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REFUGEE CAMPS AND CAMP PLANNING: THE STATE OF THE ART

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INTRODUCTION

In 1971, a group of engineers and planners formed a team to undertake a detailed study and analysis of refugee camps – how they operated, how they could be made more manageable, and how they could be designed to be more cost-effective. The studies included an examination of social and health problems, an analysis of the economic constraints encountered by relief organizations and local governmental authorities, and a review of administrative and organizational factors which affect the management of camps. The results of the studies, which are continuing under the auspices of INTERTECT, emphasize several important points:

First, refugee camps are manageable. If properly laid-out and organized from the outset, problems can be substantially reduced.

Second, camps can be cost-effective. If properly planned, and if adequate resources are committed at the outset, refugee camps can be run with a minimum of administrative cost, with the refugees operating most – if not all – of the camp sub-systems. Furthermore, the total costs of designing and installing a livable refugee camp are less than the continuing operational costs of a sub-standard camp.

Third, in high exposure environments such as the tropics, good physical layouts or plans can save lives. Designs which facilitate sanitation and encourage refugee organization reduce the incidence of disease and promote participation by the site occupants in activities ultimately leading to self-dependence.

The conclusions drawn thus far can be illustrated by examining the major case studies which were conducted by members of the team. The methodology employed in each case was to study first-hand problems of existing camps in various disasters and to examine to the greatest extent possible the following factors:

Physical factors

(1) Layout or design of the camp, planned and actual.
(2) Physical components of the camp, such as housing, sanitation, water distribution, etc.
(3) Land use – how facilities such as housing, clinics, etc., were grouped and how well they functioned in their area.
(4) Land tenure – who owned the land, how did it become available for a camp?

Social factors

(1) Demographic information – who were the refugees, what was their life-style before they came to the camp, what was the make-up of the population by age, family, etc.?
(2) Organizational factors – what was the organizational-labor potential, what types of organizations were successful, how well did the refugee labor perform?

Health factors

(1) Incidence of disease – what diseases were prevalent, how were they most often spread, how were they affected by the layout and environment of the camp?
(2) Health Programs – what programs were successful, how did the layout of the camp affect the manner in which they were conducted?

Administrative factors

(1) Administration – how was the camp run, by whom, and who made the real decisions?
(2) Refugee organization – were the refugees organized, if so, how, how did the organization work, to what extent did they participate in the running of the camp?
(3) VOLAG Contributions – to what extent did voluntary agencies participate in camp administration, where were they most useful, and where was their money best spent?
(4) Costs – who spent what, when, where and how much, were expenditures cost-effective?

In the research program the team relied heavily on the personal experience not only of our own staff but also of the field staff of the various governments and relief agencies.

MAJOR CASE STUDIES

(A) *International refugee camps (India 1971)*

The first case study undertaken by the team was conducted during the Bangladesh civil war in 1971. During the period preceding India's invasion of East Pakistan in December of that year, an estimated 10–12 million Bengalees fled to India for sanctuary from the fighting. The vast majority of these were placed in refugee camps which were concentrated in areas near the border. The largest number of camps was in the state

of West Bengal, especially in the districts near Calcutta. Camps in this area ranged in size from a minimum of 3000 persons to several which had a population of over 250,000.

The study of these camps was important for several reasons. First, and most important, it was the largest relief operation ever conducted in the developing countries. Second, the refugees crossed an international border and their survival and maintenance became a responsibility of a foreign government whose first obligation was to their own people. Third, the refugee population was not constant; it kept expanding until the very end of the war, making it difficult to get ahead of the situation or even to stay abreast of developments.

The first conclusion of our study of the Indian camps was the realization that, where there is a constant influx of refugees, three distinct classes of camps emerge. Each type can be identified or classified according to the stage of crisis during which it was erected, and to the extent of prior planning which was undertaken. Using these criteria, the three classes of camps were designated Phase I, Phase II and Phase III camps.

Phase I refugee camps are those camps set up immediately following a disaster or during the initial influx of refugees across a border. Due to the shortage of time, no prior planning has occurred. They are considered temporary by the government and receive only emergency relief supplies. Despite their being considered temporary, as long as there are large numbers of refugees without shelter, the Phase I camp is difficult to close. A Phase I camp is often used as a processing centre and thus is usually located near a railroad, a major highway, or sometimes an airfield. Due to the expansion of its population and its temporary status, living conditions in the Phase I camp are the worst of the various types.

Phase II camps are those set up with limited planning and are designed to be semi-permanent (no immediate closing is foreseen). The camps are usually in much better physical shape

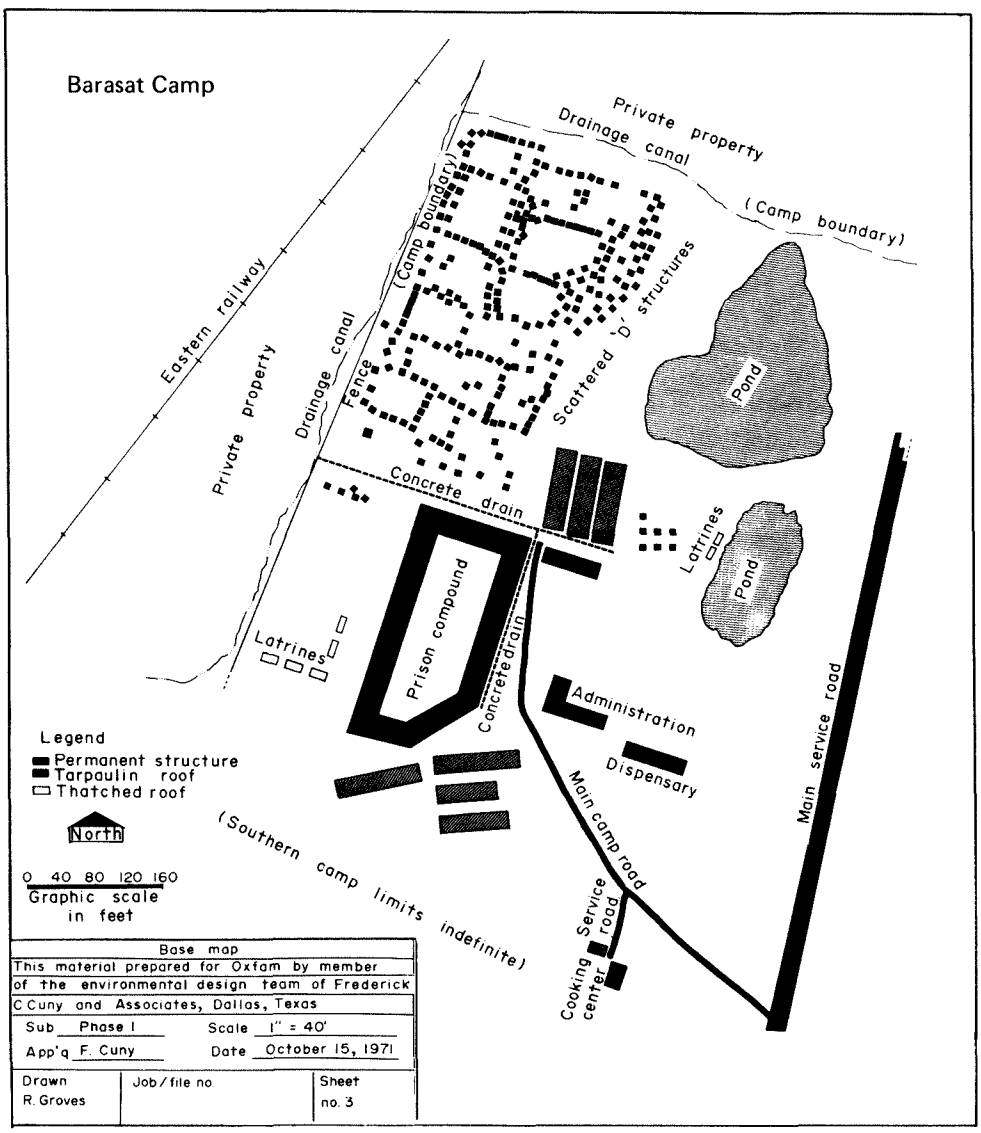

Fig. 1. Barasat Camp (W. Bengal, India 1971): This drawing illustrates a typical Phase I camp. It was built on government lands surrounding a prison. Note the shelters which were constructed on the embankments of rice paddies and have no scheme of layout.

than the Phase I camps since authorities have had time both to realize the magnitude of the refugee problem and to learn from the initial mistakes of the Phase I camps. The major difference is the willingness by both government and relief organizations to commit permanent as well as semi-permanent items to camp development; these include such articles as roofing materials, field hospitals, etc. In some cases, the government will commit a major governmental property for use by the refugees as a camp. In most cases, the camp is restricted for a predetermined or maximum number of refugees.

A Phase III camp is a permanent camp built from the ground up as a refugee camp; it is designed to maximize control and administration, reduce overall costs and facilitate the delivery of relief services. The principal characteristics are that considerable advance planning has been undertaken and that a comprehensive master plan for the camp has been developed before the refugees begin occupying the site. The critical element to success in the development of a Phase III camp is the ability of construction and administration to keep ahead of the resettlement of refugees in the camp. Resources for balanced delivery of services, adequate drainage, shelter and sanitation are committed early in the development stage.

The significance of this classification of camps cannot be overstated. It gives the planner/researcher a framework for analyzing results in terms of the level of commitment, and it provides a basis for comparison of site plans and their relationship to the operation of a camp.

The second important lesson derived from the study in India was that successful operation of a camp is directly related to the layout of the camp. Across the board, camps which were disorganized and haphazard in their layout were more costly and difficult to manage than camps of similar or even larger size which were laid out in an orderly scheme. Most successful were those camps which were laid out on a use-area plan, i.e. common activities were provided land so that they could be grouped together.

