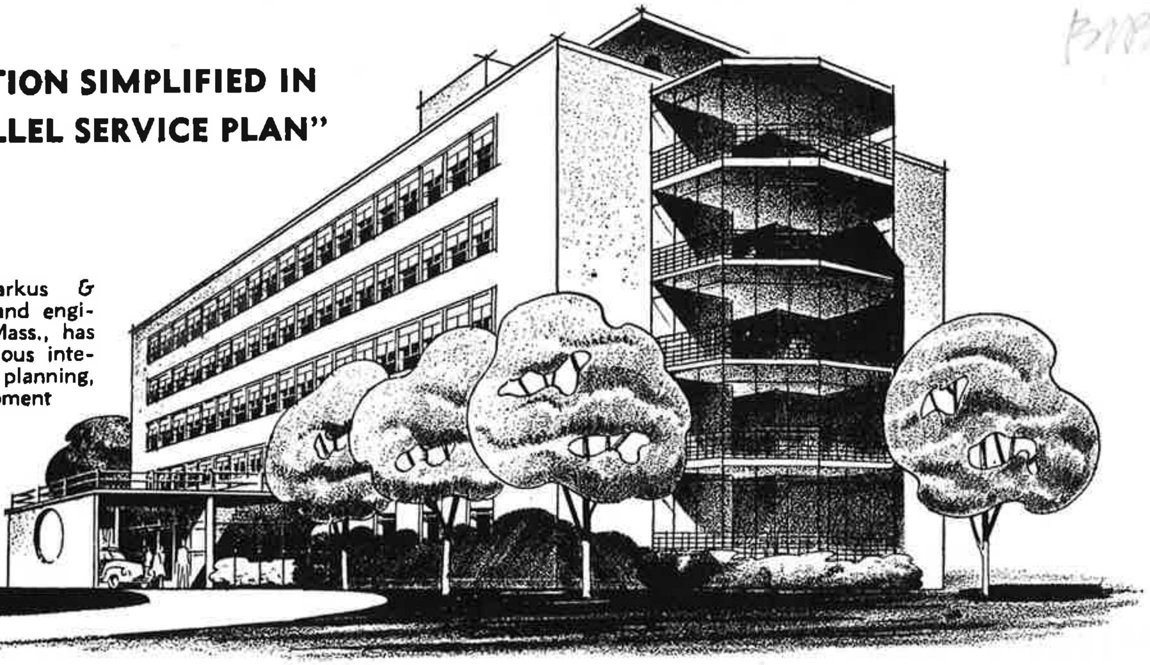
Reprint of - **HOSPITALS**

...BUILDING TYPES STUDY NO. 68

PREPARED FOR ARCHITECTURAL RECORD BY ROGER WADE SHERMAN, AIA

CONSTRUCTION SIMPLIFIED IN THE "PARALLEL SERVICE PLAN"

Research by Markus & Nocka, architects and engineers of Boston, Mass., has produced an ingenious integration of hospital planning, construction, equipment

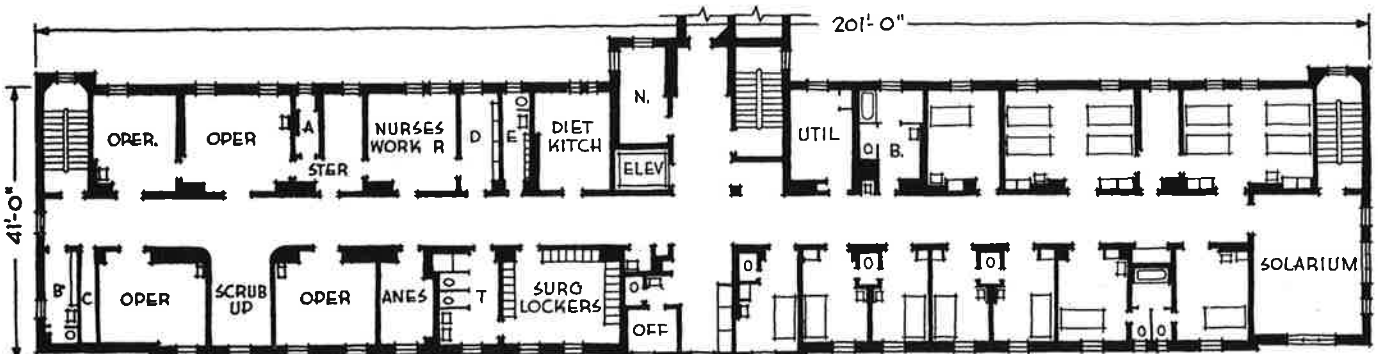


OBJECT OF the Parallel Service Plan is to simplify and improve hospital construction, increase operating efficiency, and, if possible, to reduce cost.

