On Mountain Tops

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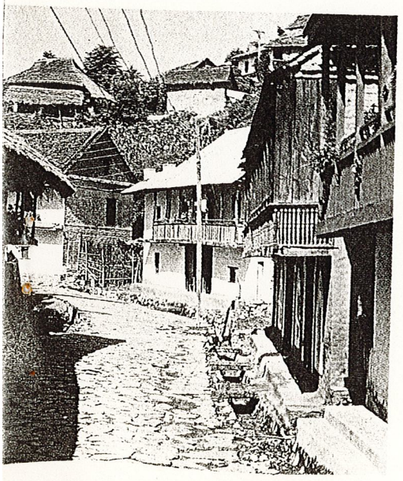


Facing page: Dhankuta bazaar
Above: Staff housing: general view

Tucked away in a remote hilly region of eastern Nepal, is the typical Newar settlement of Dhankuta – a village of white-washed houses ascending a steep ridge. The houses which line the well-paved, flag-stoned main street, faithfully mirror the traditional architecture of the area in their design and proportions. Set at slight angles to each other in their attempt to adjust to the difficult terrain, they are two-storeyed, shallow structures with long street frontages. Brackets support the overhanging roofs, while door and window frames are usually painted black and balconies with delicately fretsawed or turned wood railings adorn the first floors of almost all houses abutting the street with its continuous flow of heavily laden porters and pedestrians.

But Dhankuta was not destined to remain a sleepy village, as the Nepal Government plans to make it the administrative centre for the entire region. As a first step in this direction, the Dhankuta Community Medicine Auxiliary Training Centre (CMATC), the first of its kind to be entirely located in a rural setting, has changed the tenor of the place.

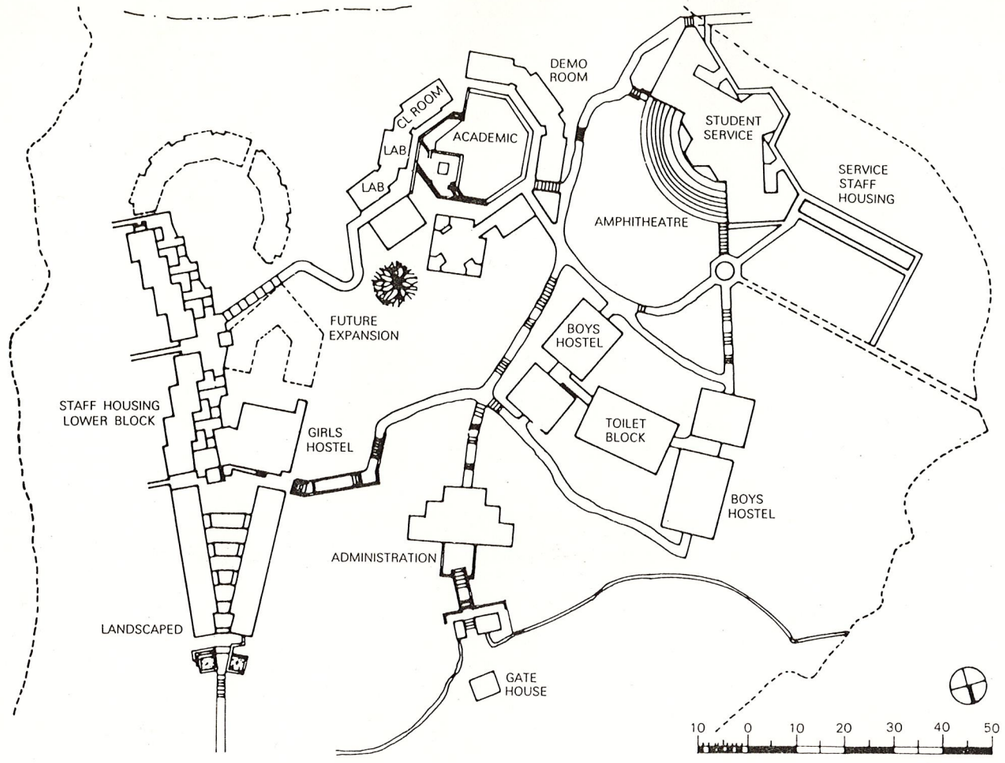
But has this change threatened the survival of a unique culture? Is it for better or for worse? This problem of conservation as opposed to development invariably arises, posing issues which go beyond the mere preservation of a physical environment or the provision of modern facilities.

One is almost tempted to say, "Don't touch this, leave it as it is." But casual observation does not disclose the fact that changes are already taking place and will continue to do so, regardless of the plans of developers.

Architects and planners no longer remain apathetic to this controversy, having learnt harsh lessons from the past. Instead, there is now an appreciation for the human as opposed to the super-human scale, an attention to local context, and a growing respect for tradition rather than a rejection of past forms and materials.

Keeping these concepts in mind, Dhankuta's CMATC campus, which provides medical services to the rural areas, is in total empathy with the vernacular architecture of the area, as the architects have incorporated references to the local building tradition, while at the same time adapting them to meet modern needs, so that the building complex blends with the peculiar character of this Nepalese village, and stimulates local pride.

The site is clearly defined on all four sides. Towards the east of Dhankuta lies a ravine. The boundary lies at the bottom, but the sharp drop-off makes construction on the first 25 m



SITE SKETCH

almost impossible. To the west, the outward ravine serves as the boundary. The northern boundary lies on a public path, while the south is dramatically cut by the new Dharan-Dhankuta road.