In India, all the camps which had any kind of plan used a grid system; that is, the housing units were placed in lines which were divided by streets and walkways into squares. While this was better than no plan at all, it tended to give the camps a regimental appearance and did nothing to give identity to individual areas. Even so, we discovered a tendency of residents to re-group within the grid and to try to divide themselves up into some sort of community space. Why not, we asked, design camps with small communities built in?

These observations lead to the third major lesson identified in our study. This was the realization that when large numbers of people are concentrated in a small geographic area, in effect a camp ceases to be a camp; in actuality it becomes a town or a small city with all the accompanying problems. A refugee camp must have housing, water, sewers, roads, clinics, fire protection, garbage disposal, parks, schools – everything found in a town. Thus, development plans for refugee camps should be considered with the same detail as a master plan for a town. If the camp is treated as such and if the government and voluntary agencies will co-ordinate the refugee relief program with the development of the camp, the net effect will be overall reduction in the long-range costs of supporting the refugees.

The final observation of major importance learned in India was that the success of any camp plan is dependent on having adequate facilities installed before the refugees occupy the site. If occupancy outruns production, the uncared-for people will multiply the adverse factors in the camp and will increase the problems which the camp was designed to alleviate. Indeed, authorities must often be ruthless in the assignment of refugees to a camp and often deny entry until the camp is sufficiently under construction. To reduce this problem, all components or systems of a refugee camp as well as the plan itself must be designed for extremely rapid installation and mass production. In terms of camps, this means developing a variety of standardized camp layouts. Based on given data, a layout suitable for a particular situation can then be selected.

(B) *Camps following a natural disaster*

During the following year, the team studied a number of camps in various countries in Africa and the Middle East and began work on a series of standard camp plans which could be widely used. The earthquake in Managua, Nicaragua, in December 1972 provided a further case study and the opportunity to use a standard plan and monitor its performance.

1. *Managua (1972).* Several days after the disaster, INTERTECT sent a small team to Nicaragua to assist OXFAM and volunteers of the Catholic Institute of International Relations and the Nicaraguan government in establishing a refugee camp programme[11]. Construction was delayed for over a week while the government tried to decide how to handle the refugee problem. At this time there was no risk from weather exposure, and the majority of refugees had moved to outlying areas to stay with relatives[8]. However, in the town of Masaya, which is 30 Km from Managua, a large number of refugees without nearby relatives had moved into the town square, parks and open lots, and were living in the open without any health or sanitary provisions. On January 6, 1973, the government announced that it intended to build a series of refugee camps for the refugees who had not been absorbed by the extended family system, including one camp for the refugees at Masaya. At this point, OXFAM offered to assist in development of a model camp at Coyotepe, a site 2 km east of Masaya, design and supervision of construction to be directed by INTERTECT. The Nicaraguan government accepted the offer and, on January 7th, construction began.

The plan selected for the camp was called a modified cross-axis plan*. It consisted of a series of small communities of 10–16 housing units (camping tents) grouped around a central

*The name is derived from the points or axes where construction on each group of communities is begun. It differs from a cross-axis plan due to modifications necessary to allow single-family as opposed to multi-family housing.

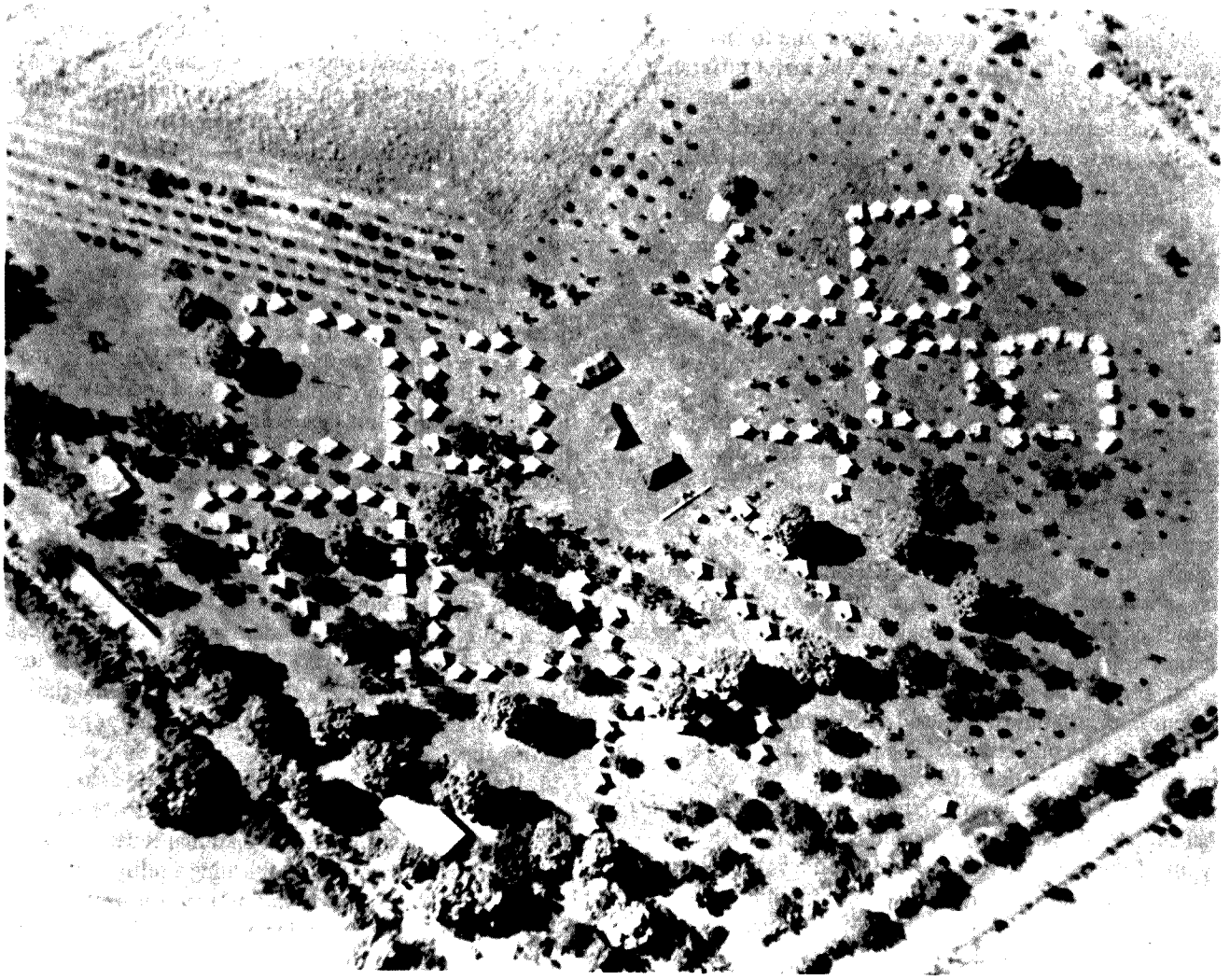

Fig. 2. Coyotepe Camp (Nicaragua 1972): This photo shows the camp in its early stages. Note the communities and various use areas (see also Fig. 8).

administrative core where administration, clinics and storage facilities were located. Each community was designed to provide private space for each shelter as well as a large "common" or open area for community use. By orienting the opening of each shelter inward, it was felt that a sense of community could be provided. Each community had provisions for group cooking, washing, and recreational activities. An integrated road and walkway system was built to provide access to all communities and was constructed with sufficient width to provide adequate fire breaks throughout the camp. Space was allotted at the edge of each roadway for drainage ditches to be built (see Figs. 2 and 8). Sanitation was provided by bore-hole latrines placed at the perimeter of the camp but within easy walking distance to all shelters. Water was supplied daily by truck, although a few water lines were later installed. At the edge of each intersection of the roadways, a tall (10 m) lightpost was installed with one high intensity mercury vapour light and several electrical outlets for use by each community[5,7].

OXFAM and the CIIR staff provided assistance to the refugees which included registration, social services and community organization (even organizing a camp newspaper). The refugees were included in all plans of the construction programme and assisted to a limited extent in developing modifications to the cross-axis plan.

How did it work? Despite the failure of several of the sub-systems – notably the camping tents and the water systems – overall operation went very well. The camp remained in its initial form for several months†, and we had ample time to monitor various aspects of the whole camp. In addition, the U.S. Army built two refugee camps of the same size in other locations, both using a grid layout with no prior planning or

†Several months later, a German team moved into Coyotepe, removed the tents and installed some polyurethane igloos in a grid system. The refugees moved out gradually over the next month and the camp was closed.

sequencing of development. The differences between their camps and Coyotepe were amazing. As a sample:

Our camp cost 37% less to operate.

There were no major health problems in Coyotepe. The Army camps were plagued with skin infections, various waterborne diseases and several outbreaks of minor contagious disease. At the Tipitopa camp, 100% inoculations were conducted 6 times; at Coyotepe no inoculations were ever given except on an individual basis or to those living immediately next to an affected patient.

By every account, Coyotepe was a relatively happy and industrious camp. Photos show small cottage industries in the camp, children playing, and women working together on household chores. At Tipitopa, the Army had to forcibly segregate one segment of the camp to keep order, and thefts were prevalent.

A strong refugee council evolved at Coyotepe and informal organizations abounded; at the Army camps, participation was weak and the volunteers working there reported extreme apathy was prevalent.

It is difficult, of course, to determine how much of this was due to the layout of the camp as opposed to other factors such as the quality of the relief effort in each camp. But an examination of data collected about the refugees in each camp shows that they were all from the same socio-economic background, held the same level of skills, and received the same general social services. In addition, the same types of housing, latrines and water supply were used. On the basis of this data, we concluded that the layout of the camp had facilitated community organization, promoted a feeling of group security, reduced the incidence of disease, and reduced the level of administration required to operate the camp. This enabled the refugees to recover faster and look after their own welfare sooner.