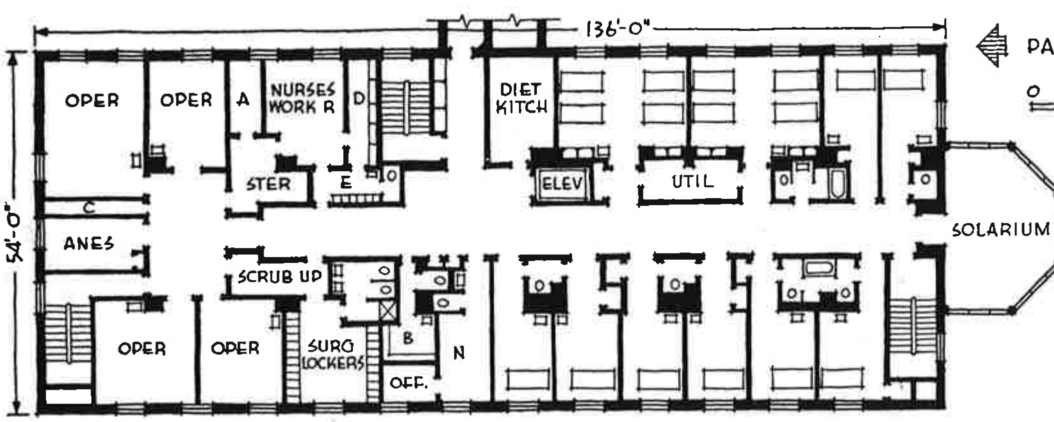
The basis of the scheme is illustated in the two plans below. Here—and in following drawings relating to construction and equipment—requirements of a hospital representing conventional good practice have been adjusted according to the new scheme. Essentially, the Parallel Service Plan employs enclosing wall space only for those rooms which require outside light, and locates all services in parallel areas of the interior. This produces a layout that is both wider and shorter than the conventional type.

Obviously, this permits immediate simplification of construction. In the conventional layout, varying beam spans, numerous sizes and irregularities complicate the form and steel work; and the central span is too short both structurally and economically in proportion to outer spans. By employing optimum spans in both transverse and longitudinal directions, the Parallel Service layout not only unifies all beam, slab and column sizes, but also reduces the number of them. Thus, field construction is simplified; and in addition to actual savings in materials (see notes on structure, plumbing and heating) there are other advantages.

For example, utilities are concentrated in shafts at each column and though concealed in accordance with the best practice are easily accessible at every floor for maintenance or changes. All mechanical systems are thus zoned; and runs of pipe and wire



CONVENTIONAL PLAN



PARALLEL SERVICE PLAN

0 25 50

With identical hospital facilities the Parallel Service Plan shows the following space advantages:

	Conven.	Par. Serv.
Gross Fl. (sq.ft.)	8,480	7,730
Corridor (lin.ft.)	180	118
Expansion (emergency beds)	3	8

are comparatively reduced, automatically reducing the sizes required.

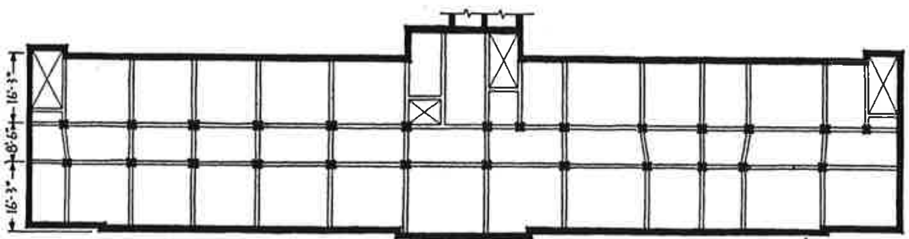
Again, all transverse beams have been eliminated and provision for wind stresses and partition loads have been incorporated in the floor design. As a result, partitions can be installed at any transverse point and changed as required. This flexibility of partition locations is increased by the use of a radiant heating system which eliminates all radiators and outside risers.

