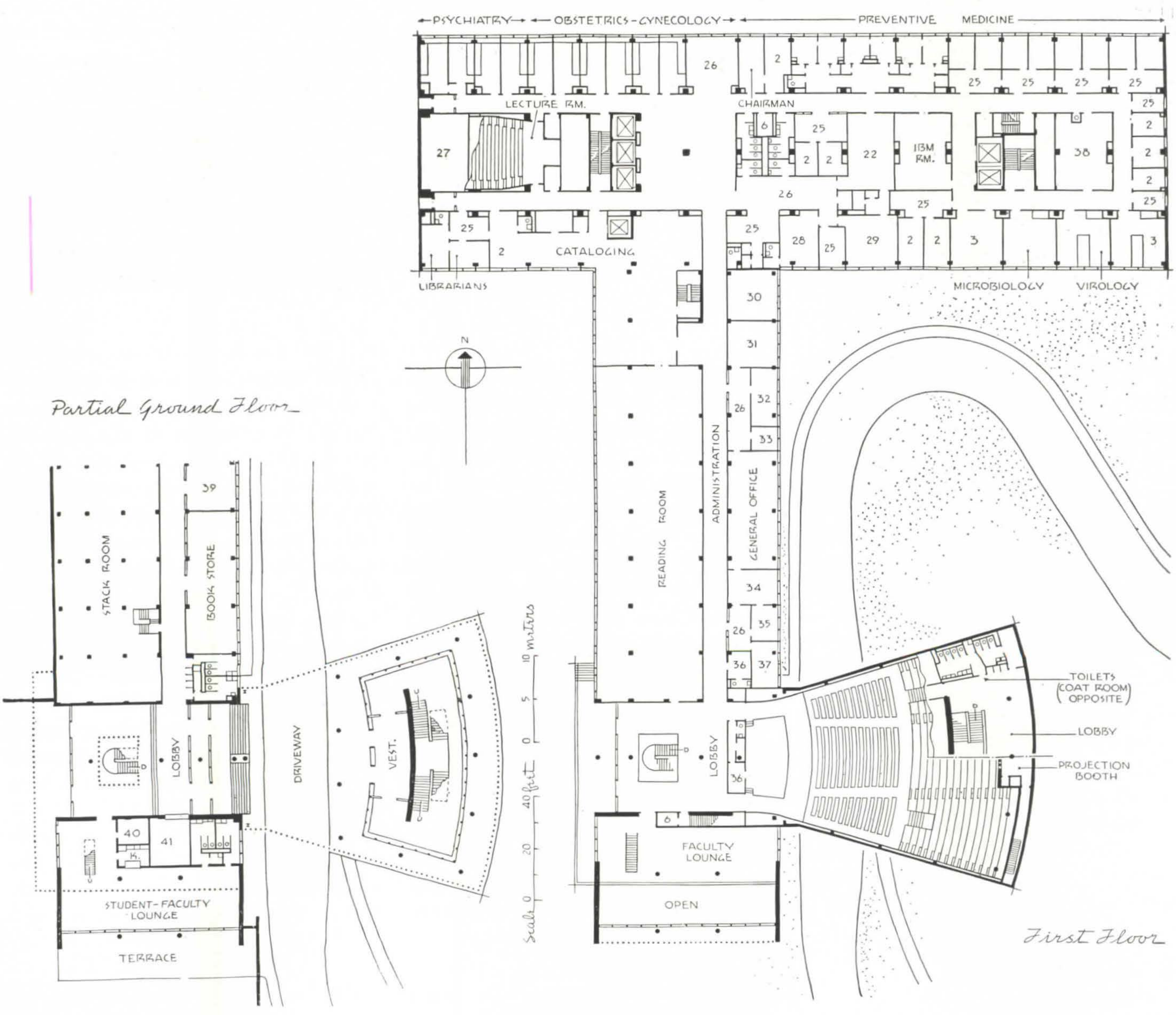
The principal plan shown on the facing page is the first floor, which contains the auditorium and the main library floor of the projecting wing, and the administrative floor of the school building. The College functions also begin on this floor, with classrooms and laboratories for the departments of psychiatry, obstetrics and gynecology, and preventive medicine. Shown, in part, is the driveway approach entrance at the ground floor, with steps leading to the lower level of the auditorium from a special vestibule outside the building (to the east of the drive approach). The classroom portion of the fourth floor *(top of facing page)* is fairly typical of the third through fifth floors—student laboratory rooms on the north, instructors' and research laboratories on the south. These floor plans are based on a double-corridor system, with the central core of the building restricted to mechanical, storage, and other facilities which do not require daylight. The second floor is devoted primarily to research laboratories; the sixth to dissecting rooms. Animal rooms are on the top floor.

The College is planned to be built with a reinforced-concrete frame. Exterior walls to be of masonry and glass, with a window system of nonferrous metal which, in effect, forms a continuous curtain wall.



Fourth Floor

1 office/lab
2 office
3 lab
4 men's locker room
5 women's locker room
6 janitor
7 rest room
8 media room
9 incubator room
10 balance room
11 stock room
12 glass wash-sterilizing
13 sterile room
14 autoclaves
15 dark room
16 special instruments
17 isotope counting
18 cold room
19 mycology
20 parasitologist office/lab
21 virologist office/lab
22 seminar
23 serologist office/lab
24 biochemist office/lab
25 secretary
26 waiting room
27 upper part audio-visual studio
28 assoc. director
29 director of medicine
30 director of chemistry
31 registrar
32 records
33 mimeograph room
34 bookkeeper
35 bursar
36 lecturers' room
37 purchasing
38 demonstration room
39 canteen
40 coat room
41 switch board

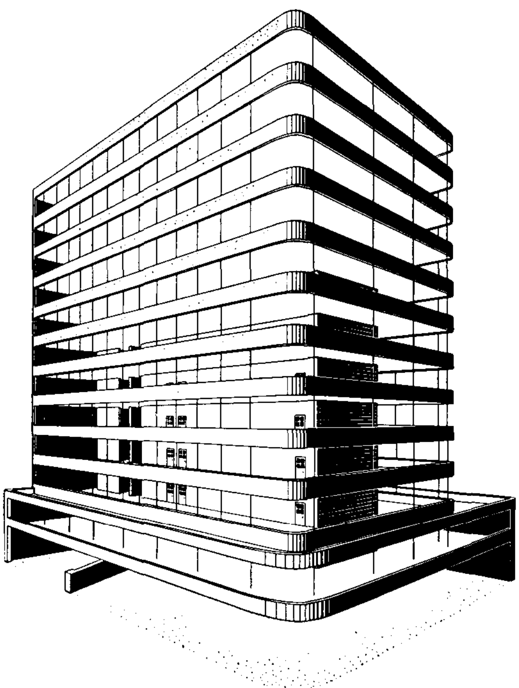


Partial Ground Floor

First Floor

center-core cantilever construction

by Henry H. Werner*



By allowing the walls enclosing a central service core to carry the entire weight of a building, a method of cantilever construction has been developed which will provide better useable floor space in multistory office buildings than is now afforded by conventional methods. These core walls can be constructed of reinforced concrete by the same slipform process commonly used in the erection of grain silos and other bulk-storage facilities. Although these walls may be slightly less than 12 in. thick, a 12 in. thickness provides adequate shelter areas for protection from atomic blasts. It is this thickness that the Atomic Energy Commission recommends as the minimum for structures located a half mile from a possible blast.

Within the main walls of a center core would be situated elevator shafts, stairwells, other vertical service ducts, rest rooms, file rooms, and possibly a mechanical garage *(Figure 1)*. The top cantilever construction is supported by the walls of this center core and cables from the ends of the cantilevered steel trusses support the edges of the floor slabs *(Figure 4)*.

In a typical layout, the ground floor would be an area for free development with direct access to escalators and elevators while the second and, possibly, third floors would be suitable for large shopping areas due to the cantilevered floor extensions and the few slender cable supports *(Figures 2 and 3)*. (Every second cable from above is omitted in these floors.) In a building constructed by this method, no columns would obstruct the area of the typical floor since the cables disappear in the mullions. Thus, it is possible to obtain a much more fluid arrangement of offices and equipment *(Figure 1)*. On all floors the file rooms, stairwells, and rest rooms are arranged and interconnected to form shelter areas.

* *Consulting Engineer, Long Island City, New York. The author is also the deviser of this structural scheme.*

In general, a center-core cantilevered building will have ample strength and stability even at a height of 15 stories. In the eventuality of an atomic blast nearby, the outer shell and even part of the cantilever construction could crumple without impairing the core. Footing and basement construction are conventional with the added advantage of a center concentration of the main footing. Erected on the core slab at the second floor, a tongue-and-grooved. long-grain slipform would be approximately four ft high for typical walls and extend horizontally in one continuous form. As the form is jacked up on vertical bars imbedded in the lower concrete, concrete and reinforcing are added continuously while space for doors, floor joists, ducts, etc., are boxed out as the form is raised. Erected and anchored on the core and spaced about 10 ft apart, the cantilevered steel trusses (±9 tons each) have an approximate depth of 9 ft (one-third that of the 27 ft cantilever). Having supporting lugs for each floor, high-strength plough-steel cables with ±2 in. diameters and an allowable unit stress of 100,000 psi are attached to the trusses. At this stage construction is ready to proceed from the roof downward—the form and its working platform underneath are lowered directly from floor to floor, suspended on the main as well as some auxiliary cables.

Although slipform walls are not new, they are used most widely in the field of bulk storage construction and certain conditions brought about by the use of the slipform method should be observed.

(1) In this type of construction, the top cantilever would be a rather stiff truss with any anticipated deflection provided for in the cables.

(2) One-sided live load has no appreciable effect on the cantilever or center core.

(3) Cable loads of 200 kips or 70,000 psi and floor connections of up to 30 kips are not unusual when compared with loads carried by cables in suspension bridges.

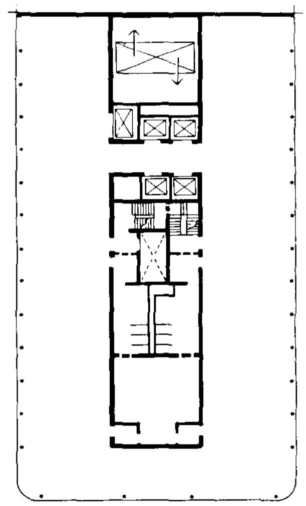
(4) Cables should be well insulated and

protected against accidental damage—a comparatively simple matter in both cases. Elastic and plastic deformations in the cables or concrete are small and if the cables are warmed electrically during construction, any anticipated changes can be counteracted.

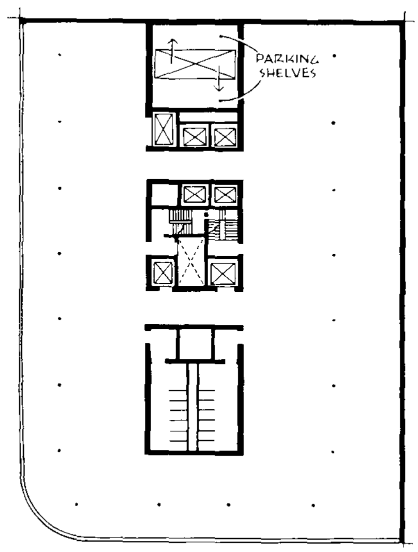
(5) Floor construction should begin from the roof downward and without shoring posts.