Nicaragua gave the team an opportunity to study the differences between a major relief operation following a natural disaster and one for war refugees residing in a foreign country. The differences are significant, especially as they pertain to refugee camps. First, in the former case there is only one type of camp; there are no phases as in the latter. Second, the government, for political reasons, must respond itself to the needs of the refugees; thus a camp will receive more consideration by local authorities, and more government resources will be available to camp builders. At the outset of a crisis, in fact, more facilities are immediately available for a camp than for refugees residing outside. However, these resources dry up very quickly as the priority shifts to reconstruction programmes. This implies that flexible, pre-planned layouts are necessary from the outset to provide a framework for the commitment of maximum resources while they are available.

A third difference relating to camps is that the number of refugees following a natural disaster is constant. This enables the planner to design a camp for an ultimate capacity, facilitating selection of both a plan and a site.

Another factor is that social services within the camp are geared to getting the refugee back into the mainstream of national life, while a government will usually restrict foreign refugees to activities within their own camps and prohibit them from meaningful work outside. The significance of this is that social and community organization will be easier in the former type of camp whilst the supply of labor for camp improvement and maintenance will dwindle as reconstruction progresses. This further emphasizes that the camp, by design, must facilitate rapid and easy maintenance and operation.

Finally, and significant to the per family space allotment in the layout, is that following a natural disaster, refugees usually have more possessions than do escapees or evacuees from war zones; the latter in many cases travel long distances and cannot bring their valuables with them. Most camps will be located near their former homes, so they may often rescue such items as clothing, furniture and prized possessions. Furthermore, they will be able to obtain more goods as reconstruction progresses through their inclusion in the work force. Thus, the camp planner must select a plan which allows more space per family and encourages a system of community participation in reducing thefts. In most cases, this means single-family housing units and some sort of community arrangement where everyone can see what is going on in the immediate area.

During the comparison of data obtained from our study of the camps in and around Managua and other camps around the world, the team became aware of an important consideration affecting camp planning in all relief operations: the fact that few of the camps established following a natural disaster – and Phase II or Phase III refugee camps – are ever totally abandoned. Once established, the land rarely reverts to its former use. In Managua, two out of three camps are still refugee communities, even though they are no longer classified as camps. We thus decided to expand our study to see how, and in what form a refugee camp evolves. This study would point to additional criteria to be considered in site selection for a camp. The refugee camp at Choloma following Hurricane Fifi's devastation of eastern Honduras in 1974 provides a case to illustrate this evolution.

2. *Choloma, Honduras (1974).* Immediately after the hurricane, a number of camps were constructed as temporary settlements for refugees. The largest was established near the town of Choloma to house 318 families (1831 persons). The site selected was formerly owned by a small cement company and was adjacent to their plant. The land is flat, bordered by a creek, a railroad, a government building site, and a major highway (see Fig. 3). It was chosen because it was close to the ruins of Choloma and had not flooded seriously during the hurricane. The camp was built by a consortium of agencies. Housing consisted of tents provided by the Venezuelan and Canadian armies, which were laid out in two separate blocks, each using a grid pattern. No consideration was given to terrain (except to avoid obvious areas of standing water), spatial orientation or social factors. The tents were originally

Fig. 3. Choloma Camp (Honduras 1974): This aerial photo shows all three stages of a camp in transition. The original grid layout of the tents can still be seen as can the re-grouping typical of the second stage. On the left, the new permanent housing can be seen under construction.

only 1-2 m apart. A number of social services were provided by various relief agencies at sites which were scattered around the camp; latrines were likewise scattered.

INTERTECT visited the camp 3½ months after it was built. By that time, the camp was well evolved, and we were able to observe a number of interesting developments. First, the camp had already begun to change from a temporary refugee camp to a permanent community. A number of agencies had persuaded the cement company to sell the land, and a complex of multi-family housing was under construction.

The remainder of the camp had changed quite a bit from the original layout. The grid was still followed, but many of the families had relocated their tents or had exchanged tents with others in order to be near friends. In some cases the re-grouping consisted of community arrangements not unlike the community units in the Masaya camp in Nicaragua. All administrative services had re-established themselves near the centre of the camp (except the clinic which was in a wooden building too heavy to move). What made this interesting to us, and the study significant, was that neither the government nor the voluntary agencies provided any administration for the camp; thus we were able to see what the refugees themselves did to the camp, and how the layout was affected.

From the study, we were able to identify three stages of development or transition within the camp. Subsequent studies have shown that these occur in almost all camps following a natural disaster. Stage I covers the period of initial occupancy. Refugees go where they are assigned, or take what is available. There is little or no involvement or participation of the refugees.

Stage II is the period of re-organization; people establish new friendships or find old friends, and a social re-organization begins. This is characterized by adjustments in the camp layout, such as moving tents, re-grouping into units, centralizing services, and establishing refugee organizations.

During Stage III, occupancy becomes tenure. The refugees are already on the land, so it seems "logical" that they rebuild here. After all, why move again? So permanent facilities are installed and the camp becomes a permanent community.

The trouble with this evolution is that – more often than not – the site for the new community has received no more

consideration than that originally given to the refugee camp. At Choloma, the site was exceptionally poor. A survey later showed that the reason the site had not flooded earlier was because a temporary diversionary dam had been created by mud slides upstream, and the site where the new housing was being constructed could easily be inundated in another severe storm. Thus, the camp planner is faced with a major design consideration: select every campsite as if it were for a permanent community. It very well may be!

(C) *Refugee settlement centres*

A discussion of housing around Choloma provides an opportunity to discuss another type of development which often comes under the planning activities of relief authorities; this is the resettlement community, or Refugee Settlement Centre. Typically, these have developed following a natural disaster when the site which was destroyed by the disaster is considered too dangerous to rebuild; thus, new communities are required. Refugee Settlement Centres may also be built by a host country to re-settle refugees who have virtually no chance of returning to their own country. RSC's following a natural disaster are usually small communities of 25–50 houses built by a voluntary agency. The number is usually small due to the limited resources of the voluntary agency and the high cost of permanent housing. The RSC's are ordinarily found on sites near the old town, and the residents usually retain their identity with the whole community. In Choloma, a total of five RSC's were built and, although some are several miles from the town, all are officially considered a part of the township. (see Fig. 4).

Refugee Settlement Centres for foreign refugees are usually constructed by the host government and may be a great distance from the refugees' country, not to mention their former home. Host countries typically build RSC's for two reasons: to develop a community wherein the refugees can pay for their own maintenance, and/or to settle and develop lands previously underdeveloped or unpopulated.

The development of an RSC is more complex than that of a refugee camp and requires a good deal of technical assistance in developing appropriate layouts, agricultural and economic activities, and administrative structures. But in the long run, the centres can offset and greatly reduce the cost of maintaining the refugees. Because of the complexity of an RSC, each must be developed individually, and standard layouts can rarely be used[6]

(D) *Redevelopment programs*

To this point, we have discussed camps built after either a war or a natural disaster, the camps with which the relief adminstrator

Fig. 4. A typical Refugee Settlement Centre (Choloma, Honduras 1975).

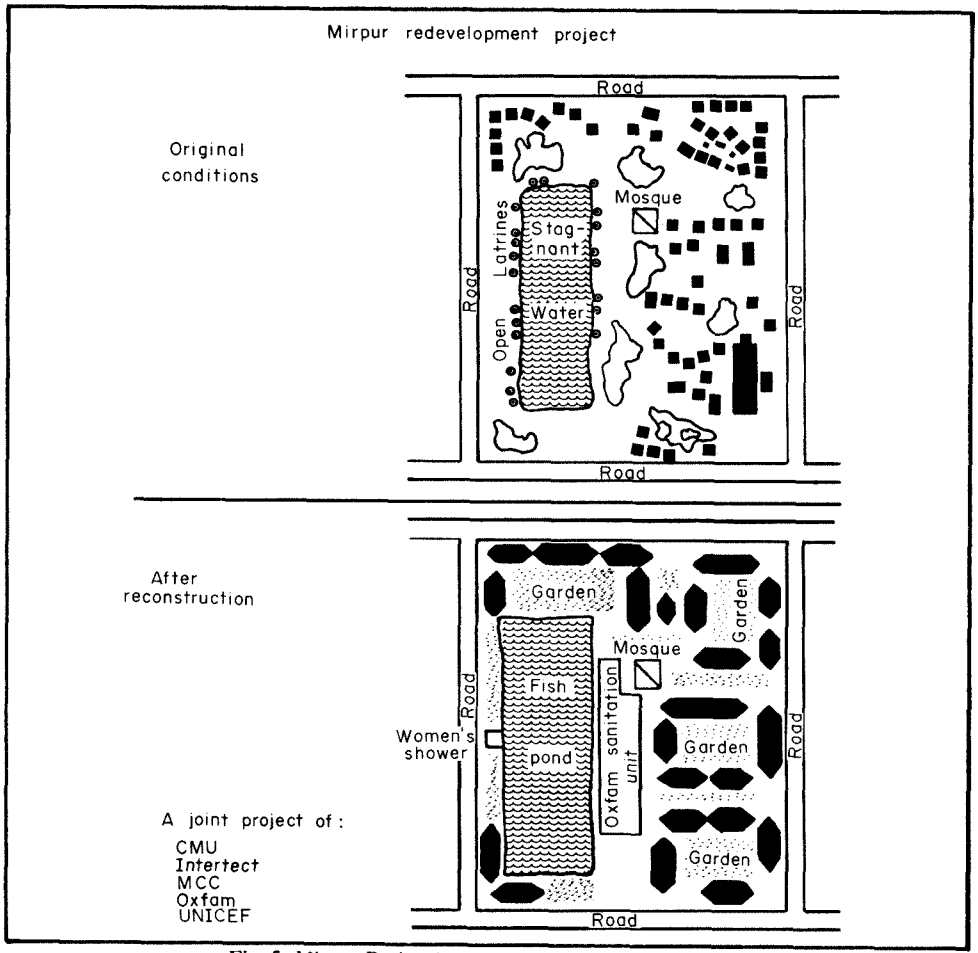

Fig. 5. Mirpur Redevelopment Project (Bangladesh 1975).

will normally be confronted. There is, however, one more type of camp which may be encountered, especially in countries such as India and Bangladesh which have extremely high population density. These camps are the result of a mass eviction. In south Asia, they are called "Bustee" camps, and, as there are more in this area than anywhere else, that term is universally applied to connote this type of camp. These camps take on the worst aspects of Phase I or II camps, i.e. limited or no pre-planning; but what makes them unique for the relief administrator is that he does not have an opportunity to work with the refugees until the camp is a *fait accompli.* In order to effect a physical change, he must redesign an existing camp, an extensive task which few agencies are willing to undertake. However, with proper planning, redevelopment programs can be successful. A recent case in Bangladesh can be used for illustration.