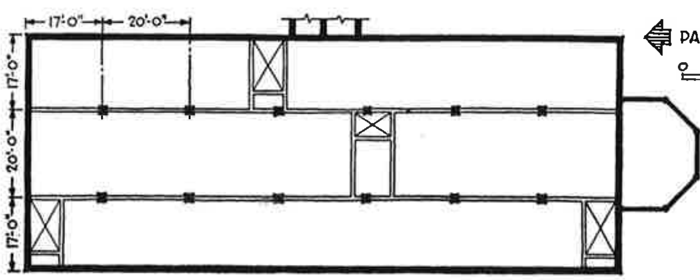
This radiant heating system is integrated with the construction. The building is divided into six heating zones per floor; and hot air, thermostatically controlled according to requirements of each zone, is circulated through floor ducts. These are of precast concrete and are the essential structural units of the floors.

This novel integration of structure and equipment permits a compact plan without loss of essential space. As one result, horizontal nursing travel is reduced. Patients' rooms are removed as far as possible from corridor noise; and because these rooms are not cut into by various furred spaces for plumbing closets, etc., (as in the conventional plan) they can readily accommodate an additional bed if emergencies should so require—an impossibility in the conventional plan, although net areas of bedrooms are identical.

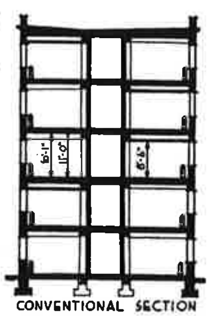
In view of current practice, the inside location of service areas might be criticized. But the designers point out that good practice requires mechanical ventilation of service rooms even though windows are present; and point also to the inside locations of service areas such as kitchens, laboratories, etc. in hotels, science buildings and windowless industrial plants.

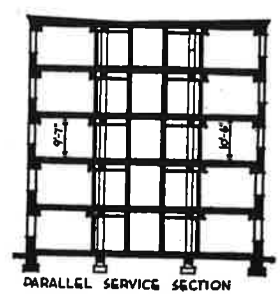
As to first cost, the new hospital layout has been estimated at about 20 per cent less than its conventional counterpart, assuming the same materials and equipment. It is reasonable to assume mechanical operation would also cost less, since the Plan has 20 per cent less outside wall surface, 10 per cent less gross roof area.

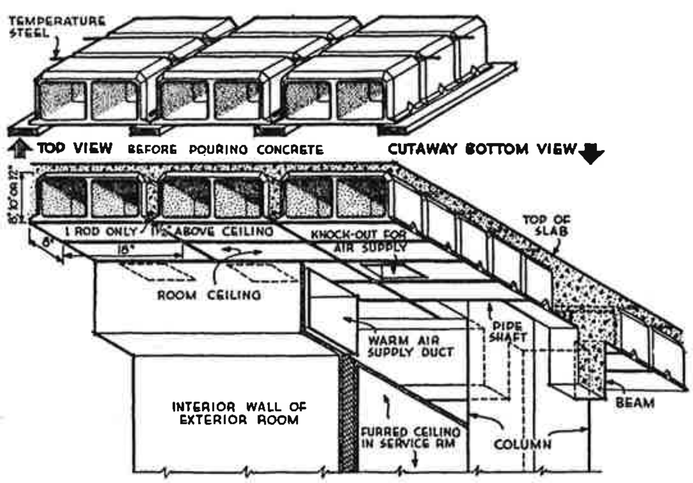




	Conventional	:	Parallel Service
Columns (number)	26	:	12
Beams (lin. ft.)	940	:	390
Walls (sq. ft.)	5,620	:	4,260