The site itself is made up of three areas which are visually, as well as physically distinct. The eastern ridge is defined by two substantial ravines and joined only by narrow paths to the central ridge. The slopes of these two areas appear to drop similarly. The central ridge is defined physically by the in-site ravine to the east, and the public road to the north and also a roadway to the south. The western slope of the central ridge flattens out to form the third area. Being lower than the central ridge, the west side is separated from any visual connection with the eastern ridge and a natural amphitheatre emerges as the terraces of the central ridge twist around the north-eastern boundary of this area. The sharp earth cut to the south-west and the outward ravine to the northwest, create a western boundary that ends the site. It was the planner's rationale to use the unusually severe landscape to help define land use areas and to plan in such a way that the earthwork might be minimized and advantage taken of the changes of elevation.

Topographic problems of the site were by no means the only ones. The fact that the average slope is thirty degrees, combined with other difficulties like the loose nature of the soil, the presence of active land slides and seismic activity classified as the most extreme (zone V), leading to the need for unusually wide and deep footings to prevent sliding. In addition, water, electricity and building materials are all in short supply in the area. Early on, it was decided that all masonry upto ground floor slab level would be of river rock as this material could be quarried about five kilometres from the site (and two kilometres below it) and carried on human backs to wherever it was needed. It was estimated that by the time slab level was reached, the British vehicular road project would be complete and bricks could then be trucked up from the nearest factory to complete the superstructures. Thus two forms of masonry were used in the project. Climatic studies suggested that comfort within the buildings would not be greatly affected by solar orientation, though the site receives

Academic complex: general view.

direct sunlight throughout the day.

Rationale for the master plan and building design

As part of the Government's plan to build a regional administrative centre, several government and educational buildings have already been sited on the slopes to either side of the bazaar. Many of these new structures mar the overall beauty of the landscape and are ill-considered in their relationship to the bazaar.

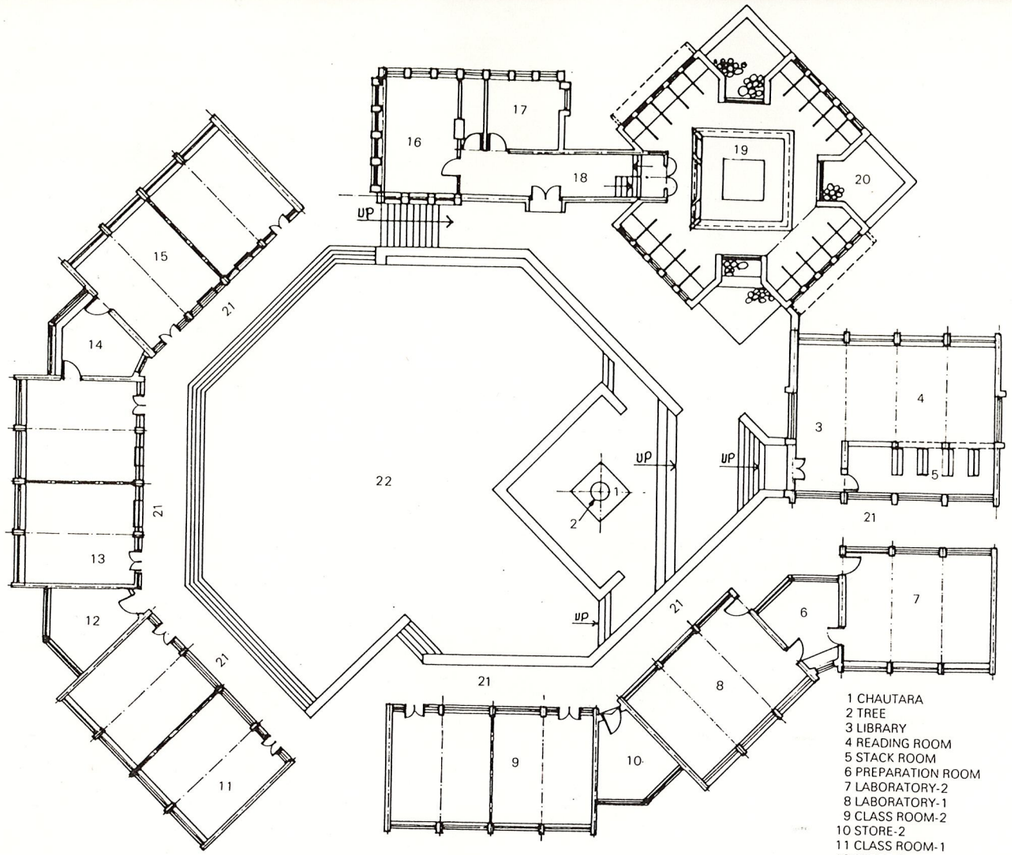
One of the chief concerns in master-planning the CMATC campus, therefore, was that as far as possible it should relate in scale and character to the existing traditional development and not contribute to a burgeoning process of visual pollution. This consideration ruled out any solution that would have consolidated the facilities in one massive mega-structure or proposed large sophisticated buildings of an urban character. Practicality and budget constraints would have made such concepts impossible in any case.

A second planning principle was to exploit the topography by locating indoor and outdoor facilities on the less steep slopes to minimize earth retention. It then became necessary to allow floor levels of individual spaces within building complexes to find their own level and to connect them with the required stairs.