Following independence in 1971, the government of Bangladesh rounded up an ethnic group called Biharis whom they felt were Pakistani partisans and whom they intended to "ship back to Pakistan". Pakistan refused to accept them, and today most still languish in the camps set up after the war. One of the largest of these is Mirpur, a subdivision of Dacca which had been a Bihari area before the war. Thousands of extra people were forced into the area, and families were living in every available space and along several of the roads. The worst area of the camp was a one-acre plot at the edge of a stagnant pond, on which 108 families resided in 56 makeshift houses. Around the edge of the pond, dozens of open latrines had been built and, after three years, the health hazard was enormous.

A number of agencies were interested in trying to improve conditions in the area. Under the auspices of OXFAM, a demonstration redevelopment plan was prepared by INTERTECT (Fig. 5), in which all the agencies were able to participate. The plan also incorporated a demonstration of two new relief items: the OXFAM sanitation unit which had already been installed, and the Emergency Shelter Unit designed by Carnegie-Mellon University/INTERTECT‡.

The plan consisted of three phases. In the first, several current projects were incorporated and sequenced. These

‡ The OXFAM sanitation unit is probably the greatest single item yet produced for relief operations, especially in refugee camps. It enables planners to provide close-in sanitary facilities throughout camps, thus providing great flexibility in design. It is to OXFAM's credit that they have been developed, to their detriment that they are not more readily available.
A complete report on the C-MU/INTERTECT Emergency Shelter Unit may be obtained from Carnegie-Mellon University, Advanced Building Studies Program, Schenley Park, Pittsburgh, Pennsylvania 15213, U.S.A.

included improving the site around the OXFAM sanitation unit; replacing the open septic pool with a fish pond; and installing a drainage system to keep site runoff water from entering the fish pond. This involved leveling the entire site, filling in the cuts and holes, installing the drainage canals, draining the pond and shaping its bottom, and building a berm around the edge.

Phase two called for demolishing the existing structures and installing the Emergency Shelter Units. The units, designed to give each family structurally sound housing, whilst providing communal open space, are multi-family houses grouped in small, inward-facing rectangles.

Phase three was an integrated camp improvement program consisting of development of gardens and installation of tube wells in the open space within each rectangle; construction of showers and washracks for the whole area; and completion of the fish pond. During this stage, a number of social services were also initiated. All work was carried out by the refugees themselves who were paid under a Food-For-Work program. Participating agencies included OXFAM, the Mennonite Central Committee, World Food Program (UN), UNICEF and Carnegie-Mellon University/INTERTECT.

This project illustrates two important considerations. First, an integrated re-development program can be conducted in an existing camp. While the costs may be high, by combining current programs and currently funded projects they can be distributed. The success of the Mirpur program to date provides a strong argument for the integration of social, health and physical programs.

Second, while a standard layout for the entire camp is not practical for re-development, elements of a standard layout – such as the community units – can be used. Thus, the camp planner should concentrate on developing various flexible community unit arrangements which can be selected for re-development programs. These unit plans must be developed using the same design criteria as for a larger camp, considering constraints as traditional living arrangements, housing types and spatial orientation.

RECOMMENDED APPROACH AND METHODOLOGY

Once the examination of the various classes and types of camps, as well as their evolution, was complete, the team was able to develop an approach and methodology for refugee camp planning and design. We concluded that four elements are necessary: a balanced planning approach; adequate site selection; good site planning; and development of a balanced camp improvement program. The design of refugee camps must be based on a realization that maximum density may be achieved within a limited area without creating detrimental social problems only by designing a community completely balanced within its primary borders. The development of the camp must create settlements rather than simply an area of emergency shelter. Camps must offer a full range of educational, recreational and medical facilities. Special emphasis should be placed on encouraging new and more efficient methods of site development, housing construction and provision of camp facilities through the practical application of new systems and technologies.

To initiate the development of a refugee camp, a detailed master plan should be prepared. A critical path, with decision points, should be followed and consultation with all concerned national, state and local officials and relief organizations should be effected early in the process. Integrated in the planning process are social objectives, determination of administrative structure, and an economic and cost profile. A new camp should be self-contained with a high percentage of development work carried out by the refugees themselves. An investigation should be made to determine if suitable programs or items are available which can assist in making the camp semi-self-supporting. Such programs would include agriculture/garden projects, cottage industries, etc.

(A) *Planning approach*

The planning approach should be structured to include the following: Program; Design; Production; and Occupancy.

Programming is the first step and includes assembling the data upon which decisions about size, location, budget, timing and social structure of the camp can be based. With the exception of social characteristics data, these are standard analyses which are based on town planning practices. All relief demands a social profile of the refugees and a preview of projected occupancy; these provide the socio-spatial basis for the design.

Design involves the testing of alternative plans against the data assembled; a decision upon a general layout; its expression in a preliminary site plan; and the production of a construction plan or Camp Development Program[4]. Special attention to the social and economic consequences of the plan is called for, and it should be exposed to review by as many agencies as possible before construction begins.

Production is the longest phase and is the actual building of the new camp with its myriad disruptions, confusions, compromises, and changes. Surveys of early refugee conditions during this stage will reflect the ordeal of their personal readjustments to new and different surroundings and their frustration in having to make do with minimal facilities. Nevertheless, it is important to conduct on-site evaluations of the constructed areas in the light of the actual-versus-anticipated physical and social performance. Mistakes in the design can often be corrected during the early stages of production. Since the new camps will be in stages, there is opportunity for valuable feedback from the first stages to succeeding ones. Recurring systems and engineering investigations should also be conducted at each stage of development, with continuous communication of findings back to the design program.

Occupancy initiates the real testing of the planning approach selected. After construction is complete and the refugees have moved into the camp, important social and health changes

should begin to occur among the occupants as they adjust to camp life. At this point, the authorities involved should conduct a series of studies (especially a census) to enable in-depth comparisons of actual-versus-projected refugee composition, activities and interaction, along with an evaluation of the workability of the total camp design. Continuing feedback of relevant data into programming for other new camps in probably the single greatest advantage of this approach, for it offers a means of continually evolving operational, environmental and design objectives from actual experience.

(B) *Site selection*

Before a camp can be built, a suitable site must be selected and acquired. Varying factors which have a bearing on site selection include:

Topography. The site should be on gently sloping land of sufficient size to avoid overcrowding. Good drainage is essential; marshes or low ground which doesn't dry quickly after rains should be avoided. Extremely rocky sites are generally undesirable but are preferable to marshy lands.

Outline of water areas. A stream or the shore of a lake or other body of water may dictate modification of layout. High adjacent stream flood levels will require building at higher elevations. Flood hazards must be evaluated to preclude dangerous and unnecessary use of flood plains. Construction should be sited beyond the known flood level.

Soil types and conditions. Foundation difficulties due to ledgerock, swamp or other unfavorable soil conditions may affect layouts and require increasing the minimum distances between housing areas.

Existing vegetation. Sites with grass or tree cover should be selected as opposed to barren sites. The value of ground cover for shade and heat reduction, dust control, and soil erosion prevention is great. Existing plants remaining in place give effective ground cover immediately; vegetation planted to take the place of ground cover which has been destroyed cannot be expected to protect until a later time. Modifications in plans and special measures adopted during construction to preserve existing vegetation cost less than the cost of restoration planting. Similarly, the preservation of existing soil, grass and trees, and the adjustment of all construction areas to conform to the dictates of topography, are the best preventatives of soil erosion and assurances of dust and erosion control.

Prevailing winds. The site should be selected to take advantage of winds but, at the same time, not to be too exposed.

Access. All potential campsites must be located near roads. Larger camps should be near railroads or airports.

(C) *Site planning*

Camps must be planned units, and the plans must enable authorities to administer and control all related activities with maximum flexibility and minimum effort. Considerations in site planning include:

Layout. Due to the limited sophistication of planning techniques, overall camp planning must involve a "use area" approach. This entails assigning each land area a particular use (e.g. housing, administration, etc.), then integrating these into an overall system. In most terrains, standard designs can be adapted for use. The delineation of use areas provides the basis for circulation (road and walkway) and drainage systems. Efficiency of operation should be the prime consideration in the arrangement and relationship of areas such as housing, motor storage, warehouse-utility and recreation. Where economies in construction may be made by adjusting plans to topography, the housing or other areas may be spaced farther apart. Savings in such costs, however, may be cancelled by the cost of additional roads and utility lines.

Sanitation. Each camp must be built around a sanitation plan. Especially crucial are latrines. In a large camp, the number necessary to adequately serve the population can be staggering, and placement of latrines can be a major problem. Also included in sanitation planning should be areas for washing and laundry.