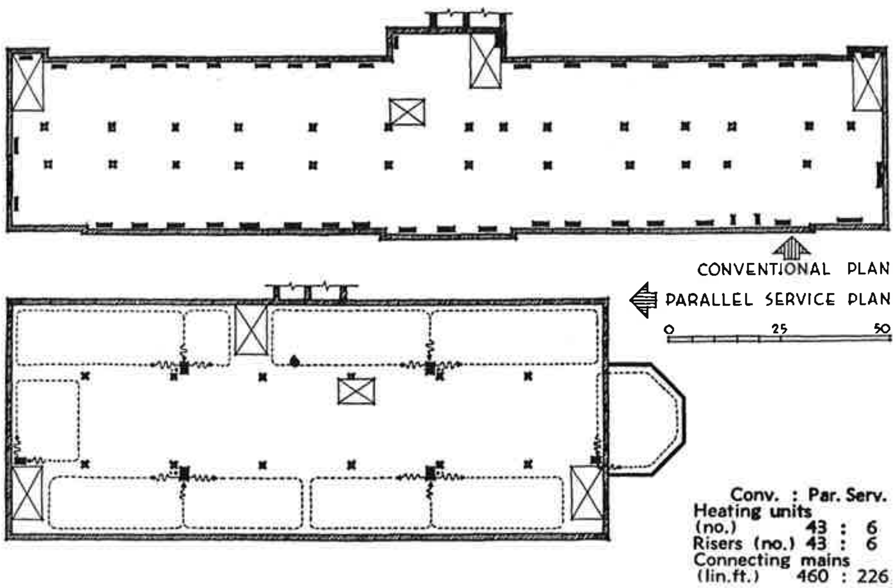


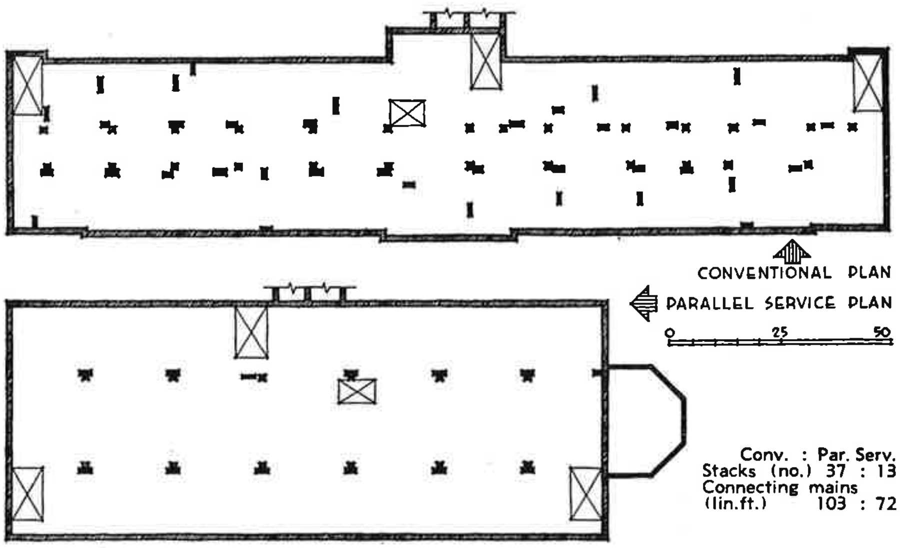


Detail of the floor construction. Precast, lightweight concrete blocks are hollow to serve as ducts for the hot air radiant heating system. Set as shown, blocks are self-centering both ways; and the bottom of the slab becomes, in effect, a tile ceiling, for joints between blocks can be pointed and left exposed. If made with a cinder aggregate, the blocks would provide a sound absorbing surface of considerable effectiveness. Use of steel is simple and minimum; bending eliminated except for bond hooks

STRUCTURE

CAREFUL FIGURING of spans and elimination of transverse beams by use of precast concrete blocks incorporating the one-way T-beam principle combine to produce an ingenious, simplified structural system which should prove economical in field erection. Design of the blocks with projecting V-shaped chairs makes all but the negative steel self-centering. Joints are chambered to allow concrete to flow in, thereby providing a structural continuity so that the blocks can be figured as part of the compression member, thus lightening the dead load. The only wiring and centering necessary is for the negative steel which is wired to the top of the temperature steel shown in the sketch at left; and bending is almost entirely eliminated. Continuous ducts formed by the hollow floor blocks are utilized for distribution of heated air to form an unusual system of zone-controlled radiant heating. This gives radiation from the floor and ceiling and eliminates imbedding mechanical service lines in the primary structural members.

