A THESIS

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ON

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THESIS ABSTRACT

The object of my thesis is to investigate the adequacy of medical and health facilities in Bichi District of Kano state. It is obvious, from research that the provisions for medical and health facilities are grossly inadequate, in scope and ineffective in serving the people of this area.

I also require to investigate the architectural implications of providing one or a group of needed health facilities.

In view of this, I reached the conclusion that the people of this area needed not only one complex Hospital, but a wide distribution of fill the types of health-care facilities located in various points within the District-to have medical and health facilities at within the doors of the people of the area.

A master plan for the district has proposed for the provision of one full-fledged General Hospital, a district Hospital, three Comprehensive Health-centres, and six primary Health-centres.

Thus, my thesis is to take up, the proposed District Hospital, bearing in mind, the areas of medical care, which the people require the most.

LIST OF CONTENTS

PAGE

TITLE PAGE.....(i)

THESIS ABSTRACT.....ii

ACKNOWLEDGEMENTS.....iv

INTRODUCTION.....V

CHAPTER ONE - THE SITE.....1-13

CHAPTER TWO - THE DISTRICT HOSPITAL.....14-55

" THREE - THE DESIGN 56-62

" FOUR - SCHEDULE OF ACCOMODATION AND SPACE REQUIREMENTS.....63-64

CHAPTER FIVE - CASE-STUDY 65-67

BIBLIOGRAPHY..... 68

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INTRODUCTION

I have noticed with great concern the gross inadequacy of the provision of medical and health-care facilities to the people of Bichi, and have made a study of the various health-care needs of the people.

With this, I found it necessary to design, as a thesis, an Hospital to carter for the people of the District of Bichi. With the proposed master plan for the town, in which has a proposed District Hospital, I was able to work out a concept study to guide in the execution of a succeessful Hospital Building which the People could use easily and satisfactorily.
A concept of two important Hospital streets running parallel to each other with health-care units attached perpendicular to them, has been adopted here,
(Hospital street"- meaning a wide corridor of not less than 4.0m in width to accomodate the movements of patients, staff, visitors etc.)

The overall complex itself is grouped into systems, with the supporting systems going hand in hand with the medical care systems, in which case one cannot go without the other. One problem involved in the study of the District Hospital is the case of

cont.....

Patients' and staff circulation and departments relationships; however; the concept adopted has to a large extent solved a lot of these problems. Site planning, was yet another of the problems involved in this particular proposed Hospital as the planners of the town have chosen a site not according to the rules of general selection of Hospital sites. In anycase, the concept adopted has helped alot in the general site planning of the complex.

I have resolved to designing the most possible simple layout and simple structure, but providing the necessary medical and health-care facilities within the complex.

CHAPTER ONE

"THE SITE" (BICHI) (Extract: Bichi Master Plan)

LOCATION:-

"The Site", located in Bichi, a town, 45Kms away from Kano metropolis, is proposed by the Kano state Urban Development Board to be developed into a modern District Hospital to cater for the growing population of Bichi town.

Bichi, is the Headquarter of Bichi Local Government. The town's geo-political relationships to Kano-City and its administrative structure are significant to its growth. Its also the first most important settlement on the international highway linking Nigeria with the Eastern region of Niger Republic.

CLIMATE:

No reliable climatic data exists for Bichi, however, Kano's climatit data and inferences will be used.

There is a relatively wide and rapid change in temperature and humidity. Averages annual rainfall is about 870mm most of which falls between July and September with the highest amount (above 30mm) falling in August.

The months of Jan. Feb. & March are not only the driest but its this period that the worst effects of the dust-carrying harmattan winds are experienced.

TOPOGRAPHY:

Bichi as a whole lies on a gently sloping ground, falling from the east of the town towards a tributary on the west; and from the T.T.C..(Teachers Training College) On the south towards the further south.

Most of its lands are flat except for the very unnoticed slopes and mostly around the rivers.

THE EXISTING BICHI

EXISTING LAND USE PATTERN:-
(Extract: Bichi Masterplan)

Qualitatively, Bichi is developing on either side of Kano-Katsina highway.

Generally the old portion of the town, with its walls and gates still visible at some places, is located on the North side of the road and the new development with its Chess-Board- type layout, is on the South side. The old portion is organically developed and the new part appears to be planned.

Buildings are generally made of mud. Roads are of varying width with laterite surfacing. A park behind the District Head's Palace. Open space in front of the Central Mosque is well Organised. Apart from the market area and the local government offices, which form specific land-use zones, most other uses e.g. (industrial, commercial, public, semi public) are developed in a mixed land-use pattern.