Housing. The provision of adequate housing must be considered with great care. Where permanent buildings are not available, a variety of temporary structures may be used, depending on the climate and terrain. In selecting and siting housing, consideration should be given to family size; social structure (extended families, individuals, tribal units, etc.) and traditional living patterns. If, for example, the camp is to be composed of members of a village, a housing arrangement which is similar to the evacuated village may facilitate the refugees' assimilation into camp life.

Drainage. Good drainage is essential to the camp plan; if the camp cannot be drained adequately, the result will be an increase in disease. Provision for adequate drainage in the early planning and construction stages will reduce time and cost of construction. Problems in draining various areas of the camp should not be treated independently from road drainage. Necessary excavations and grading should be considered in the preliminary studies and shown on construction work to minimize hand labor. The work should be planned for machine grading if available, but plans based on hand labor may be more realistic.

Circulation and transportation. Each camp should have a road system including approach and internal roads, major walkways connecting the various use areas, and local footpaths. The entire system should be above the local flood level and should be designed in conjunction with the drainage system.

Water. If a public water system is nearby, connections to the camp may be possible and the important problem of a satisfactory supply may be solved. Where the only sources are wells, springs, streams or ponds, these must be tested for quality and quantity and, when in use, should be continually checked by a physician so that all necessary measures against pollution/contamination can be taken. If possible, water points should be established throughout the camp.

Fire prevention. Selection of sites for individual structures is based upon the function of the structures and upon fire

prevention procedures. In areas of temporary-type construction, the following fire prevention provisions should be made:

Firebreaks of width 50 m every appropriate one thousand feet of built-up area.

Spaces between buildings of frame construction should not be less than these minimums: one-story, 15 m; one-story and two-story, 20 m; two-story, 20 m; isolated warehouses, not including platforms, 25 m. The preferred separation between the sides of warehouses which do not face railroad loading platforms is 30 m.

Spaces between tents should not be closer than the following minimums: tents measuring less than 5 x 10 m side by side, 2 m; rows of tents end-to-end, clearances of 10 m; tents and other types of structures, 10 m; every 300 m of tent-occupied area, a firebreak of 25 m.

Waste disposal. In large camps, the problem of waste disposal can be overwhelming. Areas and facilities must be planned for collection, transportation and disposal of both solid and liquid wastes.

Administration. All administrative functions of the camp, such as medical facilities; warehousing; vehicular storage and parking; educational facilities and general administration should be placed in a physically central location; in larger camps, many functions can be decentralized. All administrative areas must be above the flood level.

Lighting and power. If existing electricity lines are not too far distant, temporary service may be possible; if not, generators should be used. Proper lighting must be installed as soon as possible. Whilst it will assist administration in many ways such as keeping down disturbances, the singular most important benefit is that it will reduce the incidence of night defecation in areas other than the latrines.

Recreational areas. As the number of refugees increases, so will tensions, so that at least football-pitch size areas must be designated and preserved for organized recreation. They can also be used for other programs such as camp meetings, etc. If possible, recreational equipment for small children should be provided.

Security. Arrangements should be made to provide areas and facilities for camp guards, police and fire personnel and equipment.

Commercial areas. In many camps, planners may wish to establish areas for commercial stores, refugee work centers, or cottage or light industries, so that refugees may help to support themselves.

Signs. A series of signs should be developed for both residents and visitors; they should be both graphic and colorful, in both the local language and the language(s) of principal foreign relief organizations.

(D) *Camp development programming*

A balanced plan for construction and improvement of a refugee camp is called a Camp Development Program. The CDP is a vital link between the camp's master plan and the actual construction of facilities. If a detailed CDP is not undertaken before construction, there is a high probability that improvements will not be realistically paired with resources. By camp development programming, needs can be identified and priorities established in line with available resources; thus, these resources can be better used.

The purpose of the Camp Development Program is to develop an orderly schedule of permanent improvements needed by the refugees. The CDP aids in determining needs, establishing priorities and analyzing the government's ability to bear total costs. The proposed – or concept – plan of the camp identifies in general terms what the government wants to accomplish; it is vital to the relief effort because it lays out a plan for financing improvements as well as scheduling activities.

The processes outlined here are applicable to all phases of refugee camp development and are recommended as a guide. Preparation of a Camp Development Program calls for the following steps:

An inventory of needed site improvements including cost estimates and an initial evaluation of their relative priority.

Analysis of past camp improvements and various systems' workability.

Analysis of project requests from assisting relief organizations, usually involving discussion with the sponsoring organization.

Investigation of the financing capabilities of the government and/or relief agencies.

Analysis of available material and equipment.

A schedule of project execution in a long-range program list which considers the relationships of the improvements to each other and overall material availability.

Selection from this schedule of a slate of improvements for early action. This generally takes the form of the development budget for the coming year.

Formal adoption of the development budget against the background of the long-range recommended program, usually after some form of higher review.

The preparation of the Camp Development Program must be a co-operative effort. The process should be initiated by the government through a communication asking for the co-operation of all involved and outlining the purposes of the program. It is important to involve all groups who will be working in the camp in the identification of projects because of their knowledge of the specific needs of the refugees. The government plays an important co-ordinating role by making sure that requested improvements conform to the government's ability to pay. The government must establish general objectives and, of course, be responsible for the execution of the program. Refugee leaders must also be involved because of their knowledge of immediate needs.

(1) Procedures for Programming. After the CDP has been initiated, several basic studies must be made. These involve three main areas – general information about the refugees to live in the camp; availability of money and materials; workability of proposals, and needed and planned projects.

Much of the information may be available from other studies or from personnel at other camps.

Background information. Including demographic information on current and/or projected population; geographic features of the camp site; the economy of the surrounding area; and other general matters. An examination of current services in the camps and their adequacy should be carried out. Past and present site improvement projects should be examined to determine their effectiveness, and the source and current availability of materials should be ascertained.

Financial analysis. The fundamental purpose of the financial analysis is to determine approximately the present and future ability of the government to pay for the construction and maintenance of site improvements by establishing the present availability of funds; by research into probable future trends in outside financial assistance; by appraisal of all factors related to the administration and operation of the camp; and by determining what limitations are imposed by prior commitments upon the government. In effect, this amounts to comprehensive financial planning for the camp. All avenues of financial assistance should be examined thoroughly. All possible factors that may affect the camp must be taken into account. The government must consider such matters as population change within the camp, rate of construction, etc. Estimates must be arrived at logically and should be accompanied by a complete explanation of how the estimates were calculated and what conditions might change the estimates.

Expenditures. It is important to examine both past expenditures, in order to get an inventory of low-cost workable improvements, and future expenditures, to help determine the government's ability to pay for future improvements. Two general types of expenditures should be examined: operational expenses and site improvements.

Operating expenses should be classified by major service areas. In most cases, the various participating organizations use convenient and meaningful classifications. Expenditures for each classification should be listed for the past 6 months. If major fluctuations occur from month to month, there should be a short explanation attached. Past expenditures are a great asset in determining future operating expenses. Estimates for operating expenditures should encompass the period covered by the Camp Development Program. Estimates of future operating expenses are normally based on past expenditures with adjustments for increases in camp population, general inflationary trends, etc. To a great extent, operating expenses are based on service levels provided by assisting organizations; therefore, in considering future operating expenses, the government must anticipate all increases or decreases in assistance from outside resources.

An analysis of past site improvement expenditures should be conducted. By examining past site improvement expenditures, the government can determine the feasibility of new improvements. It is also helpful to know how past improvements have been financed. Site improvements and costs should equal about 20% of the total budget.

(2) Inventory of Projects. Each participating organization should prepare a list of all projects, improvements or programs currently underway and needed in the future. Future projects should not be limited to just the length of the initial development program. A period of 5-10 years can be used in assembling a comprehensive list of all potential projects. Improvements can be identified from studies made during the design of the camp's master plan.

All organizations should prepare individual project estimates. Forms should be prepared for this purpose which include such information as a description of the project, its priority rating, justification, estimated cost, etc. A priority rating should be required for all projects; the following scale may be used:

Urgent: Should not be postponed. Essential to meet an emergency, to maintain present level of service, or to complete a project already underway.

Necessary: Should be carried out within an indicated period of time to meet the anticipated needs of the camp or to replace unsatisfactory facilities.

Desirable: Needed for proper development of the camp, but exact timing of these projects must wait until funds are available.

Deferrable: Improvements which may be needed for ideal operation but which can be postponed.

The following criteria are suggested for use in determining priorities of projects:

Will the project contribute to the protection of life and property, and/or the streamlining of relief services?

What is the relationship of the project to the welfare and progress of the refugees? Will the project enable the people to adapt to their new environment?

How will the refugees be affected by the project? How many will be harmed or benefited if the project is or is not carried out?

Will the improvement replace existing facilities which are obsolete, or is the item new?

Will the project add to the self-sufficiency of the camp?

How will the project affect neighboring existing communities and/or private property?

Will the general lifestyle or stability of the refugees be enhanced by completion of the project?

Will the improvement reduce or increase current operating costs?

(3) Review of Project Requests. It is mandatory to thoroughly analyze the project requests submitted. It is particularly important that projects conform to the master plan for the camp. Conferences should be held with participating organizations to gain a more thorough understanding of individual project requests. Certain improvements at this time may be shifted into lower priorities.

After the projects are reviewed and consultations completed, the list should be considered in its entirety. Total requests should be reviewed according to the general criteria previously listed. After final priorities are assigned, the first six-month Camp Development Program can be prepared. A Camp

Development Program Report should be prepared for distribution to interested parties and should include information such as individual project descriptions, priority ratings, justification, programming of the project, estimated cost by month, effect on the operating budget, and other factors related to the fiscal capacity of the government/agencies.