A third planning principle was to minimize interior circulation. This meant an acceptance of extended roofs to form covered pathways in heavy-use areas, 'double-loading' of covered ways where possible, and the complete elimination of covered connections between building complexes.

For planning purposes, the building programme was divided into five main groups: the academic complex, the administrative building, the student services building, male dormitories and staff housing which incorporated a small female dormitory providing a residential training centre for 160 students.

It was considered desirable to separate the students living spaces from the staff community, but at the same time create a plan in which the academic area was equally accessible to both. This was done, by locating the academic complex at the southern plateau of the central ridge. As the eastern ridge is relatively narrow, by allowing overlapping



1 CHAUTARA
2 TREE
3 LIBRARY
4 READING ROOM
5 STACK ROOM
6 PREPARATION ROOM
7 LABORATORY-2
8 LABORATORY-1
9 CLASS ROOM-2
10 STORE-2
11 CLASS ROOM-1
12 STORE-1
13 DEMONSTRATION ROOM-2
14 PREPARATION ROOM
15 DEMONSTRATION ROOM
16 COMMITTEE ROOM
17 CHAIRMAN'S ROOM
18 CORRIDOR
19 STAFF MEETING/PREP
20 LOOSE ROCKS
21 COVERED WALK AREA
22 CENTRAL COURT

ACADEMIC COMPLEX GROUND FLOOR PLAN

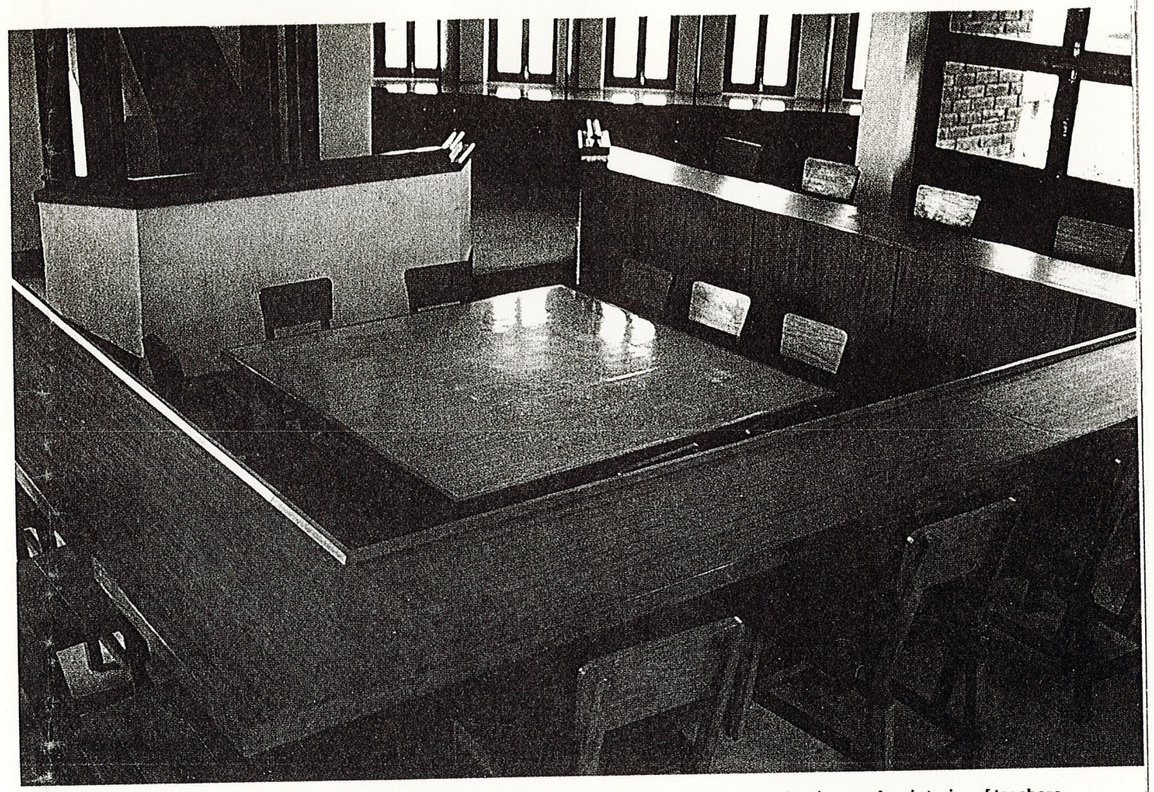
living units, this slope could provide cross-ventillation through each unit and yield good natural light and views. The separation of the eastern ridge is a positive quality for staff housing and would be a problem for any other activity group. The female dormitory, which had to be separated from the male quarters, is located at the northern most point of the eastern ridge. This would allow the highest degree of privacy to the women students. The male dormitory defines the western boundary of the site, and was conceived as a sharply stepped building to reduce circulation area and allow natural light to penetrate the southwest walls. This would allow a double loaded corridor, which would otherwise have been undesirable. The siting of the male dormitories is similarly determined by the natural amphitheatre and gently sloped areas of the west-side, permitting areas for recreation and student services with access to the Dharan-Dhankuta Road. The student services complex is sited in such a way that the amphitheatre becomes a large scale seating area for outdoor activities. The final group is located on the upper-most third of the central ridge and houses the administrative functions. Its siting was determined by its proximity to the north gate and easy access from the staff housing.