Qualitatively, 79.7% (93.1 hect.) of the total area covering the present Building activities, is developed. The rest 20.3% area is undeveloped and is either lying vacant or used as agricultural land. Among the land use patterns existing in Bichi, is the public and semi public; which is devoted to about 4% (3.6 hectare) of the total developed area. It covers local Government Offices; schools, Health i.e. (the existing Dispensary), religious and other Government places. All these activities are haphazardly located and there is need to spatially re-organise them. The quantity of land devoted to this use appears to be less.

AVAILABILITY OF UTILITIES, SERVICES AND FACILITIES EXISTING IN BICHI

(1) DOMESTIC WATER:-

The deep force-hole supplying station, located about 10Km south of Bichi on Kano Road is the main source of domestic water. It has been found that the present water consumption for Bichi population is far beyond the capacity of this station. Out of the 74% of the households who have access to piped water, only one third enjoy house to house connection.

(2) ELECTRICITY:-

At present, Bichi is served by a small power station having a very limited capacity (9418KWH). Electric installation network has already been completed in all parts of the town and the town could be connected anytime from now, to the national grid.

(3) HEALTH SERVICES:-

The entire populations of Bichi (10,000) is served by only one dispensary, which also offers maternity clinic twice a week. The daily attendance of the dispensary ranges between 200 and 300 patients from Bichi and the sorrounding villages.

For the Maternity Clinic the medical staff comes from Kano. This service is grossly inadequate and there is a need to argument it.

As far as the publio health service is concerned, the street cleaning is a daily activity limited to certain parts of the town; garbage collection is done twice a week from communal bins located only at certain points of the town; In the parts of the town not served by proper waste collection and disposal system; garbage from houses is dumped on streets and open spaces.

There is no proper drainage system for the surface water and the waste from the houses. It is sometimes a real public health hazard in places where water is not naturally drained. In some parts of the town streets are full of waste water. The situation in the vicinity of public water strands is specially chaotic.

It is felt that a proper drainage system is urgently needed for the town.

(4) OTHER FACILITIES AVAILABLE ARE:-

(a) Educational facilities.

(b) Religious facilities

(c) Postal Services

(d) Police Services.

(e) Transportation Services

(f) Recreational and sports facilities.

POPULATION CHARACTERISTICS:-

The demographic census of the year 1952 gives the population of Bichi as 6,021 and that of 1962 as 5,537. The decrease was found to be caused by the out-migration of job-seeking males. There is no official statistic for the present period except the estimation made through the 10% socio-economic survey of September 1979. According to the survey the present (1977) population of Bichi is 10,382. The increase in this case, was mostly due to the fact that some people who find it c convenient to work in Kano, live in Bichi being forced to do so by a high rear and the deteriorating housing environment in Kano due to housing shortage. Moreover, being a district headquarter and an educational and Commercial centre, for the immediate region, Bichi town attracted some population from surrounding villages.

* EDUCATIONAL LEVEL OF BICHI POPULATION (SEPT. 1977)

Secondary and above	Elementary	Quoranic	Illiterates
7.4%	25.6%	47%	20%

* Some of the main occupation of the population are

--Agriculture

--Mining

--Industry

--Trade and Commerce

--Government Planned Projects.

* SITE SURVEY

LOCATION:-

The site is proposed in a masterplan prepared by the department of Urban and Regional Planning of the Ahmadu Bello University and adopted by the Kano State Urban Development Board to settle an essential and expected population of 100,000 for Bichi in the near future.

SITE ANALYSIS:

The site is beautifully located as it is as near as possible to the geographic and population centre of the community. The proposed Hospital will be easily reached not only by patients, but also by doctors, visitors, nurses, suppliers etc.

Except for some few environmental effects which I have made out proposals to combat them.

The most important of these are Noise, Odours, and dust, which the site should be free from.

(i) The western part of the site is bounded by a highway used as a by-pass mostly by heavy-duty vehicles , so will produce noise hazard to the site especially in the nights.

(ii) Further west, 160m away from the site is located as Agricultural Centre. 350m away you meet the Banks of the Matari river, whose effects would be to blow cold air in the night, and possibly be used significantly by the site.

(iii) A road running directly in front of the site, towards the west, leading to a Teacher's Training College, and towards the east, leading to the Central Bichi town.

This road, from traffic survey is found to have peak hours between 11-12 A.M. and 5-6 P.M. and has very few traffic throughout the day, so its very much less congested. The road forms the longer side of the site, and so I have proposed my best entry point along this side. Further north, immediately after the road, is a proposed organised open space; whose effects on site might possibly be the fact that, if unproperly kept, the wind blowing from NW, especially the harmattan winds, will bring serious dust hazard to the site, which is tentative that a Hospital should be free from. Buffer zones are therefore needed between the road and the open spaces, and between the road and the site.