As in the case of all new construction methods, time and money are decisive factors. It takes time to become familiar with and be thoroughly convinced of the merits of any new method and it takes money to solve any difficulties which might arise in the experimental stage. Taking this into consideration, this center-core cantilever method meets the decisive conditions very well. A building can be raised very quickly by sliding the core walls. For example, it would take an estimated time of one week to reach the roof height of a 12-story building (*see perspective*). Furthermore, the use of one set of shallow forms would produce smooth walls at quite a competitive price. The necessary cables fall into this same classification since they are standard items requiring little additional fabrication and have the advantages of easy erection and simple connections. Standard fireproofing and protective shells can be used to cover them. Although the top cantilevers are not the least expensive structural supports, the minimum amount of field work, their simple erection as units, and the repetition and composite action of the steel and concrete in the bottom chord would allow their cost to be within reasonable limits.

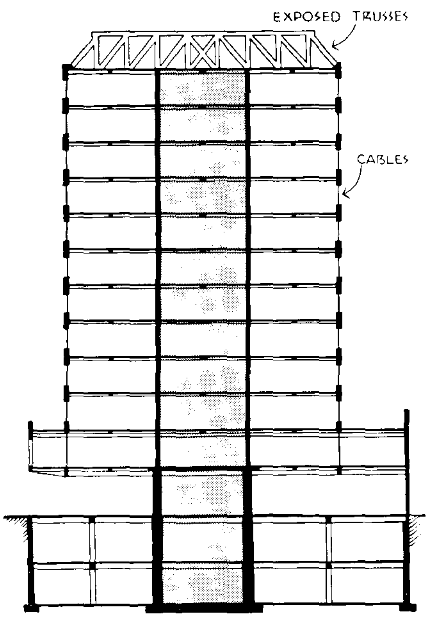
The application of the method which has been described above is not confined to center cores of office buildings. There is an opportunity to use it whenever an open elevation and a great amount of freedom at the ground floor are desired and, at the same time, a number of vertically superimposed walls can be used as the structural support.



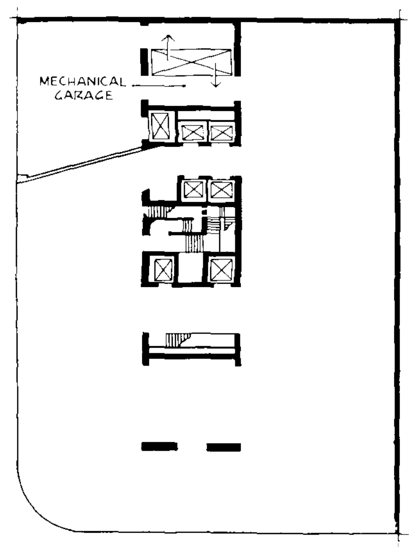
1: typical floor



2: second floor



4: cross section



3: first floor

Dimensionally stabilized cellulose-fiber boards have countless applications: wall and ceiling panels, metal-panel backs, bases for plastic overlays, movable partitions, etc. By proper arrangement other manufacturers may use the patented process described in this report.

research report:

DIMENSIONAL STABILIZATION OF

Chemical research has mothered new ways of solving many old problems of the construction industry, and now a new process has come to light to eliminate expansion and contraction, which take place due to atmospheric changes, in wood and other structural materials principally composed of cellulose fiber. Impregnated with selected chemical compounds, these materials can be made dimensionally stable, thereby preventing warping, cracking, delamination, and other damage found under varying moisture conditions.

The process, developed by Dr. W. P. Ericks, Director of Research of the Upson Company, Lockport, New York, entailed an extensive study of the structure and behavior of cellulose fiber. Its primary objective was the selection of chemicals having an affinity for cellulose equal to or greater than that of water.

That cellulose-fiber materials have a strong affinity for water is, of course, well known. Chemically, this affinity is attributed to the hydroxyl groups present both in the cellulose and the water *(Figure 1)*.

Water, when taken in by cellulose, is held chemically by secondary valences of hydroxyl groups in the amorphous, noncrystalline portions of the cellulose-molecule chains *(Figure 2)*. These are located between sections of regularity, called crystalline portions, where the cellulose chains are arranged parallel to each other and, most frequently, parallel to the fiber axis. Inasmuch as water passes and is held primarily in the noncrystalline sections, it pushes apart the sections of regularity, the crystallites, causing the fibers to swell.

In grained materials, swelling of the width of the cellulose fibers can be as much as 10 times that of the length. Where there is random distribution of fibers, the total percent of dimensional change due to variations of humidity is the same in all directions *(Figure 3)*.

To prevent such expansion and contraction, Dr. Ericks reasoned that chemical compounds having two or more hydroxyl groups in each molecule would associate with cellulose and permanently replace water in some sections of the cellulose molecules, thereby fixing their special arrangement. Experimenting, he determined that chemical compounds of a molecular weight less than 6000 and having two or more hydroxyl groups in the molecule chain would produce dimensional stability *(Figure 4)*.

The first group of chemical compounds which were found to be effective as dimensional stabilizers are known as glycol dicarboxylic acid monoesters. Other partial esters of polyhydric alcohols and polycarboxylic acids, as well as the reactants themselves (the polyhydric alcohols and the polycarboxylic acids), were also cap-

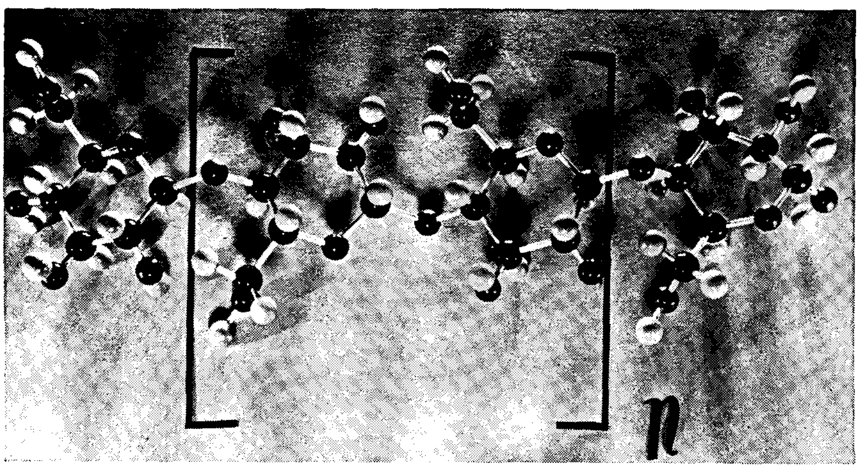
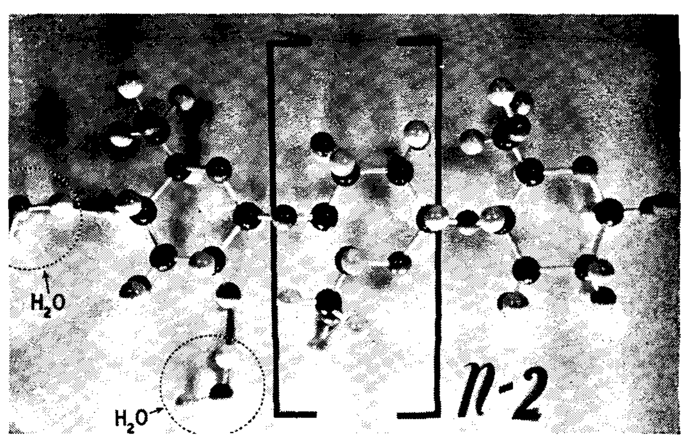


Figure 1—single-molecule chain in cellulose fiber is made up of hexagonal units formed by five carbon atoms and one oxygen atom (above). *Each unit contains three hydroxyl groups of one oxygen atom and one hydrogen atom.*

Figure 2—cellulose molecule with two molecules of water added (right). *Through hydrogen bonding, hydroxyl groups present in both water and cellulose become attached and cause expansion of the cellulose fiber.*



CELLULOSE-FIBER MATERIALS

Expansion Tests for Treated and Untreated Newspaper Sheets

Monoester in impregnating solution, percent	Monoester in sheet, percent	Expansion eliminated, percent
40	33	88
20	20	61

able of dimensionally stabilizing cellulose.

While the action of these stabilizers is not fully understood, Dr. Ericks believes they enter into chemical union with the cellulose through formation of hydrogen, ester, and possibly glucosidic bonds *(Figure 5)*.

Certain of the Upson experiments show that expansion and contraction can be completely eliminated through a range of 0-95 percent relative humidity. Others show that they can be reduced by specific amounts.

For example, sheets of unsized newsprint stock, 12″ x 2″ x 0.042″, were thoroughly impregnated with glycol dicarboxylic acid monoester by immersion at room temperature. They were then dried and heated at 130 C for 30 minutes. The sheets were measured accurately when dry and after conditioning at 90 percent relative humidity at 37.8 C. The results, compared with untreated sheets, were as shown *(table above)*.

Generally speaking, the degree of dimensional stability achieved is determined by the type of material treated and the type and quantity of chemical used as the stabilizing agent.

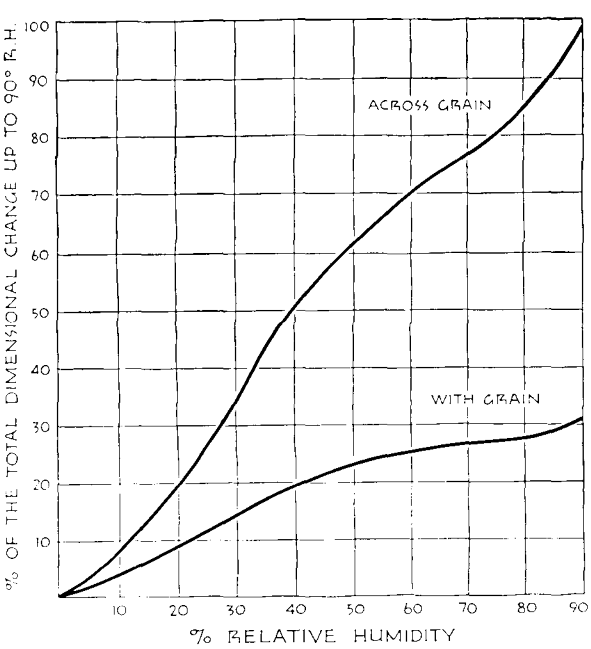
With regard to wood, and wood products, dimensional stability can be accomplished by conventional methods of impregnation. The simplest methods comprise either spraying or immersion; the stabilizer can thus be introduced into the fibers from which board is made, into the individual plies of a laminated product, or with much greater difficulty into the final laminated assembly itself.

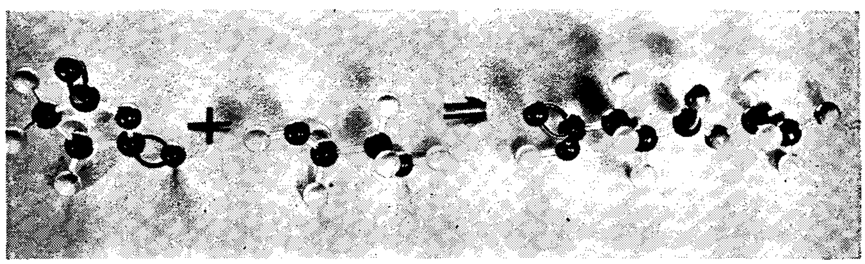
Pressure or heat are not required in the process except where it may be necessary to increase the rate of solvent composition or the speed and depth of penetration. The material can then be suspended in a chamber, subjected to vacuum, exhaust gases, and other volatile materials. Flooding the chamber with the stabilizing compound, the pressure can be raised moderately. The solvent contained in the compound can later be removed by drying.