(4) Updating the Program. The CDP must be reviewed monthly and updated. It should be a continuing part of the government's budgeting process. Projects are reviewed to determine the progress of projects already started, and whether certain improvements should be continued, revised, delayed or eliminated. The process of review involves the same people who participated in the formulation of the original CDP. The process includes evaluation of the projects currently included in the program, as well as the extension of the program by 6 months, and a review of resources available.

Changes in the Camp Development Program may be the result of a change in priorities due to unforeseen emergencies, new sources of assistance, etc. A monthly review of the program will ensure that it reflects the most pressing needs of the refugees.

USE OF STANDARD LAYOUTS

In order to facilitate and speed construction – as well as to integrate the various objectives outlined earlier – a number of standard camp plans have been developed. Before reviewing these, however, the factors which may affect their selection should be examined.

The first factor to be considered is the terrain. All plans are based on geometry and order, and each one can be modified to some extent to allow for topographic variations. However, each has its limitations. There is no point in selecting a grid, for example, for use on steep, hilly terrain, nor a circular layout for a camp on a thin peninsula. Square or rectangular patterns work best on flat land; circular patterns work best on hilly terrain.

The second consideration is the estimated population of the camp. Some plans require more space per capita than others, thus the size of the population may be too great to achieve an acceptable density.

The types and sizes of the housing to be used is another major factor. Most layouts accomodate either single-family or multi-family shelters, but again an acceptable density must be considered; thus some layouts have been designed specifically for one or the other. Also to be considered is standardization of size and type. If a variety of shelters are going to be used, individual sectors or communities may have to be adjusted in size to retain the geometry of the plan. In some cases, the type of shelter used dictates the plan. These layouts, called "site-housing" plans, vary widely with the type of shelter and generally require more sophisticated planning.

It is necessary to determine the social, economic and administrative objectives of the overall relief program before making a final choice of layout. If the objective, for example, is to make the camp semi-self-sufficient, layouts must be chosen which provide space for gardens. If an objective is to encourage integration of the refugees into the surrounding economy, a layout with designated areas for small stores or shops (preferably near roads used by non-refugees) is desirable. If control and separation of the refugees from the surrounding community is a goal, layouts which reduce the feeling of isolation and encourage the development of self-supporting social structures within the camp itself are mandatory.

Finally, it must be remembered that a standardized plan is a concept of order. It must not be regarded as inflexible; rather, it provides a plan upon which immediate action can be taken, keeping in mind the variations which must be made due to situation and terrain. All of the above factors must be examined with regard to a realistic assessment of the resources available. Once compromises are made based on the priorities of the situation, a suitable plan may be chosen.

(A) Classification of Plans

Standard camp plans are classified according to the major limiting factor determining their choice. In most cases, the limiting factor is either the terrain or the type of housing. Thus there are three classifications of camps – open camps which require large, flat and open area; terrain-dictated camps which offer the only viable plan in a particular site; and integrated site-housing camps whose layouts must conform to the dictates of the shelter units being used.

(1) *Open class layouts*

The area must be relatively flat with only enough slope to adequately drain the site in a heavy rain. This class, is divided into two categories: grid and community unit camps.

Grid camps (Fig. 6). The grid has been the type most often selected in the past because it appears to be orderly and easy to lay out with very little supervision. Grid camps are composed of a series of square or rectangular use areas defined or separated by pairs of parallel streets or paths which intersect perpendicularly and form the use areas. The primary advantage of this layout is the simplicity of the design and ease with which various elements of the camp's sub-systems (water, drainage, etc.) can be integrated into the camp plan. This layout is also the one most always used to achieve high density, as the compactness and standard size of the various land uses require the least amount of additional space to delineate and separate individual areas.

It is precisely this tendency to use the design to achieve high density which makes the grid the least desirable of the designs proposed, for a highly dense refugee camp encourages the spread of disease and can encourage undesirable social conditions in the camp, all of which in the long run cause increased costs in administration and control.

The grid plan is most adaptable to flat, even terrain, but it can be modified for use in areas with slight elevations. The grid should not be used on hilly or mountainous terrain as the drainage and sewage systems will not function properly. Grid

Fig. 6. Photo of a typical grid layout (Sudan 1972). (Photo courtesy of the U.N. High Commissioner for Refugees.)

camps are quite similar in appearance to military camps and are often constructed by military engineers using "typical" plans for military site-planning. Herein lies a major problem – that camps laid out according to military needs (i.e. a group of individuals) neglect the basic requirements of adequate space for families and the needs of special groups in the refugee community.

Community unit camps. These consist of camps whose layouts utilize a small cluster or community of units as the primary planning component. Outstanding among these plans are the cross-axis, modified cross-axis, and a camp designed by Carnegie–Mellon University/INTERTECT for use with their refugee housing unit. The cross-axis camp takes its name from the design of the principal planning units which make up the whole camp. The idea consists of grouping four housing units into one planning unit, creating a "+"-shaped grouping wherein one axis serves as a road and the other as a footpath. Each housing unit is of identical rectangular size and abuts the intersection from a different direction. The groups are located around a central activity center creating a closed system with decentralized points for providing services. At each stage of development, additional units can be added as necessary without conflicting with the planning principles. The housing areas expand outward while the center of the camp develops independently into a central internal nucleus with complete administrative function and is separated physically from the housing area by a belt of open space (Fig. 7).

The most outstanding feature of this concept is the means by which open space can be provided without substantially increasing the density of the living plan – a small plot of open space remains at the center of each adjoining cluster. These open spaces can be used for a variety of purposes by the refugees and/or camp administration. Another advantage of the design is the flexibility with which expansion can be carried out in a uniform pattern of growth with retention of balanced installation of site improvements. An important design feature is the provision of various areas which can be used for decentralization of services, still maintaining a geographic center for major centralized administrative functions and overall control. The camp is not dependent upon the development of centralized water and sewage systems, but the design encourages their installation.

The cross-axis camp is designed for relatively flat areas but, by redesignation of walkways and roadways in certain sections, can be designed to fit into more rugged terrains by placing the camps between hills. (While the concept of the planning units can be thus adapted, the camp will normally lose the advantage of a centralized administrative center.) This is a more sophisticated design than the grid; but in the establishment of drainage systems, housing, etc. it is no more difficult than the

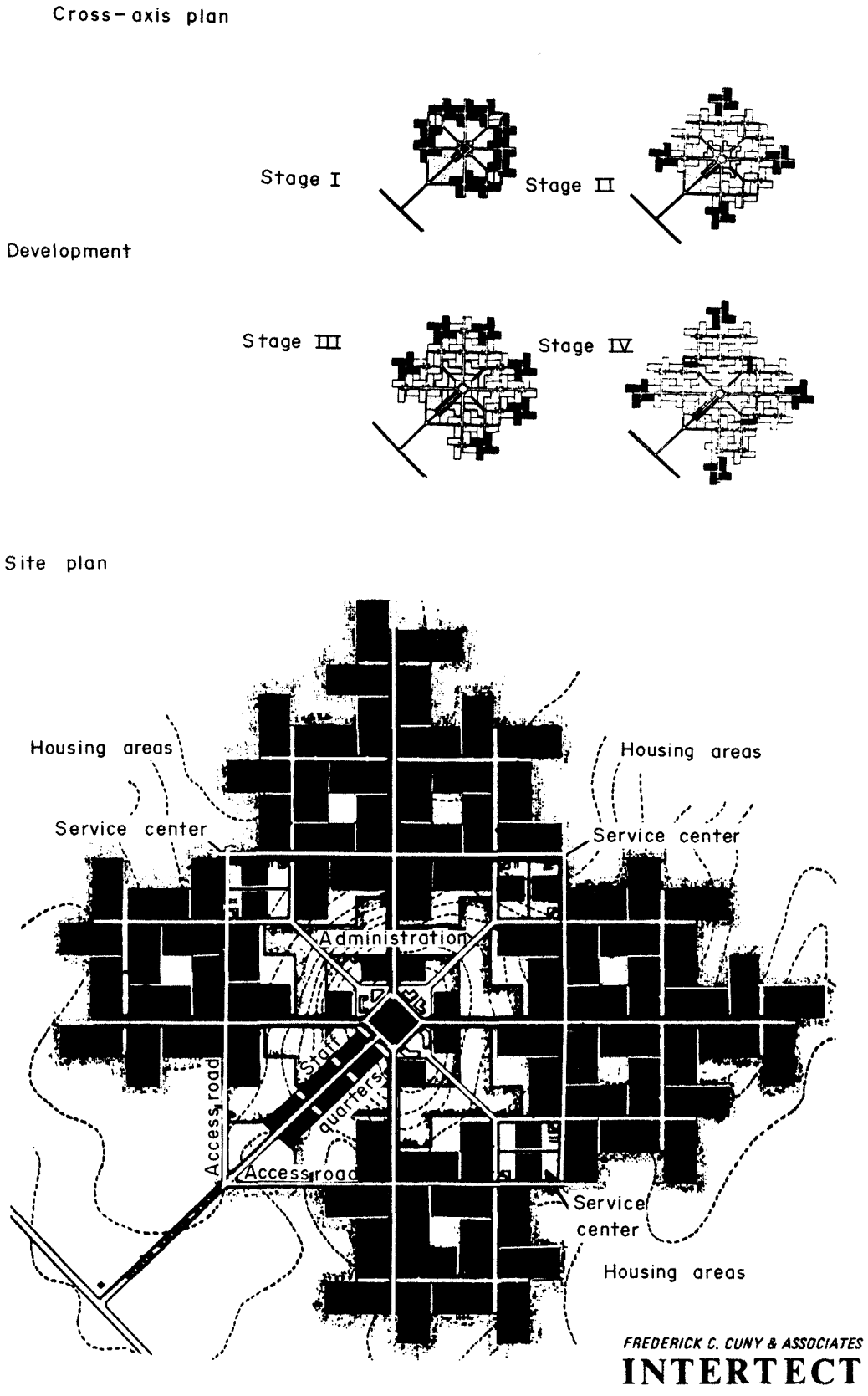

Fig. 7. Cross-Axis Plan.

grid plan. Overall planning will require full-time supervision, however, and in order to work properly, each planning and housing unit should be of uniform size and design.