A great deal of attention was given to the scope for future expansion of all five areas. Whereas growth exceeding the programme limits could be absorbed by the male dormitories, student services, academic and administrative areas, the female dormitory and staff housing could not. It was then planned that those areas would expand eastwards where land is zoned for educational uses and is acquirable.

The limitations of the topography, in combination with the need to preserve some building areas for possible future horizontal expansion and for outdoor recreation, determined the final siting of all five major complexes. The resultant distribution of building masses left relatively large areas of sloping terrain between them. The next problem to be solved was the pedestrian circulation system which was needed to connect the buildings with each other.

Dhankuta is and will remain, a community based on pedestrian movement. The new vehicular road from Dharan terminates to the east of the bazaar below it. The level at which this road is built makes it impossible to bring vehicles onto the CMATC site itself. Even if it had been possible, it would not have been necessary since the day-to-day movement between the site and the bazaar is always by foot.

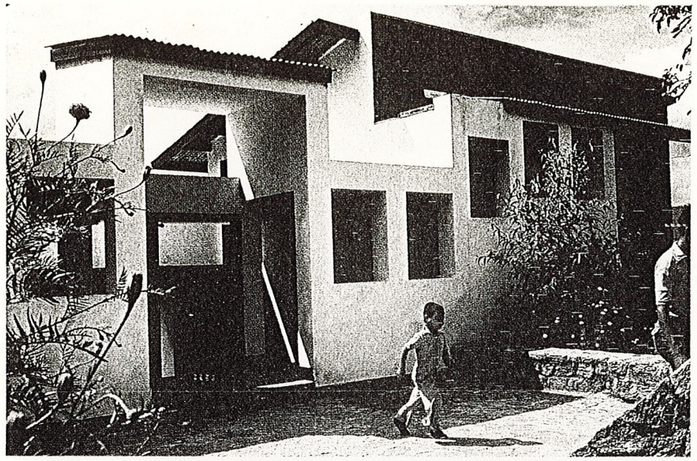
Therefore, the site circulation system was designed to provide a network of paths connecting all facilities as conveniently as possible and to provide access at two selected points. These two entrances to the site are differentiated as follows: The entrance on the south side is on the Dharan-Dhankuta road and will be a vehicular drop-off point. It is chosen at the point on the road where its elevation and the existing elevation of the site itself come closest together. This occurs just below the student services complex and is therefore intended mainly as a service entrance. The other main entrance is off the public pedestrian way on the north side of the site. This is the entrance that gives the most direct access to Dhankuta bazaar. This main entrance may also eventually be accessible to vehicles after the Dhantuka Hill road is opened. The difference in elevations between these two entrances is 60m.

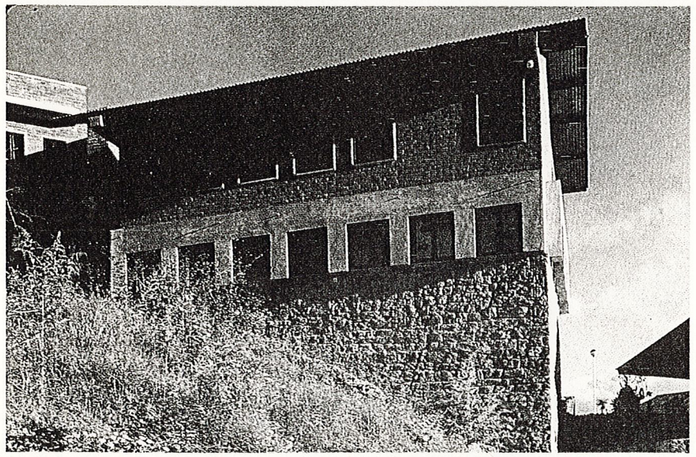


Academic complex: interior of teachers preparation and meeting room.

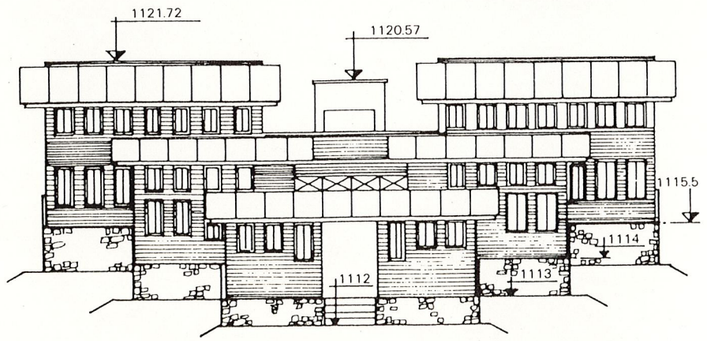
Building Construction

Foundations	: Lightly reinforced concrete
Retaining	: Local stone, battered, steel reinforced at key points
Load Bearing Walls	: 300m cavity brick walls filled with RCC
Partitions	: Brick
Suspended Floors	: RCC or RBC
Roof Structures	: Wood purlins on wood trusses RCC beams in student services building
Roof Insulation	: "Thermocoustic" or similar insulating board
Roof Finish	: Corrugated GI sheet
Doors/Windows	: Sal wood





Above top: Administration building: Main campus entry side.
Above: Academic complex: Education committee building.