A thorough fixation of the stabilizing compounds can be produced by using them in combination with thermosetting resins. After curing, these resins are believed to cover and protect the compound from attack by solvents. They also increase the hardness and water resistance of the impregnated material. The amount of thermosetting resin used, however, may be varied between 5 and 50 percent of the resin in the final product, depending upon the properties desired.

Making cellulose-fiber materials dimensionally stable by the Upson process does not appreciably alter their appearance. The desirable properties of low density and good acoustical and insulating qualities can be retained to a great degree.

Figure 3—measured with- and across-grain, cellulose fiber board expands as relative humidity increases (graph below). *Curves are imperceptible when board is impregnated with new dimensional stabilizer.*





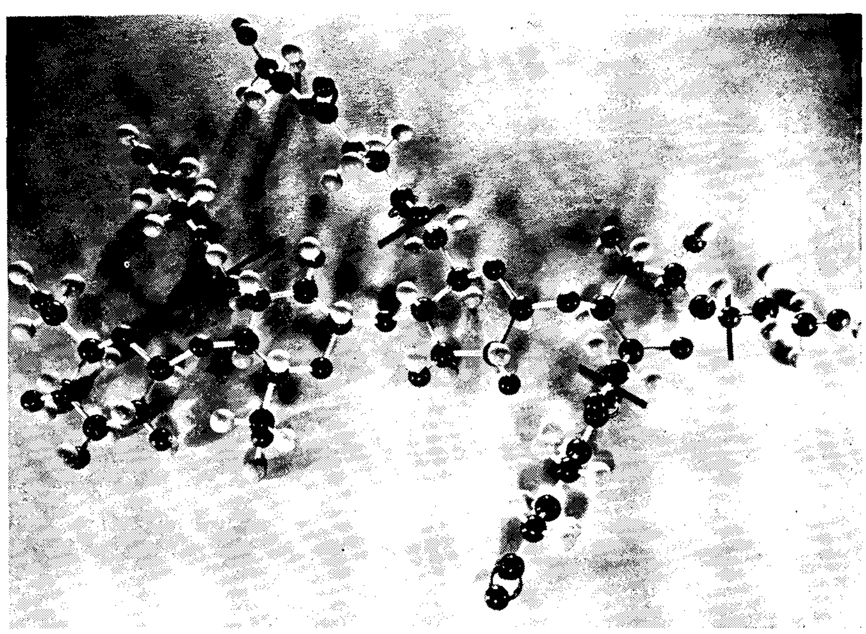
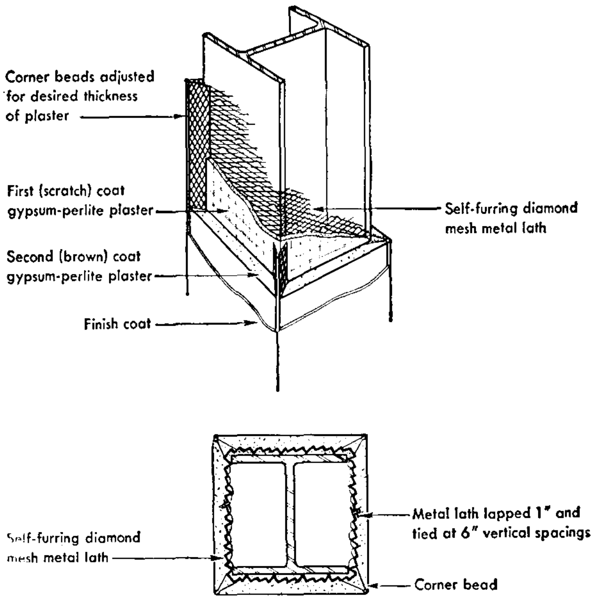
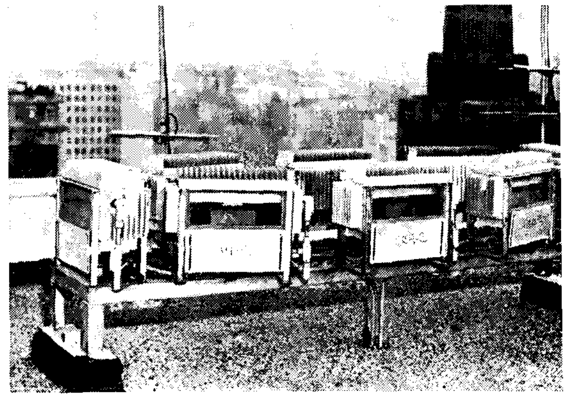


Figure 4—ethylene glycol succinic acid monoester, one of the chemical compounds which has required hydroxyl groups and allowable molecular weight (above right).

Figure 5—compound is chemically joined to cellulose molecule by hydrogen, ester, and possibly glucosidic bonds (right).

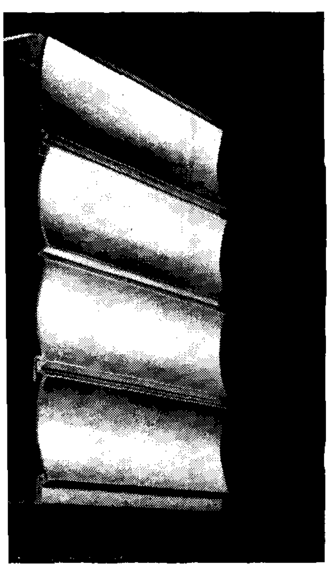




Eight electrical "watchdogs" installed on the roof of the new Los Angeles Statler Center hotel and office building automatically vary the cooling capacities of the building's air-conditioning system according to changes in the angle and intensity of the sun's rays. Each unit of the solar compensator faces a direction corresponding to one of the major exposures of the building's wings. Carrier Corp., Syracuse, N. Y.

A new method of fireproofing steel columns, developed and tested at the Underwriters' Laboratories, employs lightweight-aggregate plaster and self-furring metal lath bent to fit columns. Indentations in the lath hold it ¼" from the steel surface, providing space for the plaster to key. No channel furring is required. Metal Lath Manufacturers Assn., Engineers Bldg., Cleveland 14, Ohio.

Aluminum-extruded trim assemblies for modern fronts have been introduced in new concave, interlocking series. These can be used horizontally or vertically in a variety of combinations. Included in the series and shown *(below)* are top angle, single-fluted, double-fluted, and single-fluted starting members. Desco Metals Co., 2276 Wilkins, Detroit 7, Mich.



air and temperature control

Forced-Air Furnaces: two new oil-fired, forced-air furnaces available in six capacities from 75,000 to 144,000 Btu per hr. One model, primarily for perimeter heating applications in basementless homes, is downflow type with warm-air outlet at bottom of unit and return-air inlet at top. Other model is vertical type, listed for basement, utility room, or closet applications. Gray hammertone finish, chrome trim. Affiliated Gas Equipment, Inc., 17820 St. Clair Ave., Cleveland 10, Ohio.

Water-Air Gas Heater and Space Heater: new automatic gas water heater and space heater employs reverse air flow principle to provide maximum exchange of tank heat. Applications include dehumidification of damp basements, augmenting central heating systems, and supplying garage heat. Standard size water, gas, and flue connections; unit measures 66" high, 20" in diameter, has 30 gal water capacity, 25,000 Btu burner. Handley-Brown Heater Co., Brooklyn Rd., Jackson, Mich.

Heating Cooling Control Package: new control panel engineered to perform necessary intermediate switching functions of residential heating-cooling units is designed for use with manufacturer's thermostats with built-in selector switches. System can be used with heating and either single or two-stage cooling with 2, 3, or 5 tons capacity, single phase, and up to 7½ tons capacity, three phase. Panel size: 12" x 9½" x 4¾". Minneapolis-Honeywell Regulator Co., 2954 4 Ave., Minneapolis, Minn.

KS Enclosures: new baseboard-type enclosures for commercial and industrial installations available with line of accessories including joining pieces, corners, and end enclosures. Units mounted on full metal backings. Outline louvers located in front skirt so that convection currents are directed away from wall to improve temperature distribution. Galvanite or prime coated 18-gage steel. Vulcan Radiator Co., 16 Francis Ave., Hartford, Conn.

Type HP Heat Pump: new all-electric heat pump, depending solely on air for its exchange medium, provides heat in winter, cooling and dehumidification in summer, and ventilation, circulation, and continuous cleaning of air. Automatic operation of reversing cycle. Models: 3 hp, 30,000 Btu capacity; 5 hp, 50,000 Btu capacity. Westinghouse Electric Corp., 200 Readville St., Hyde Park, Boston 36, Mass.

Gasaver Furnace: new two-capacity furnace automatically adjusts fuel consumption and warm-air circulation to weather; extra outdoor thermostat controls operation. Six forced-air and three gravity models available; Btu ratings range from 63,750 to 176,000 output. The Williamson Heater Co., 3503 Madison Rd., Cincinnati 9, Ohio.

construction

Alsynite #200-FR Panels: self-extinguishing, fire-resistant translucent glass-fiber panels designed for highly specialized installations in critical fire areas are made with recently developed resins. Uses include skylights, sidelights, partitions, shower doors, signs, patios, and awnings. Available in standard corrugations and flat sheets, in either maize, light green, or opal. Alsynite Co. of America, 4654 DeSoto St., San Diego, Calif.

Calsi-crete: cellular concrete, developed in Europe, is claimed to have insulating, load bearing, acoustical, and water resisting qualities suitable for walls, roofs, partitions, and firedoor cores. Weight of material is 1/7 to ¼ as much as concrete, depending on density required; insulation value eight to 16 times that of concrete. Material can be nailed, sawed, and cut. Jackson & Church Co., Hamilton at Ahllborn, Saginaw, Mich.

Ruberoid Special Roofing Bitumen: new product developed as alternate to scarce roofing pitch in *applying built-up roofs of*

Page Beauchamp:

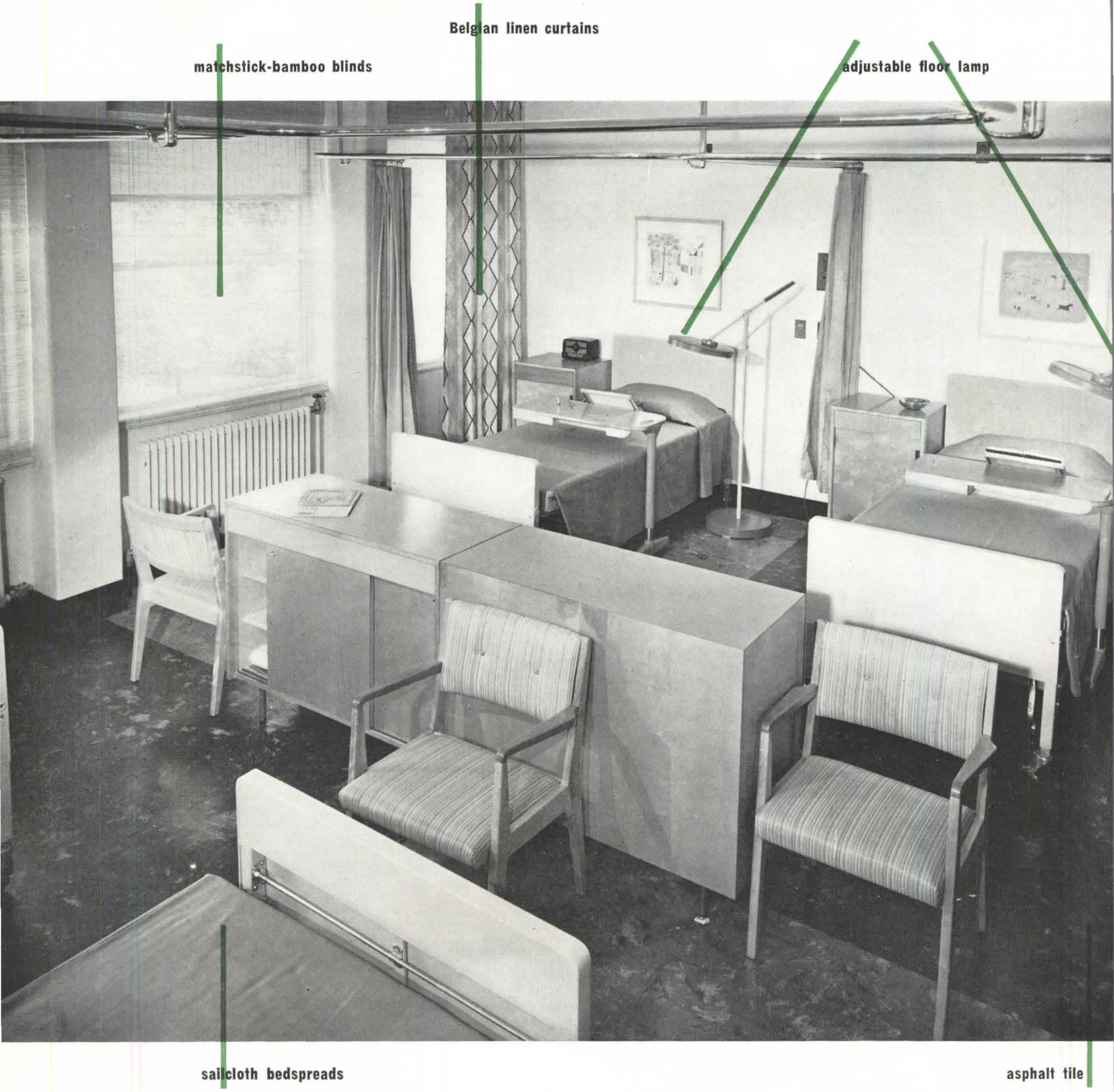
hospital patients' rooms

The rooms on the following pages were selected for presentation because they exemplify a fresh, forward-thinking approach to interior design in hospitals. There is a complete absence of the usual "institutional" or "clinical" look. Past theory evidently was that patients' rooms should be white, stark, and barely furnished. With emphasis on cheap maintenance and upkeep, there was no attempt to make the rooms comfortable, cheerful, and homelike. But here is proof that rooms may be both attractive and practical. The hospital beds are sturdy, yet enameled in soft, pastel colors—simple, yet handsomely designed. Color is used on walls, in draperies, and in the bedspreads—all washable in the hospital laundries. Especially encouraging is the elimination of harsh ceiling lights, the bane of every patient who stays in a typical hospital. The four-patient ward has had special attention. To define each patient's own area, the color of the flooring has been varied in alternating blocks, and chests are used as a room divider to help suggest as much privacy as possible. The warm wood tones of the furniture also add to the beauty of the room and dispel any hint of institutionality.

Now that there is a realization that beauty and a cheerful atmosphere are factors in promoting the well-being of patients, even greater strides will be made. Hospitals that have previously had a "look all their own" will borrow design techniques from other public buildings and even residences. More and more attractive fabrics and products can withstand rougher treatment and require little care. Finishes for furniture have been so perfected that no amount of washing or careless abuse will harm them. Therefore beauty need no longer take a back seat.

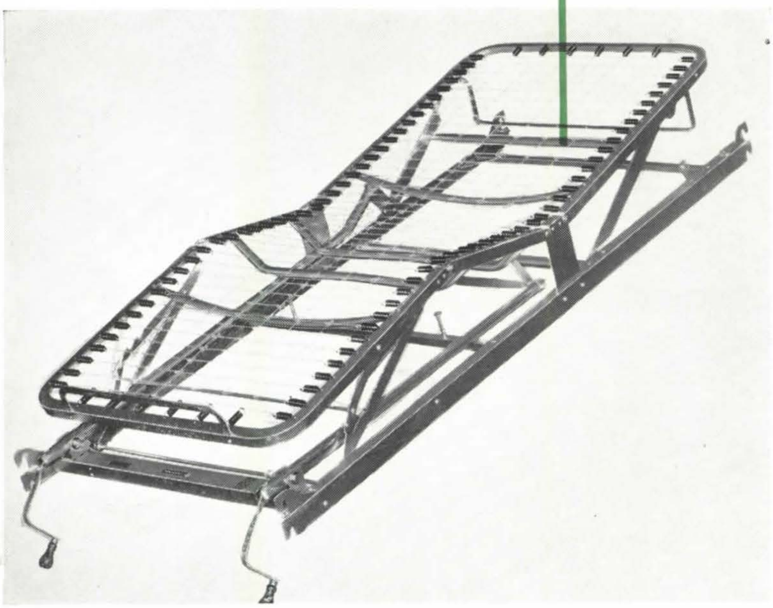
Here is a tremendous field that has hardly been touched by the interior designer. It will probably take some persuasion, even now, to convince many of those paying for hospital design that an interior designer is a necessary consultant, working hand-in-hand with those in the hospital field who know all of the requirements of a hospital room from the standpoint of service and therapy. The following examples offer proof that the interior designer is invaluable.

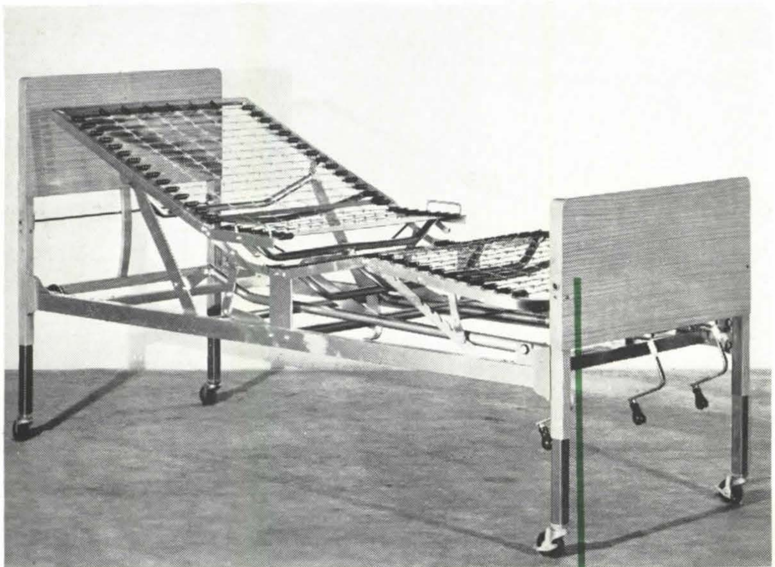
hospital patients' rooms



location	Four-Bed Patient's Room, Klingenstein Pavilion, The Mount Sinai Hospital, New York
interior designers	Maurice and Joseph Mogulescu & Gerald Luss: Designs for Business, Inc.
architects	Kahn & Jacobs

3-position spring





adjustable bed

To produce a feeling of individuality and privacy for each patient, the floor of this room has been divided into four blocks of color and bedspreads are of alternating colors. The cabinets provide storage and also serve as room-dividers. Complete functionalism from a medical standpoint, practical maintenance for the housekeeping staff, and a warm atmosphere combined with the utmost in convenience for the patient, were the three major considerations. Absence of hard-looking metal furniture, glaring ceiling lights, and sterile white walls contribute measurably to the beauty of this room.

Photo: Ben Schnall

data

furnishings and fabrics

Beds: #H-885-1/ "Vari-Hite" adjustable/ #L-146 all-position gatch spring/ Simmons Co., 1870 Merchandise Mart Plaza, Chicago, Ill.

Over-bed Table: #1950 FT/ birch/ Formica top/ Dekoren legs/ designed by Gerald Luss; Designs for Business, Inc./ Carrom Industries, Ludington, Mich.

Bedside and Storage Cabinets: birch/ Formica tops/ Dekoron legs/ designed by G. Luss/ Carrom Industries.

Arm Chair: #C-106/ birch/ woven Saran upholstery/ Jens Risom Designs, Inc., 49 E. 53 St., New York, N. Y.

Curtains: vat-dyed prints on Belgian linen/ custom colors/ L. Anton Maix, 162 E. 59 St., New York, N. Y.

lighting

Floor Lamp: custom design/ Plexiglas diffuser/ fluorescent tube/ designed by G. Luss/ Lightolier, Inc., 11 E. 36 St., New York, N. Y.

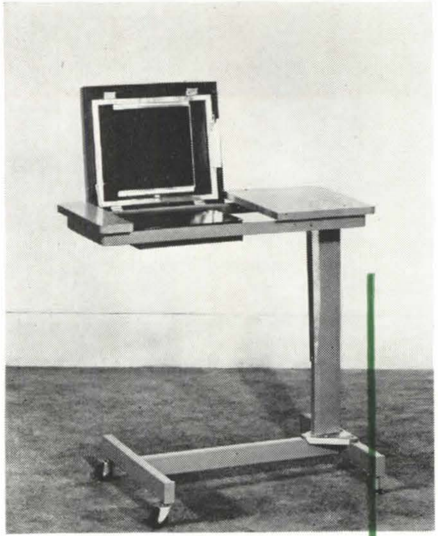
walls, ceiling, flooring

Walls: "Wall-Tex"/ custom color/ Columbus Coated Fabrics Corp., Columbus, Ohio

Ceiling: acoustic tile

Flooring: asphalt tile/ Armstrong Cork Co., 1010 Concord St., Lancaster, Pa.

hospital patients' rooms



over-bed table

location	Two-Bed Room, Wheaton Community Hospital, Wheaton, Minnesota
architects	Thorshov & Cerny, Inc.

data

Because the budget allowed an area just adequate, the interior designers concerned themselves with making this room look as spacious as possible. The furniture was selected for its long-range durability, ease of operation, and attractiveness. There has been a concerted effort to avoid the institutional look. Wall color is a primrose yellow, accent color is deep blue-gray, and the finish on the furniture is a soft pastel-gray. Just omitting the "hospital white" adds immeasurably to the cheerfulness of the room. *Photos: Reynolds, Photography Inc.*

doors and windows

Doors: 1¾" standard birch

Hardware: Schlage Lock Company, Bayshore & Blanken Ave., San Francisco, Calif.

Windows: wood sash/ standard DSA glass/ in fixed sash/ IGA double-glazed in operating sash/ Reese Metal Weather Stripping Co., 712 Park Ave., Minneapolis, Minn.

equipment

Baseboard Radiation: American Radiator and Standard Sanitation Corp., Sanitary Bldg., Pittsburgh, Pa.

furnishings and fabrics

Beds: #H846-L171/ semipanel end/ over-bed table/ Simmons Co., 1870 Merchandise Mart Plaza, Chicago, Ill.

Chair: #654W/ armless/ Forest green cotton webbing/ Knoll Associates Inc., 575 Madison Ave., New York, N. Y.

Draperies: patterned cotton print/ beige ground; green, rust, and yellow all-over print/ hardware; 1" traverse track/ recessed mounting/ Kirsch Co., Sturgis, Mich.

lighting

Spot and Downlight: designed by architect from component parts/ Kurt Versen, Englewood, N. J.