The modified cross-axis plan utilizes the same general site plan as the standard cross-axis, especially in the road and pathway systems. It differs in two key aspects, however. First, the housing types utilized must be individual, or at most two-family structures. Second, the housing units are arranged to form small planning units or communities. This arrangement has proved to be the best possible balance of land use and density and is especially useful in camps using tents for housing. It is very adaptable and, by increasing or reducing the number of housing units in the individual planning units, landscape features (trees, ground cover, etc.) can be incorporated into the site without altering the overall design of the camp. The community units have proved to be an excellent basis on which to organize the camp residents. The common square in each provides space for group as well as individual cooking, washing, etc., and the limited number of people in each facilitates the tasks of social workers. In short, the design encourages the development of a "community" feeling among the residents (Fig. 8).

The design is the safest for use with tents. The road and walkway system provides excellent firebreaks; every community is accessible to emergency vehicles; and the cooking fires located in the center of each square are a safe distance from the tents. The design is also easy to lay out and requires no sophisticated equipment. In fact, in Nicaragua in 1973, this type of camp was constructed with nothing more than a hand-held compass and 1000 m of string.

The CMU community unit plan was developed by a CMU team for use in a Bihari camp in Bangladesh. The community units are long "U"-shaped areas, formed by large multifamily shelters (the CMU/INTERTECT Emergency Shelter Unit). The plan takes good advantage of local winds for cooling and still provides protection from extreme winds. The communities provide ample open space and, by design, relieve density. The camp is excellent for use with 3500 or fewer refugees; larger populations will require modification of the layout (Fig. 9)[10].

(2) *Terrain-dictated camps*

The second classification of camp designs consists of those which are terrain-dependent. These are not the best designs; but given the topographical constraints, they are the most balanced. The first of these is the circular camp or Eaton Plan§, designed for use in hilly or mountainous terrain. If necessary, a number of circular units can be built in close proximity and the group can be administered as one camp. Such a group is actually a regional plan, made up of a series of satellite camps designed to represent "villages" within the total camp structure. Each village is built and operated separately

§Named for the designer, J. Craig Eaton, AIP.

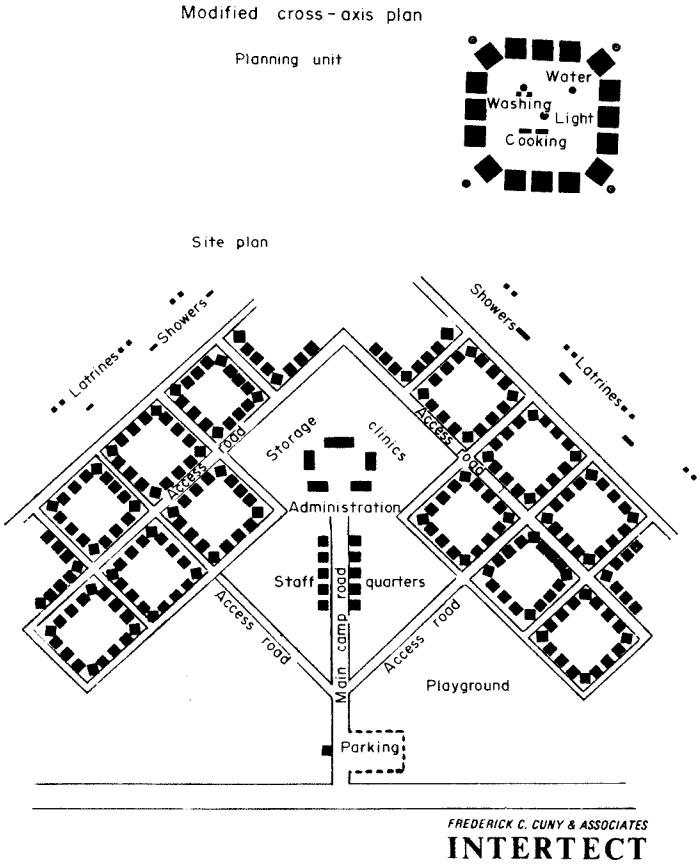

Fig. 8. Modified Cross-Axis Plan (see also Fig. 2).

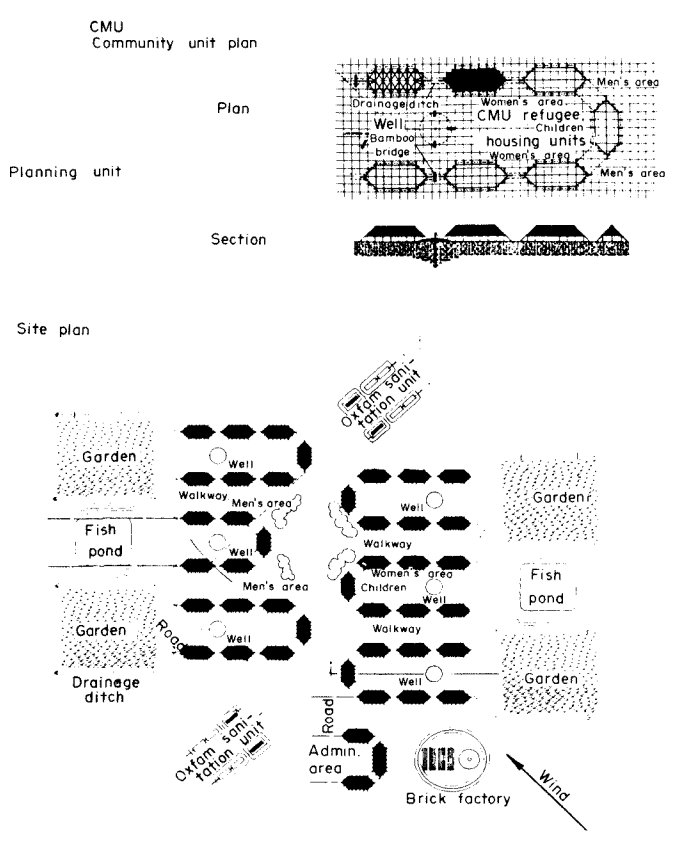

Fig. 9. CMU Plan.

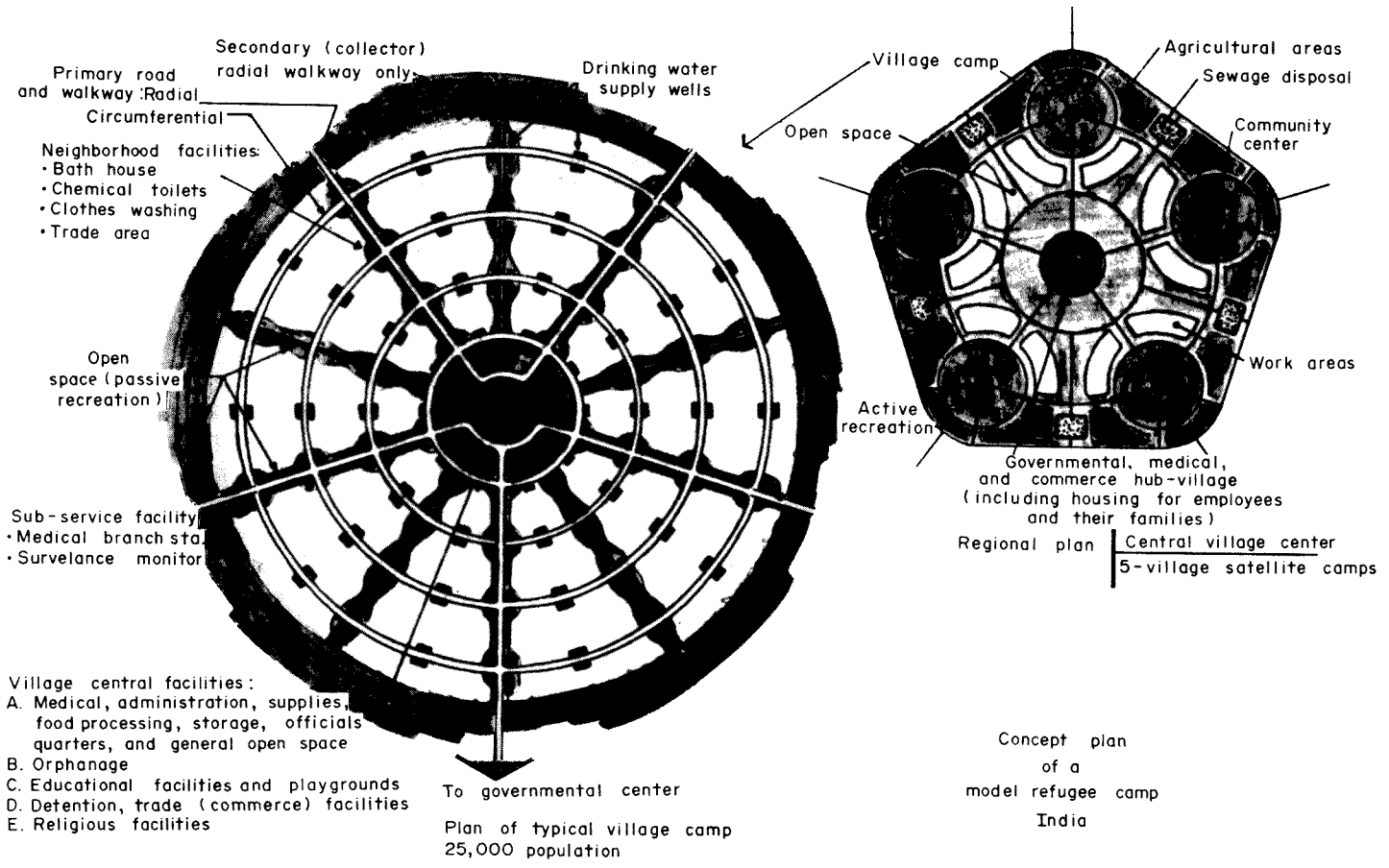

Fig. 10. Circular Camp Plan.

from the others but is co-ordinated from a central administrative complex at the center of the completed camp. However, the concept is not fixed, and the total camp and the various villages can be modified in many ways. The modular satellite village can be developed singly or in any number up to seven without losing its design features (Fig. 10)¶.