ADMINISTRATION BLOCK ELEVATION AND SECTION

The five complexes

The academic complex

The teaching space defines an octagonal open space by strictly following the contours so that the covered connecting wall is completed at one level.

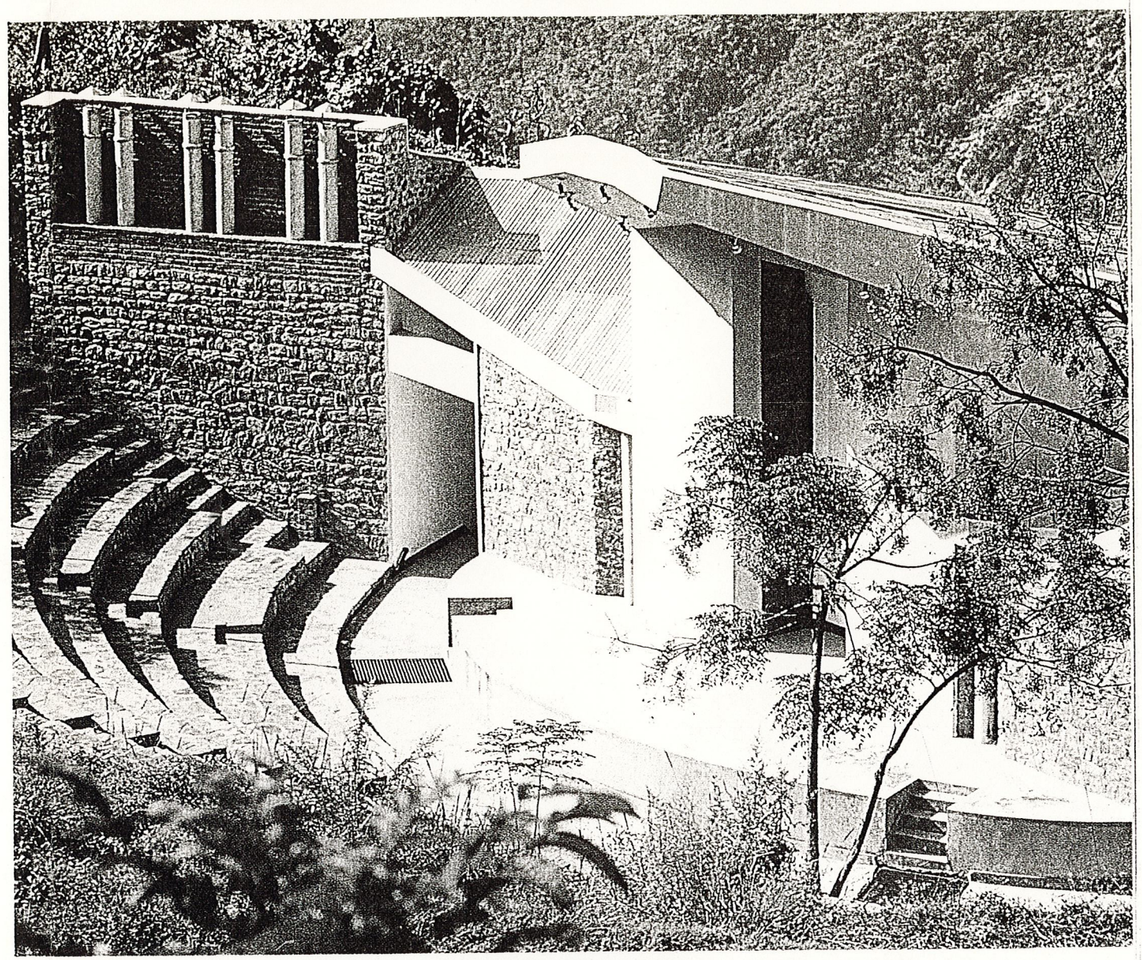
It seemed natural to landscape this area as a casual gathering space for relaxation between classes. The double loading of a connecting corridor would not have been practical here because of the gradient, which, though relatively less is still considerable. It would also have complicated through-ventilation and daylighting design. The wedge shaped spaces left between teaching areas are used as preparation and store rooms.

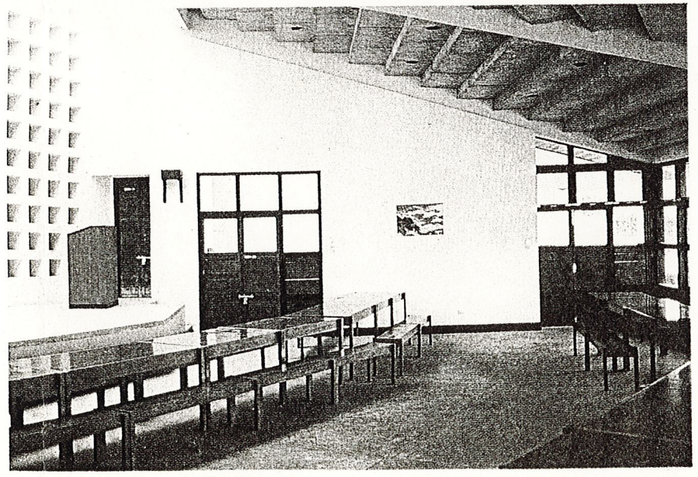
The northern boundary of the octagon is the site for teachers preparation, staff meetings and offices, and also includes the library. The design of these facilities was dominated by the large room needed to combine the staff meeting and teacher preparation functions. Had the staff meeting room been separated, it would have been unused most of the time. The need for seating 40 staff members at a meeting made a conference table impractical. Consequently, an arena type of arrangement, like a court room, was adopted. This occupies the centre of a two-storeyed space and results in sufficient perimeter to provide a one metre width of desk for each staff member (with excellent natural light) around the meeting area and on a gallery above. This, rather large hall, is located on the highest point, on the central axis of the octagon, with the other facilities arranged on either side to complete the enclosure. This defined octagonal space is accentuated with a tree on its raised 'chautara' to provide a shady spot for outdoor reading, conversation, or small seminars.