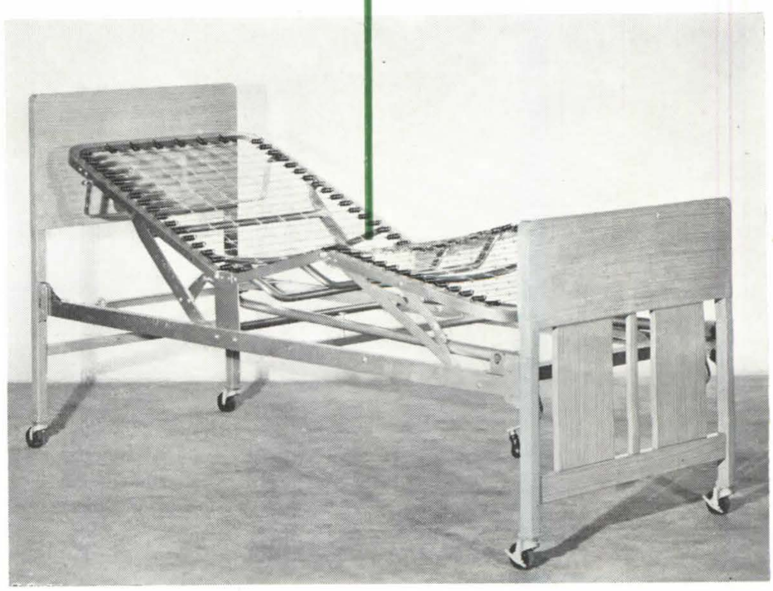
walls, ceiling, flooring

Walls: plaster/ paint: Benjamin Moore & Company, 509 Canal St., New York, N. Y.

Ceiling: "Gold Bond"/ Travacoustic/ tile squares/ National Gypsum Co., Buffalo, N. Y.

Flooring: #D-074/ asphalt tile/ gray, white field with green accent/ Tile-Tex Division, Flintkote Company, Chicago Heights, Ill.

hospital bed



acoustic tile

asphalt tile

baseboard radiation

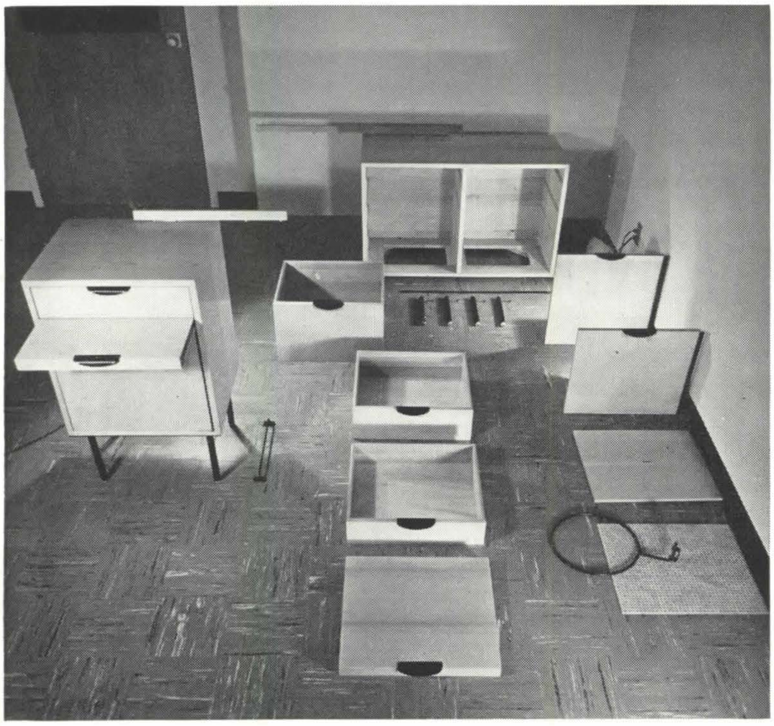
hospital patients' rooms

hospital bed

asphalt tile

location	One-Bed Room, Sinai Hospital, Detroit, Michigan
interior designers	Maurice and Joseph Mogulescu & Gerald Luss: Designs for Business, Inc.
architects	Albert Kahn Associated Architects & Engineers

modular furniture



data

furnishings and fabrics

Bed: #H-885-1/ L-146 spring/ "Vari-Hite" adjustable bed/ custom color/ Simmons Co., 230 Park Ave., New York, N. Y.

Over-bed Table: #1950FT/ birch/ Formica top/ designed by Gerald Luss; Designs for Business, Inc./ Carrom Industries, Ludington, Mich.

Bedside and Storage Cabinets: Formica top/ Dekoron legs/ designed by G. Luss/ Carrom Industries.

Arm Chair: adjustable/ birch/ designed by G. Luss/ Carrom Industries.
Side Chair: birch/ Carrom Industries.

Curtains: vat-dyed print on Belgian linen/ custom colors/ L. Anton Maix, 162 E. 59 St., New York, N. Y.

lighting

Floor Lamp: birch base/ black baked-enamel metal stem/ Butcher linen shade/ The Heifetz Co., 40 W. 25 St., New York, N. Y.

walls, ceiling, flooring

Walls: painted plaster

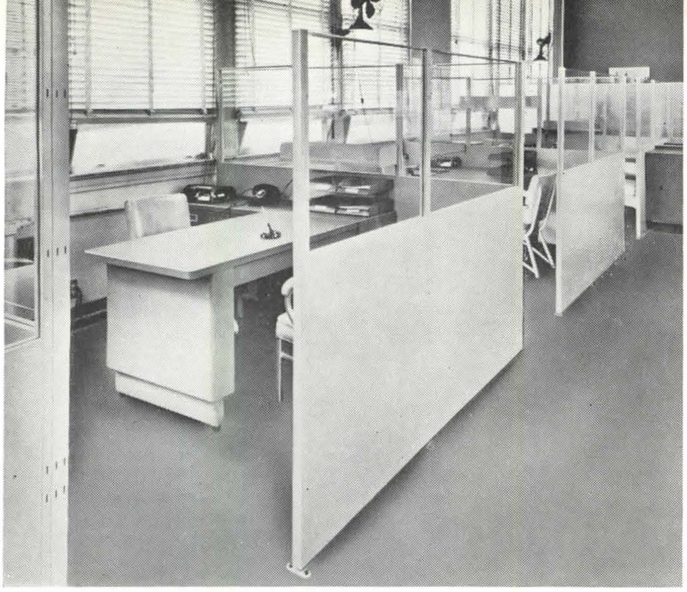
Ceiling: acoustic tile

Flooring: asphalt tile/ black with white-and-green marbling/ Kentile, Inc., 58 Second Ave., Brooklyn, N. Y.

Five different color schemes were planned for the patients' rooms in this hospital—with bedspreads, curtains, beds, and over-bed tables of neutral beige, so that they are all readily interchangeable. Monochromatic schemes in pastel shades of blue-green, beige, yellow, and gray have accents of colors deeper than wall color, or a stronger contrasting color and black. Geometric patterns in the drapery fabric unite the scheme, all fabrics being preshrunk and vat-dyed so that they can be safely laundered by the hospital.

The modular furniture may be used in many combinations and adjusted to varying spaces in the rooms. The natural birch tones add warmth, tops are plastic-impregnated, and steel-tubing legs are plastic-coated for practicality. Rooms have been made as homelike as possible, with attention to ease of maintenance, comfort of patients, and minimized labor to keep rooms neat, clean, and new-looking.

Photo: Benyas Kaufman



p/a interior design products

Free-Standing Partitions: supported by floor connector of heavy-metal angle that fits inside partition post/ broad base slotted to adjust for uneven floors may be attached to floor/ clamp grips and holds adjoining panels/ **The Globe-Wernicke Co., Ross & Carthage Ave., Cincinnati 12, Ohio**

Teacher's Desk: bevelled-edge cellular-core top/ faced with maple veneer/ available with plastic facing/ may be had with two 4" drawers and file cabinets/ knee panel optional/ height, 29", work surface, 48" by 30"/ **The Brunswick-Balke-Collender Co., 623 S. Wabash Ave., Chicago, Ill.**

Chairs and Ottoman: #41, #43, #51/ armless chair and armchair with ottoman/ imported from Sweden/ beech frame/ Swedish steel springs/ foam cushions in muslin or zipper-covered upholstery/ finishes in natural, sorrel, or walnut/ "knock-down" construction/ designed by Folke Ohlsson/ **retail:** $77, $126, $52 in muslin/ **Dux Company, 25 Taylor St., San Francisco 2, Calif.**

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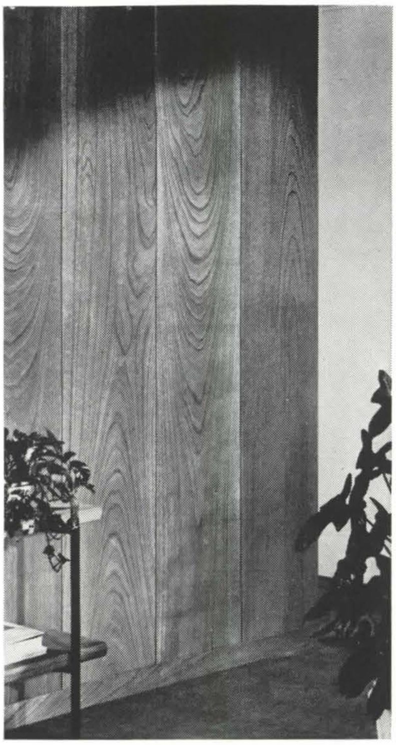
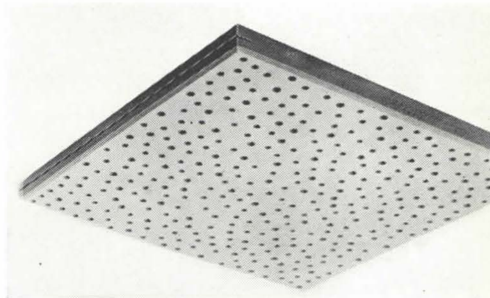
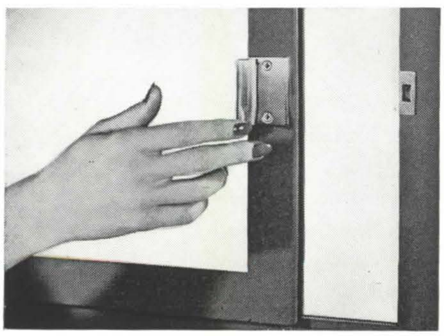


Honduras Mahogany Plywood Paneling: $1/4$" thick/ available in 6-, 7-, and 8-foot lengths/ 16-$1/4$" wide/ edgegrooved/ prefinished/ United States Plywood Corporation, 55 W. 44 St., New York 36, N. Y.

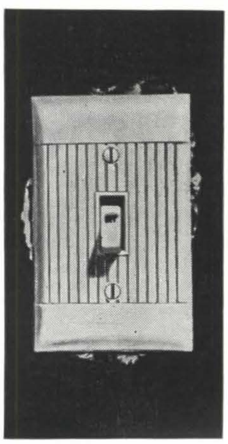


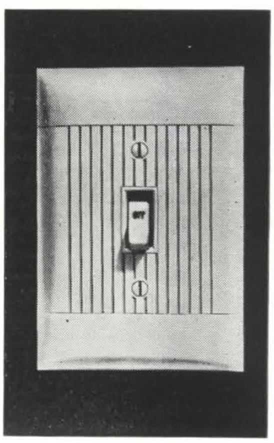
Acoustic Tile: "Full Random"/ nondirectional perforation design in "Cushiontone" fiber tile/ narrow bevel edge/ white-painted surface reflects 78% of light that strikes it/ washable/ available with flame-resistant-paint finish/ 12" squares in $1/2$" and $3/4$" thickness/ Armstrong Cork Company, Lancaster, Pa.