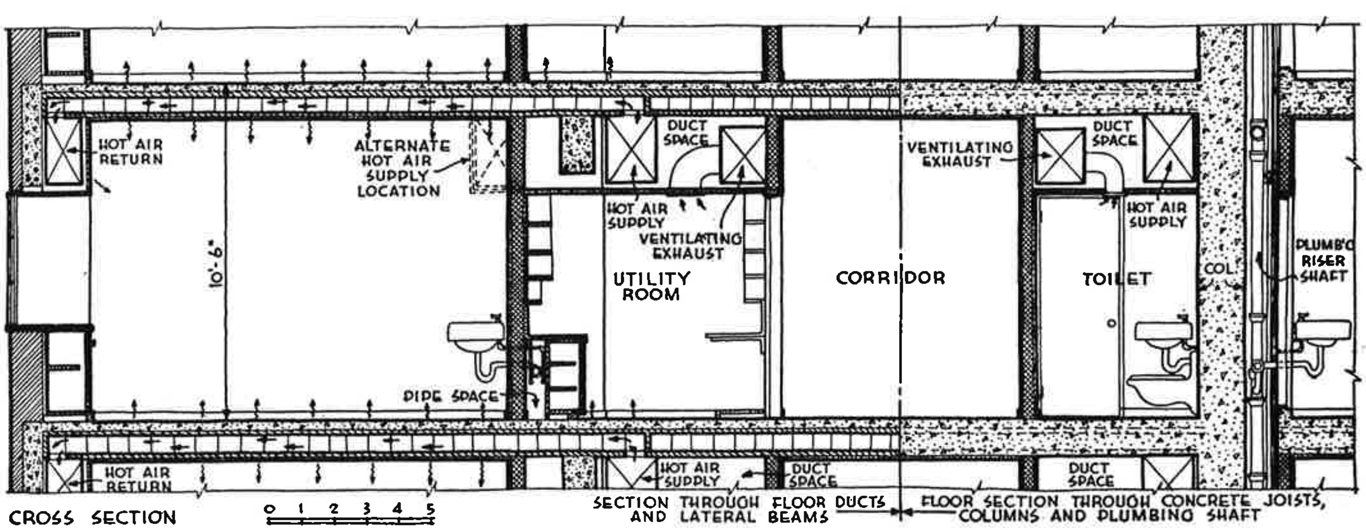




EQUIPMENT

Heating is accomplished through a zone-controlled system of radiating panels. Floors are divided into six zones as sketched. In each zone a thermostatically controlled heat exchanger is served by a riser from a central plant. Heated air is supplied by forced circulation from a plenum chamber above furred ceiling in service areas. It enters the floor ducts through holes in the end blocks (see detail, page 57, and section below) and is collected in a duct at the ceiling to be drawn back into the heat exchanger. The method can also be used to provide radiant cooling.

Plumbing lines are concentrated in a comparatively few stacks which are all located centrally around interior columns. Since all service rooms that require plumbing are located on the interior of the building, it is obvious that by use of such regularly spaced pipe shafts the maximum horizontal run for a supply or waste line need not be more than one-half the column spacing, or about 10 ft. Thus, in many instances sizes of pipe can be reduced and economies effected. Furthermore, short runs and access to shafts at every floor make for easy maintenance and facilitate alterations, justifying the desire of hospital executives for concealing all types of mechanical lines.



Integration of space requirements, construction elements and equipment units should produce numerous advantages as suggested in this sketch. Patient space is clear of wall jogs and encumbrances; mechanical systems and utilities are centralized and accessible; elements of construction serve a double purpose as essential parts of the heat distribution system; and control of interior conditions can be adjusted within zones to accommodate varying conditions, and thus maintain maximum operating efficiency and comfort —all of which help reduce costs.