The administration building

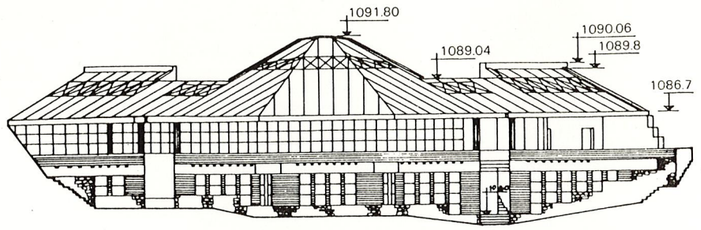
The administration building is prominently placed to act as a reception point for visitors to the campus. Its location is both central and elevated, so that it commands a view of all other facilities as well as a picturesque view of the valley below. As the site drops about two metres, the building is based on three levels, which are reflected in the interior floor levels.

The building is designed in such a way that future expansion can occur by extending the upper two storey elements to the west, along an existing terrace, and is also visually compatible

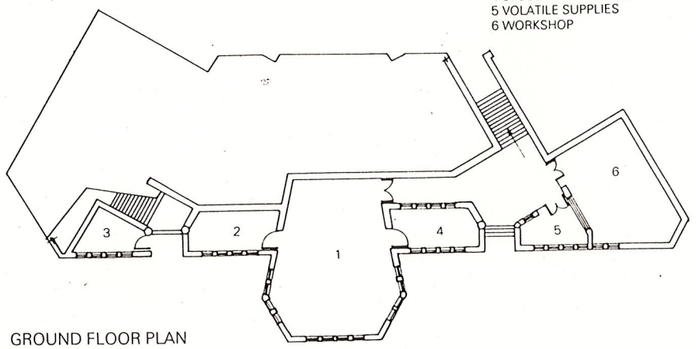




Students services building: amphitheatre and stage.
Left: Student services building: interior of canteen.

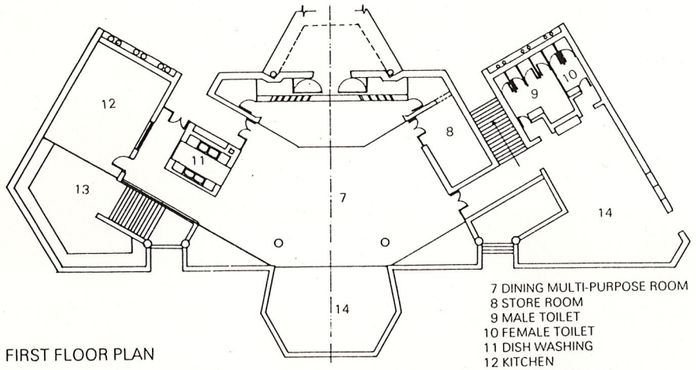


STUDENT SERVICE ELEVATION



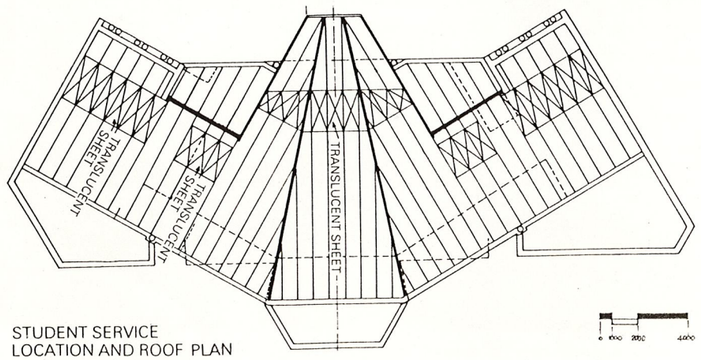
1 STUDENTS RECREATION
2 SPORTS STORAGE
3 GARDEN SUPPLIES
4 STUDENT WELFARE OFFICE
5 VOLATILE SUPPLIES
6 WORKSHOP

GROUND FLOOR PLAN



7 DINING MULTI-PURPOSE ROOM
8 STORE ROOM
9 MALE TOILET
10 FEMALE TOILET
11 DISH WASHING
12 KITCHEN
13 KITCHEN TERRACE
14 TERRACE

FIRST FLOOR PLAN



STUDENT SERVICE
LOCATION AND ROOF PLAN

in form with the neighbouring male hostel buildings.