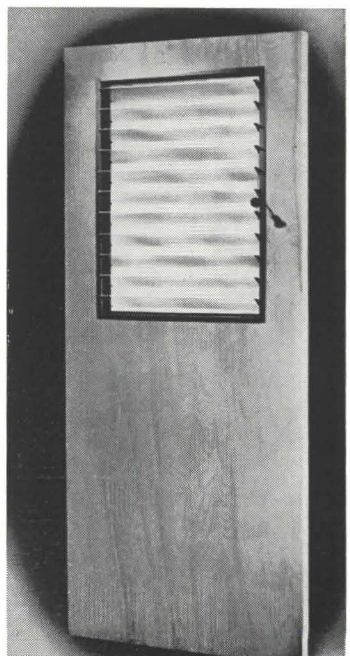
Sliding Window: steel-framed glass windows slide horizontally/ weather-stripped and uniform in design on all four sides/ nylon rollers at base with stainless-steel axels and track cap/ brass self-latching pull/ Arcadia Metal Products, 324 North Second St., Arcadia, Calif.



Wall Plate: "Sierra Jumbo-Plates"/ for double or single toggle switches to cover holes and scratches too large for ordinary plates, 1" longer and proportionately wider/ fire-resistant urea plastic, product of Plaskon Division, Libbey-Owens-Ford Glass Company/ hard-surfaced, scratch- and break-resistant with low electrical conductivity/ Sierra Electric & Manufacturing Company, E. 35 St. and San Pedro St., Los Angeles, Calif.

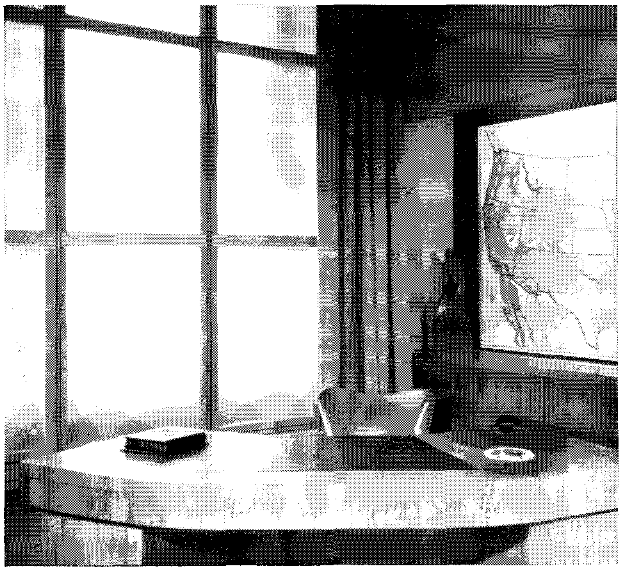


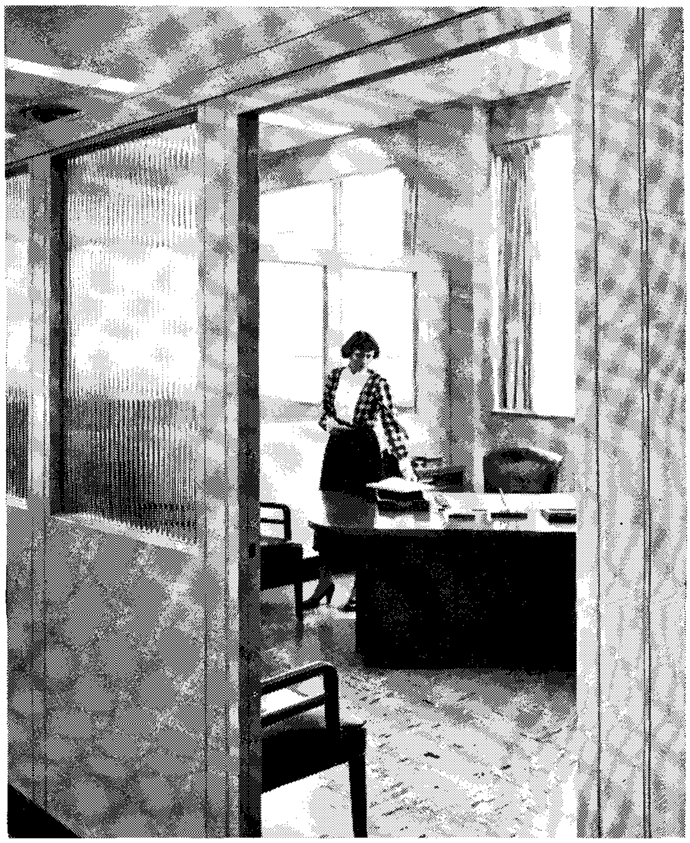




Glass-louvered Door: "Sun-Air"/ flush hardwood-plywood face/ also has rustproof-steel screen/ 1$3/4$" thick, 2' 8" wide, 6' 8" high/ Davidson Plywood & Lumber Co., 3631 E. Washington Blvd., Los Angeles 23, Calif.

Light for close work covers these drafting tables, but there are no outside distractions here. Decorative Blue Ridge *Satinol* Flutex is the reason for both these advantages. Office of Architect Irwin M. Johnson, Oakland, California.





▲ ***More working light*** comes through on both sides of this Mills Movable Wall. Blue Ridge Flutex Glass makes it possible, and offers decorative privacy as well. Designers: McGeorge-Hargett & Associates, Cleveland.

◄ ***Decorative glass*** hides a factory view, yet brings in diffused light for the desk. Blue Ridge *Patterned Glass* does the trick. Designed by Ross-Frankel, Inc.

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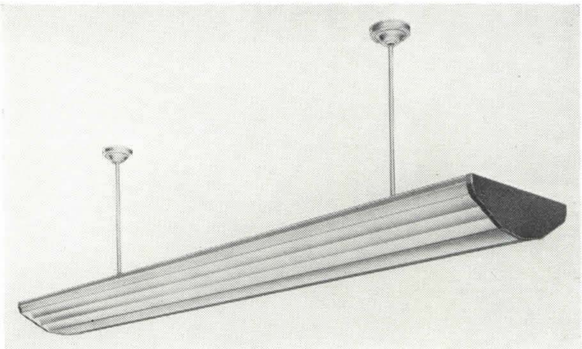
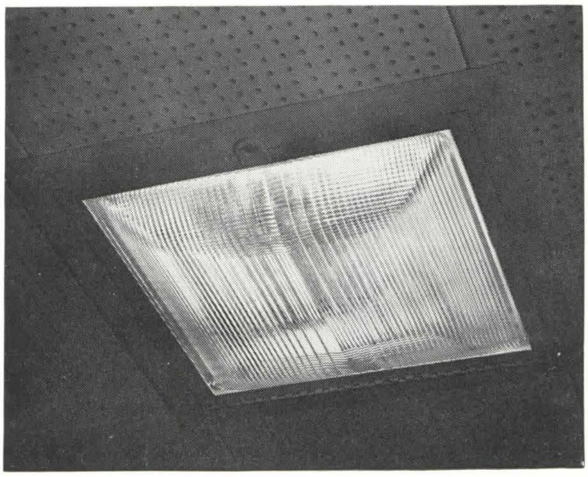
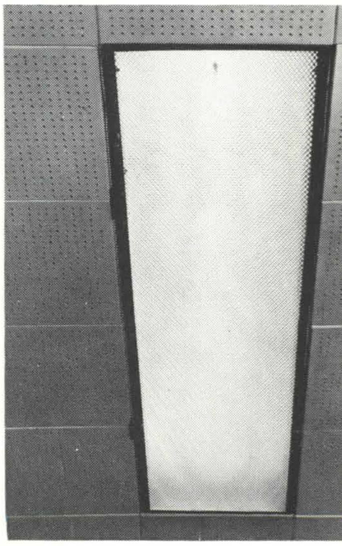
p/a interior design products

Wall-Bracket Lamps: #NS955, #NS956/ finished in gray or parchment-tone baked-enamel/ natural-walnut wall bracket/ #NS955 shade self-centers with free-swinging swivel, uses 100-watt bulb/ #NS956 swivel may be fastened in any position, uses 60-watt bulb/ **retail:** $24, $18/ **Nessen Studio Inc., 5 University Place, New York 3, N. Y.**

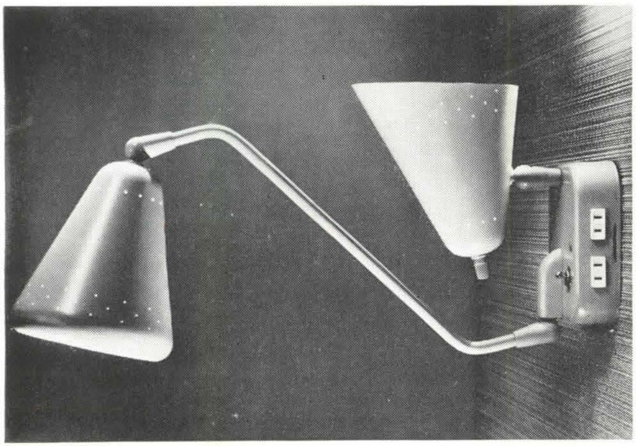
Indirect-Lighting Fixture: "Leadlighter," Model WLL/ "V"-type reflector/ metal shielding vanes/ 86% efficiency, high footcandle with low brightness/ available in 2-, 3-, and 4-light fixtures, standard fluorescent or slimline and half-section cove lights/ **Leadlight Fixture Company, Division of Oakland Engineering Company, 800 100th Ave., Oakland 3, Calif.**





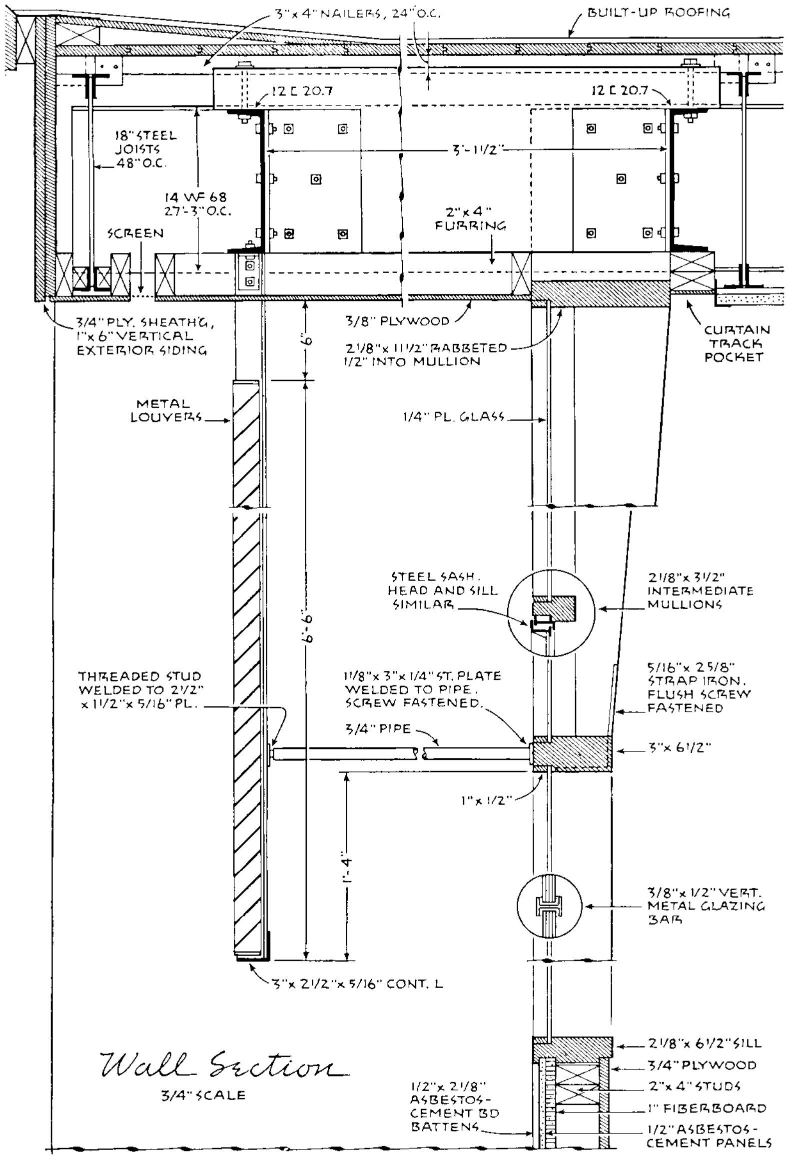


Hospital Light: "Hospitality Light," #9104-9204/ all facilities combined in one master outlet/ double-swiveled reading light, adjustable for all positions of patient, has pull switch/ indirect lighting mounted on swivel for changing to downward position/ night light concealed/ two outlets for electrical appliances/ **Kurt Versen, 4 Slocum Ave., Englewood, N. J.**