There are many advantages to this, the most important being the ability of the authorities to control development. The circular modules are easy to adapt to terrain and thus a master plan can easily be designed and a maximum design capacity assigned. As the camp is built, each module expands in a regulated, uniform pattern to the maximum density. With any rate of growth, development can be balanced, and the installation of improvements should be able to keep pace with occupancy. The camp layout facilitates – and to some extent is dependent upon – the development of decentralized site improvements such as water distribution and sewage facilities. Each unit or village can develop its own systems based on materials and terrain. The construction of central water storage and distribution points and scattered latrines/septic tanks is mandatory in each of the units.

¶Seven is the maximum number recommended due to the problems of administrative span-of-control. Odd numbers of villages are also recommended to keep a balance of open space and expansion area.

One of the key features of the concept is that it permits the retention of interior lands which can be used to develop resources which contribute to the maintenance of the camp. For instance, the lands separating the various villages might be used for limited agricultural production. By using new high-yield strains, several crops per year could be produced which could assist in some measure in lowering overall food costs. But more importantly, it would provide facilities for self-support schemes.

The circular design allows the installation of the road, drainage and sanitation systems to follow logical terrain features; and the actual requirement for lines and canals is reduced. Socially, the concept of a regional camp with clusters permits the integration of various groups of refugees into a single camp, whilst allowing them to maintain a portion of their background or identity. In such a camp, it is possible to establish villages for groups, such as people from the same region or village, and/or religious/ethnic groups. In another example, displacees from other camps could be re-established as a unit in a new village, thus enabling any previous organizational efforts to continue with minimal interruption.

The second type of terrain-dictated camp is the linear camp. These are camps which – due to flooding, standing water or restrictive land uses – must be built adjacent to roads or on a long, narrow rectangular site. About the only thing the

planner can do is to attempt to break up the camp as best he can, and to decentralize the services as much as possible. If flooding is the reason for sticking to the roadway, labor teams should be organized to build small platforms on which small groups of housing can be placed. (In low water areas such as paddies, an alternative is to build the housing on stilts, but this is rarely a good solution.) Little can be done with this type of arrangement, however, and the best solution is to move to a better site as soon as practical (Fig. 11).

A third plan for a terrain-dictated camp is the triangular camp, which is designed for use on a peninsula or on irregular plots in urban areas. The layout depicted (Fig. 12) is for a small camp, larger ones should also be comprised of community units.

(3) *Integrated site-housing plans.*

In recent years there have been many breakthroughs in the field of low-cost housing for use in refugee camps. In many camps, the very design of the housing will determine the camp plan; thus the term "integrated site-housing" applies to any plan which is dictated or greatly influenced by the design of the housing units. One of the most adaptable designs is depicted in Fig. 13. It utilizes a completely standard building unit for all the buildings in the camp, both shelters and administrative structures. The plan shown is based on an Israeli pre-fab building system, orginally designed for rapid construction in new settlements. The same unit can be adapted for use with a tilt-up concrete building process, or the components can be made of wood. In any case, a camp such as the one depicted could easily be built; it would require special consideration due to the design of the buildings and the close proximity of shelter units. It should be pointed out, however, that this type of construction is initially more costly as units must be built of permanent materials (wood, sheet metal, concrete, etc.). The advantage is that a high density can be achieved and yet adequate open space can be retained.

(B) Summary

The designs illustrated herein are essentially concepts which can be used to guide the refugee camp planner and provide him with some alternatives to existing plans. However, each situation calls for particular design and planning work, and no pre-set plan can be made to fit each case. Every camp plan must take into consideration the situation and terrain, and there is no substitute for an on-site engineer or planner-in-charge. As noted earlier, a refugee camp is essentially a town and must be planned and constructed under the same design criteria but with greater consideration for the occupants. Town planning techniques such as cul-de-sac streets, integrated walkways, development of perimeter streets, etc., are all adaptable to camps.

If the camp planner uses his imagination, follows a balanced plan, integrates services and facilities properly, and maximizes the use of every available material, a decent environment can be built in which refugees can live until they can return to their homes. And if the camp planner has done his job well, many former refugee facilities can be converted to other uses by the host country once they have ceased to house refugees.

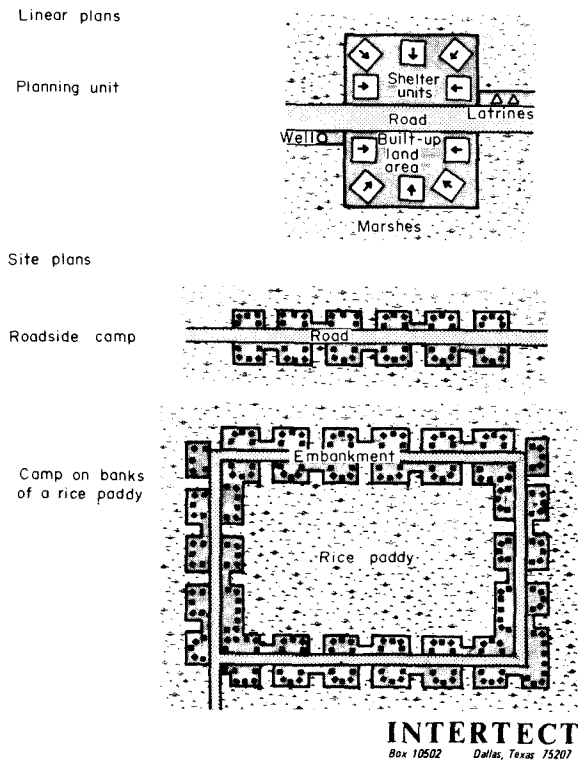

Fig. 11. Linear Plan.

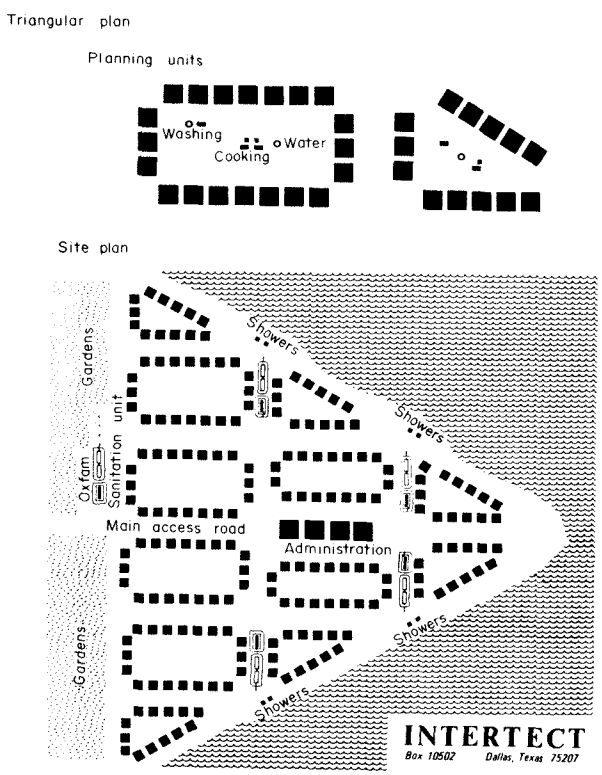

Fig. 12. Triangular (Peninsular) Plan.

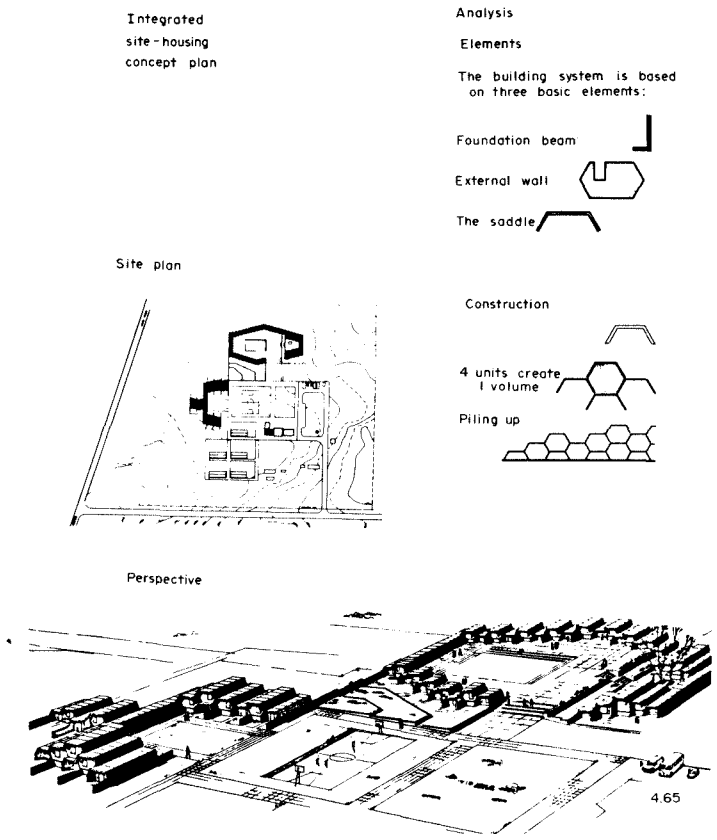

Fig. 13. Integrated Site-Housing Plan.

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