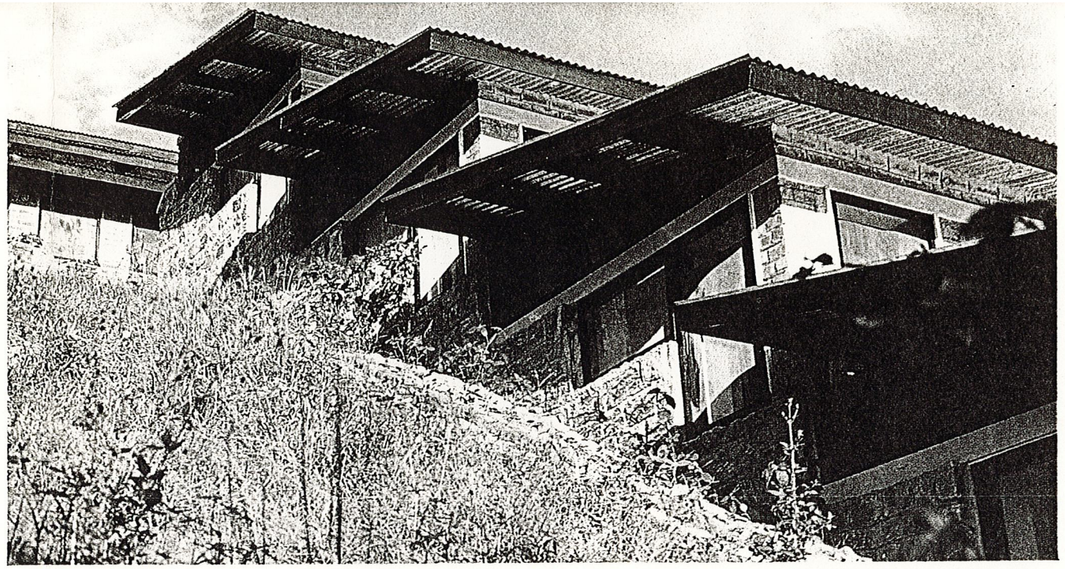
The student services building

This building was formed in response to the natural amphitheatre, which was an important reason for siting it in its chosen location. The axis of the semi-circular terraces becomes the axis of the fan-shaped dining room roof. The wings containing kitchen and servery, student union and store rooms are symmetrically disposed to dam the space and to complete the enclosure which the concavity of the hill invited. Thus the building becomes the end wall of an open theatre while one wall of the diningroom has the dual function of being a cyclorama for both indoor and outdoor stages. These essential relationships leave voids where the ground surface drops beneath the building, and can be put to other uses.

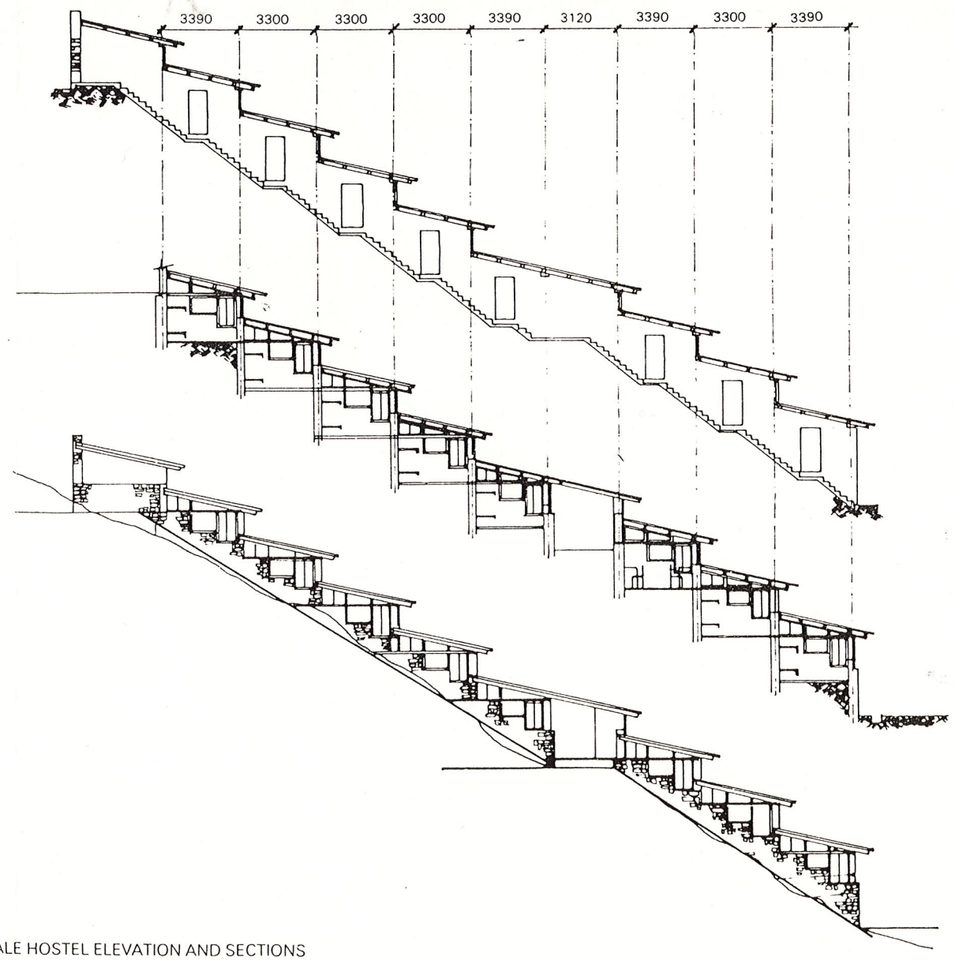
The service employee housing is added as an extended wing, following the contours to the west.