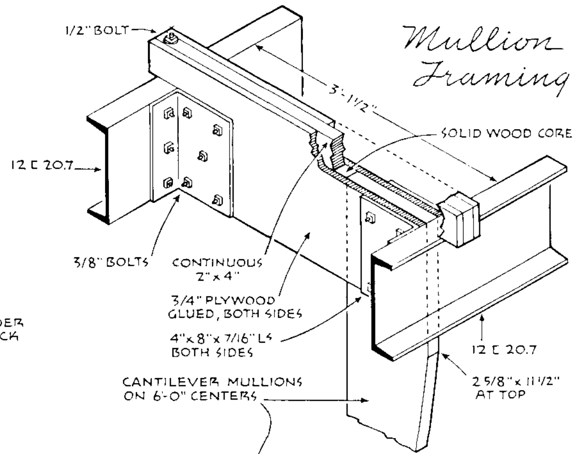
Prismatic Glass Panel: Pattern #70, Low-Brightness Lens Panel/ delivers maximum light in useful zone and reduces brightness in glare zone/ pattern of six-sided pyramidal prisms of clear crystal permit highest light transmission without color distortion/ available in widths to 24" and lengths to 100"/ **Prismatic Lens:** Pyrex Corridor Lenslite/ 10-7/8" square/ designed for incandescent lighting of extended areas such as corridors, aisles, and counters/ produces area of light adjacent to fixture, minimizing brightness contrast between fixture and ceiling/ **Corning Glass Works, Corning, N. Y.**

school: classroom window

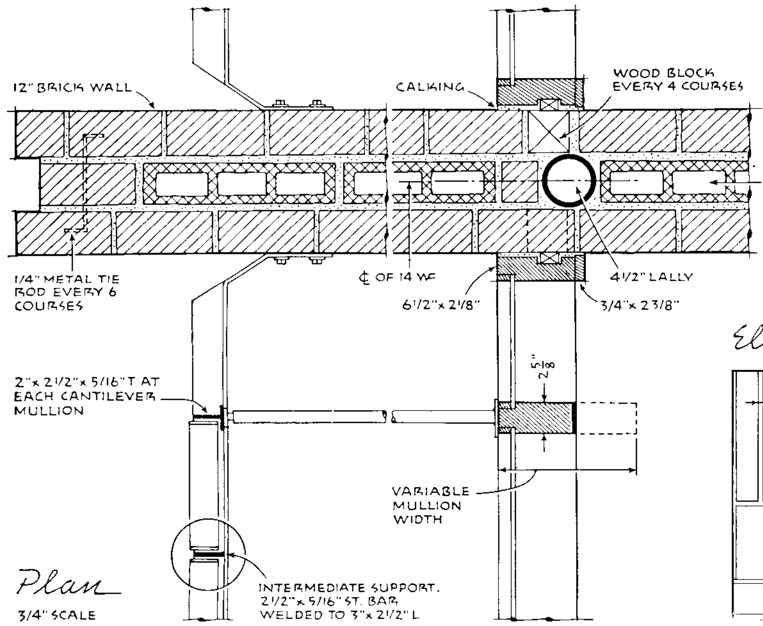


Wall Section
3/4" SCALE

LIONEL FREEDMAN

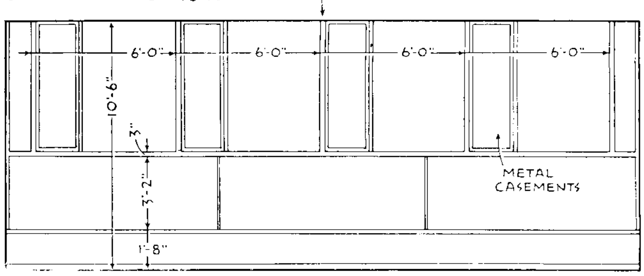


Mullion Framing



Plan
3/4" SCALE

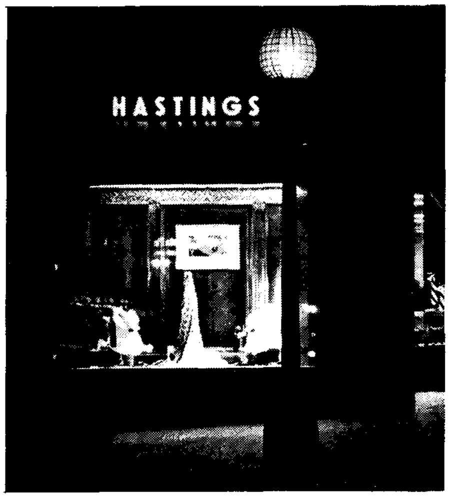
Elevation 1/8" SCALE

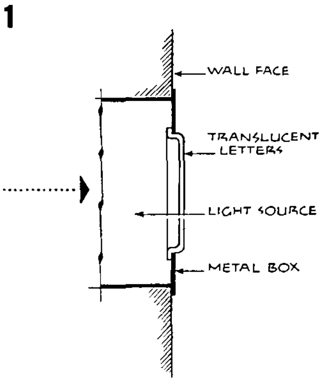


DARIEN JUNIOR HIGH SCHOOL, Darien, Conn.
Ketchum, Giná & Sharp, Architects

signs-1

1





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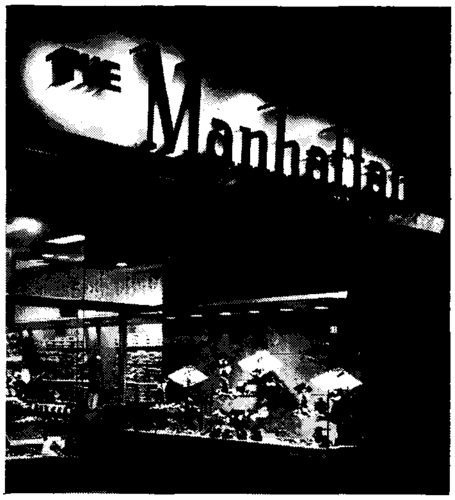

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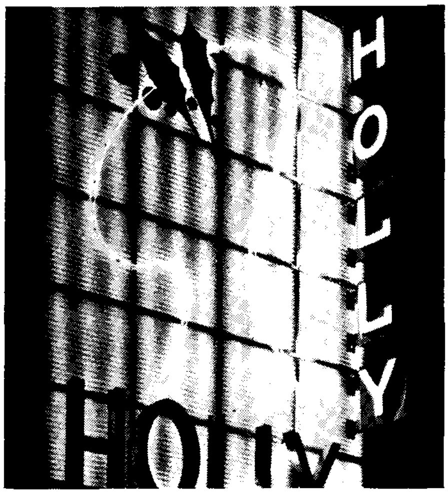

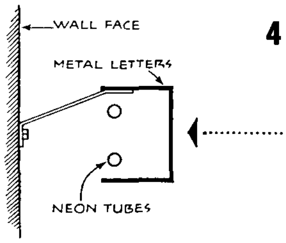

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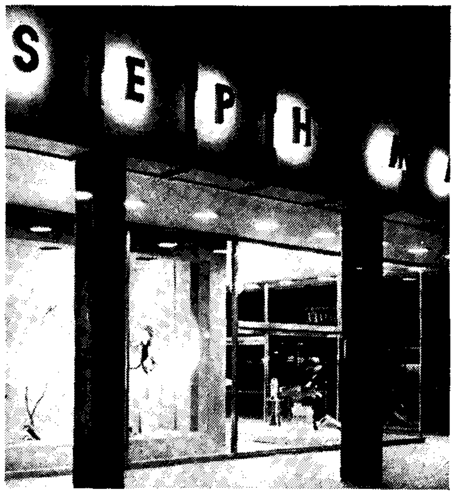
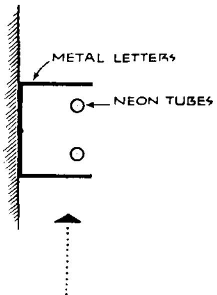
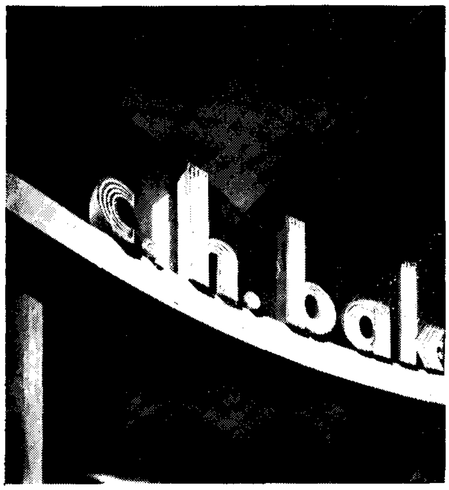
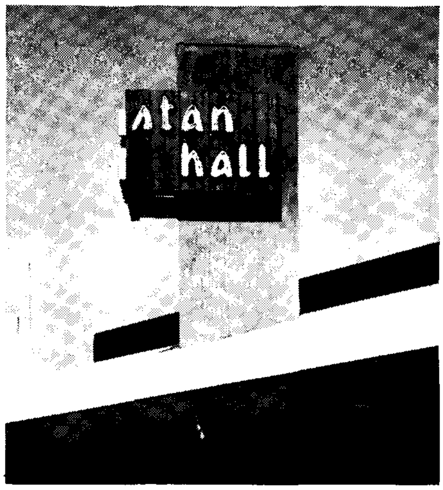


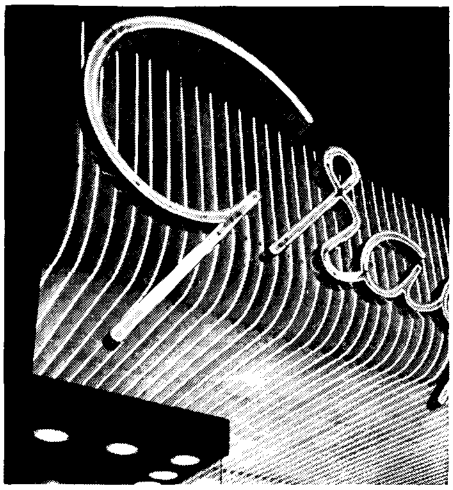


Translucent

Indirect Neon







Direct Neon

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1 Hastings Men's Store, San Francisco, California: Gruen & Krummeck, architects. Philip Fein Photo. **2** Holly Women's Store, Baton Rouge, Louisiana: Morris Lapidus, architect. Rohm & Haas Photo. **3** Manhattan Men's Store, New York City: Morris Lapidus, architect. Gottscho-Schleisner Photo. **4** Joseph Magnin Store, Sacramento, California: Gruen & Krummeck, architects. Roger Sturtevant Photo. **5** C. H. Baker Shoe Store, San Francisco, California: Gruen & Krummeck, architects. Roger Sturtevant Photo. **6** Stan Hall Men's Store, Los Angeles, California: Gruen & Krummeck, architects. Garber-Sturges Photo. **7** Gray Sons Women's Store, Hollywood, California: Gruen & Krummeck, architects. Harry H. Baskerville, Jr. Photo.

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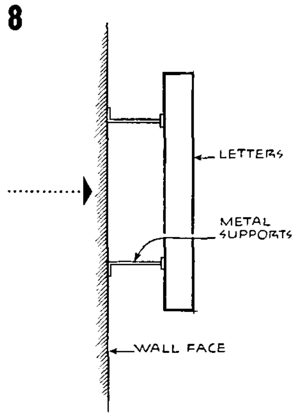

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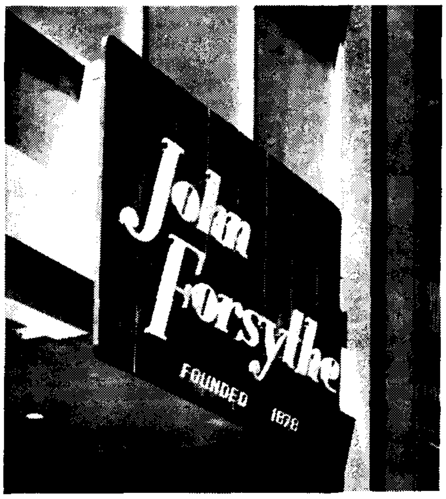
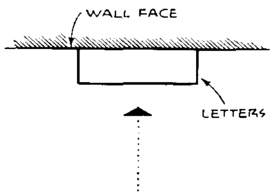


Projected Block



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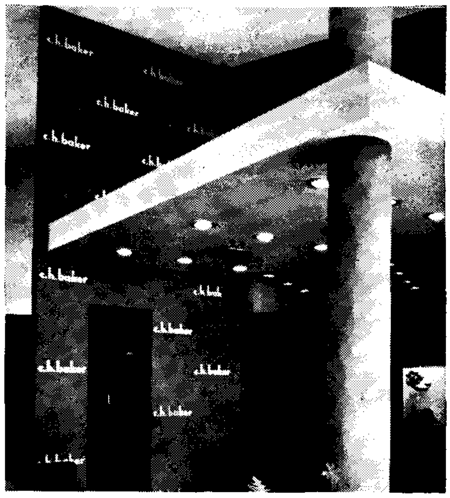
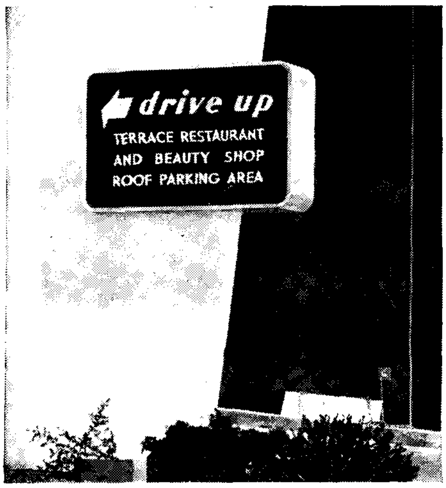
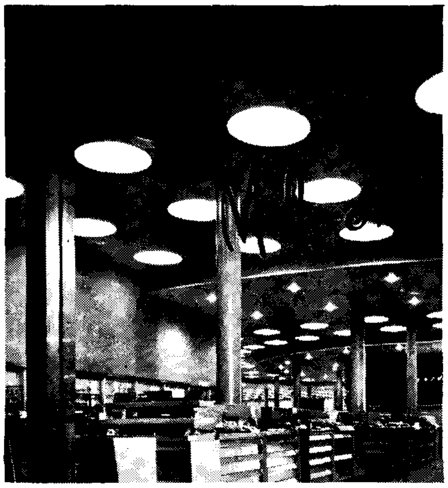


Brush Stroke



Applied Block 12



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8 Grayson's Children's Store, Los Angeles, California: Gruen & Krummeck, architects. Harry H. Baskerville, Jr. Photo. **9** John Forsythe Men's Store, New York City: Morris Lapidus, architect. Gottscho-Schleisner Photo. **10** La Regina Women's Store, New York City: Joseph & Vladeck, architects, Ben Schnall Photo. **11** C. H. Baker Shoe Store, San Francisco, California: Gruen & Krummeck, architects. Roger Sturtevant Photo. **12, 13, 14** Milliron's Department Store, Los Angeles, California: Gruen & Krummeck, architects. Julius Shulman Photo.

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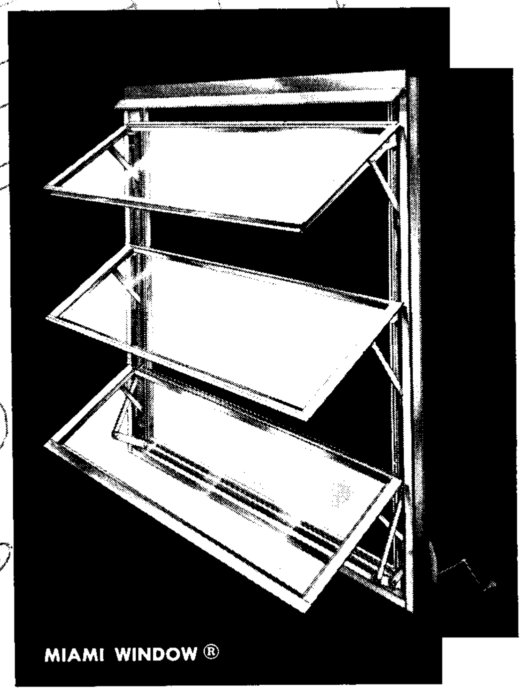

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The *General Conditions of the Contract* require amendment to properly protect both Owner and Architect in their relations with the Contractor. The inadequacies of the *General Conditions*, as discussed in last month's column, can be summarized as follows:

1. The supporting papers to be submitted by the Contractor to justify his application for payment are insufficient.
2. The furnishing of proofs is made optional.
3. No provision is made for an audit of the Contractor's books and records to insure that proper payments have been made for labor and material furnished on the project, and that sub-contractors have been appropriately paid in accordance with the Contract and the *General Conditions.*

The application of the Contractor for payment is based in part upon the requisitions of sub-contractors for payment. If the money paid by the Owner pursuant to the issuance of a Certificate of Payment by the Architect is not utilized in turn by the Contractor to pay the sub-contractors, the position of the Owner can be seriously jeopardized. A quick and certain method of checking payments to sub-contractors should be provided. In other fields, periodic audits have furnished the answer and the same solution is called for in the construction field. The *General Conditions* should include a clause in which the Contractor agrees to subject his books and records to audit and his plant to inspection. A suggested provision reads as follows:

"The Contractor agrees that its books and records shall at all reasonable times be subject to audit and its plant subject to inspection, by the Owner or Architect, or by their authorized representatives. Compliance with this article shall constitute a condition precedent to the issuance of a certificate of payment by the Architect."

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Now, *Article 24* of the *General Conditions* provides for applications for payments by the Contractor. The amendment required by this article is to eliminate the optional aspect of the furnishing of proofs by the Contractor and to provide adequate proofs. This Article might be amended in the following manner:

(Words in parentheses are to be eliminated from the article and italicized words are to be added)

"Art. 24. Applications for Payments— The Contractor shall submit to the Architect an application for each payment, and (if required) receipts or other vouchers, showing his payments for materials and labor, including payments to Subcontractors as required by Art. 37. *In addition thereto, the Contractor shall submit to the Architect the requisitions of his Subcontractors and such other supporting papers as the Architect may require upon which the Contractor's application for payment is based.*

"If payments are made on valuation of work done, such application shall be submitted at least ten days before each payment falls due, and (if required) the Contractor shall, before the first application, submit to the Architect a schedule of values of the various parts of the work, including quantities aggregating the total sum of the contract divided so as to facilitate the payments to Subcontractors in accordance with Art. 37 (e), made out in such form as the Architect and the Contractor may agree upon, and (if required) supported by such evidence as to its correctness as the Architect may direct. This schedule, when approved by the Architect, shall be used as a basis for certificates of payment, unless it be found to be in error. In applying for payments, the Contractor shall submit a statement based upon this schedule, and (if required) itemized in such form and supported by such evidence as the Architect may direct, showing his right to the payment claimed. *Included in such itemization and evidence to be submitted to the Architect shall be a description of the extent and amount of each Subcontractor's interest in the Contractor's application for payment, together with the requisitions of his Subcontractors for payment, and any other supporting papers as the Architect may require upon which the Contractor's interest in the Contractor's application for payment is based.*

"If payments are made on account of materials delivered and suitably stored at the site, but not incorporated in the work, they shall (if required by the Architect) be conditional upon submission by the Contractor of bills of sale or such other procedure as will establish the Owner's title to such material, or otherwise adequately protect the Owner's interest. *Such payments shall be held by the Contractor in trust until the Architect shall certify that the Owner's title to the materials has been properly established.*"

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The *Article 32* of the *General Conditions*, which provides when final payment or the retained percentage shall be paid, is also inadequate, in that the proofs required are insufficient and their furnishing is made optional with the Architect. This Article might be amended as follows:

(Words in parentheses are to be eliminated from the article and italicized words are to be added)

"Art. 32. Liens—neither the final payment nor any part of the retained percentage shall become due until the Contractor (if required) shall deliver to the Owner a complete release of all liens arising out of this contract, (or) *and* receipts in full (in lieu thereof) *for all the labor and material furnished on the project*, and (if required in either case) an affidavit that so far as he has knowledge or information the releases and receipts include all the labor and material for which a lien could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or a receipt in full, furnish a bond satisfactory to the Owner, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the (latter) *Architect determines the Owner* may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee."

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Control of the Contractor's disposition of payments received from the Owner by the audit of the Contractor's books and records requires personnel to conduct the audit and incurs costs. It should be clearly understood between Owner and Architect that, although the responsibility for the issuance of the Certificates of Payment remains in the Architect, the cost of auditing the Contractor's books and records shall be borne by the Owner and he shall furnish appropriate personnel for that purpose. If the contract between Owner and Contractor provides for audit of the Contractor's books, the contract between Owner and Architect should provide as follows:

"The cost of any audit of the Contractor's books and records shall be paid by the Owner, and the Owner shall furnish appropriate personnel to conduct such audit."

Consideration by Architects, individually and by their societies, of the suggestions contained in this and the preceding articles of this series would result in substantial benefit to the entire building industry, as well as the profession. Information as to the course and result of such consideration would be appreciated.

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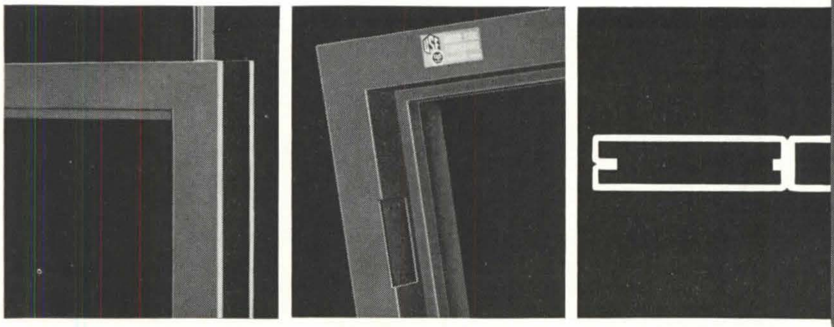

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