Male hostels complex

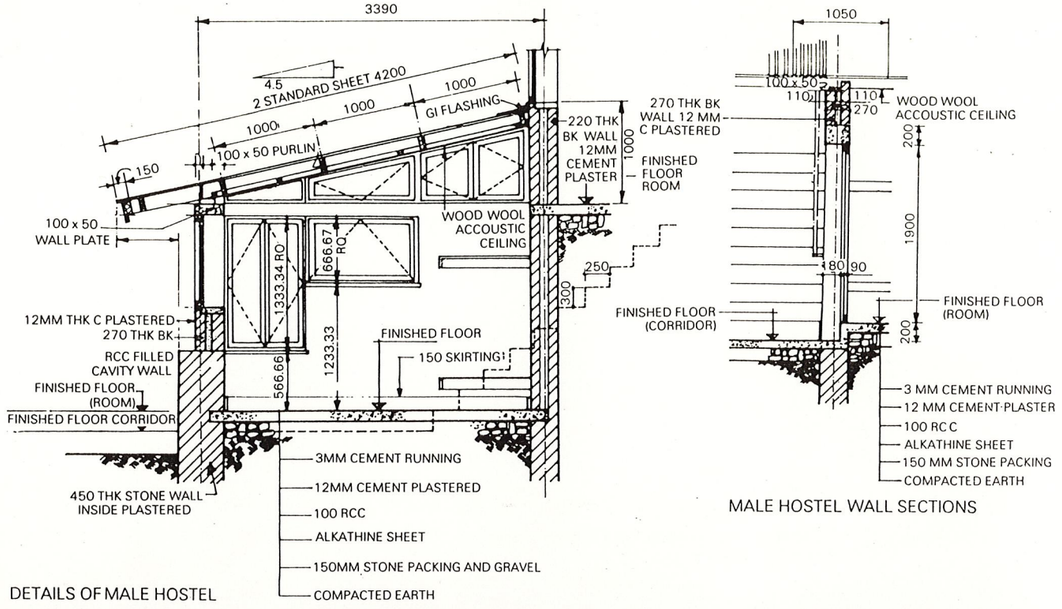
The site for this hostel complex slopes steeply, and could best be exploited with a building form that would respond to it radically. A double loaded corridor was strongly favoured for economic reasons. This corridor would be again limited as far as possible by elongating the rooms at right angles to it, thus reducing the 'frontage'. But the problem is that the rooms often tend to become dark on the corridor side. It was at this point that the basic idea of the design was conceived. By running the corridor across, rather than along the contours, the room could be stepped up the slope so as to receive ample light from two adjacent sides, rather than from one end only. The corridor then becomes a staircase. Running the rooms along the contours would not have given any significant cost advantage instead, the advantage of excellent natural lighting would have been forfeited.



Male dormitory complex: detail .



MALE HOSTEL ELEVATION AND SECTIONS

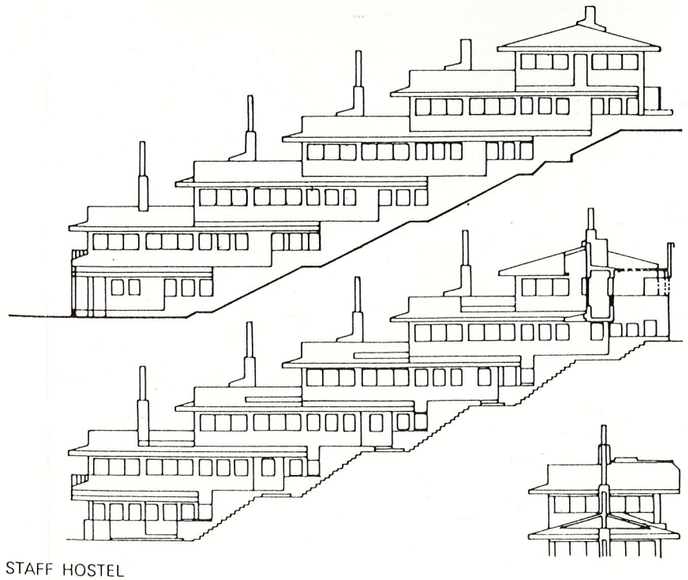


DETAILS OF MALE HOSTEL

MALE HOSTEL WALL SECTIONS

Lower staff housing: general view

Upper staff housing.



STAFF HOSTEL

The basic form was then broken into two blocks and disposed on the site above and between the alignment of walls previously determined. The toilet and shower block is located as conveniently as possible in the centre of the complex. These individual rooms provide sleeping and study spaces for four students each. In addition, there are separate study spaces for ten in each block, a warden's room and a common lounge all occupying standard room spaces which could be converted in the future to dormitory rooms.

Female hostel

These hostels are similar to the male hostel except that the rooms are bigger and can accommodate five or six students instead of four. Sixteen beds are provided with a domestic type of living, dining, and cooking facility at the top end of the slope, with common toilets and showers at the bottom.

Staff housing

The staff housing are of two types. The site for these buildings, which comprises the upper end of the ridge, slopes very steeply. The houses here are designed as single-storey units that overlap each other as they descend the slope. This gives each unit its own private grade level access and good exposure on three sides. On the lower end of the site, the slope is less and so this arrangement could not work. A simple system of two-storey row houses was devised. These are broken into discontinuous elements of three, four or five at a time to enable the curving line of the ridge to be followed without causing difficult plan distortions within the units.

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