(iv) 200m further north is the industrial zone. The industries proposed here are strictly small scale and should have no pollution at all. But there is a possible noise-production from the industries, whixh with the effect of wind can travel more than 300m. So will obviously disturb the Hospital which should be free from noise. Buffer zones will also help here.

(v) The Eatern part of the site has the medium density settlements with about 125 persons/Hectare, and from this direction, the proposed Hospital will have the maximum approach. There is a road directly beside the site running from North to South, and is a very busy one with the tendency of pedestrians crossing the road all the time, thus making this sode of the site, which is also a short site-line, very congested. It could have been a good entry point to the site, but for the busy road. It is also a possible noisy zone.

(vi) The southern part of the site has a low density settlement and it is a proposed G.R.A. and so it is a possible quite zone with 75 persons/Hectare.

It also has the minor approach of patients to the proposed Hospital and therefore must be proposed an entry point for the population in this area.

(vii) AMBULANCE ENTRANCE:- Ambulance entrance to the emergency unit of the Hospital should be carefully located to have direct, non-stop-driving to the unit.

This, from the above analysis of the site, is found to be best suited around the eastern part of the site or better to the maximum approach of patients to the proposed Hospital.

* The eastern site-line is ruled-out for the fact that the road is a busy one with primary pupils/Pedestrians/ ~~trians~~/Vehicles congestions.

* The west is a by-pass and away from the best locations for the emergency unit, so its also ruled out.

* The North, along which is the proposed main gate, could have been the best point of ~~early~~ entry, but for the fact that, at least, 800-1000 patients a day will continuosly go in and out of the main-gate, brings another possibility of having to stop sometimes at least for pedestrians.

* So the best, and less gongested area to locate the entrance is after considering movements of pedestrians along the main gate. By this, I mean that its position tion should be away from the pedestrians movement.

* The site measures about 706m x 177m and is expected to give a full conceptual planning for a modern equipped Hospital to serve a population of 100,000 and to be well-planned in such a way that it contains and accomodates, all the facilities needed by this large population.

PLANNING AND DESIGN IMPLICATIONS:-

In view of the fact that the climate of Bichi is the HOT ARID type, some of the mojor planning considerations are given below:-

(a) Combination of dry and still air during the dry season results in noise problem because sound is transmitted over great distances, unless impeded by a buffer either natural or man-made.

(b) Buildings should be compact so that houses or parts of buildings are naturally shaded.

(c) Paths and arcades should also be shaded to protect pedestrians from sun.

(d) Large open spaces are to be avoided because they are usually unkept or are unlikely to be used due to intensive solar radiation.

For the detail building design, the following implications have been identified.

(a) Air Movement:- Generally, rooms should be single banked with windows in the North and South walls to ensure air movement by means of adequate cross-ventilation.

(b) Layout:- Buildings should be oviculated on an east-west axis, the long elevations facing north and south so as to reduce exposure to sun.

(c) Openings are to be of medium size.

(d) Both internal and external walls should be massive.

(e) A heavy roof with subtantial thermal capacity, giving a time-lag of at least 8 hours is essential.

(f) Between the months of April and May, the climate is usually such that people prefer to sleep in the open. Patios and Verandahs could be provided for outside sleeping.

CHAPTER TWO

THE DISTRICT HOSPITAL

The Health-care bilding types, can be classified into the followings:-

a) Dispensary

b) Clinic

c) Health Sub-Centre (or primary health centre)

d) Comprehensive health - centre

e) the Hospital i.e. General, Specialist; Psychiatric; etc.

The Dispensary, being a health-unit serving about 110 persons per day in the sparsely settled areas

The Health sub-centre serves about 220-250 persons per day in a medium settlement.

The Comprehensive Health-centre serves about 500-above persons per day in densely settled areas and does not provide for in-patients services.

- The General Hospital, however, is a bigger comprehensive health-centre with bigger and more equipped facilities. Sometimes, some hospitals are made to be teaching hospitals and some are specialist, while others are specialised in one or two curative processes,

like the Mental Hospital; maternity, Dental etc.

But these days, Health Centres perform the same functions as the big Hospitals, as the size of any health care system depends on the number of beds it can accomodate and the population it serves, and also the number of facilities it can provide to the demanding community. So that the basic difference between the health-centre and the Hospital is that the Hospital provides for impatients services while the Health-Centre does not provide for that.

HEALTH CARE SIZE:-
(Extract: M.A. Ahmed B.SC Thesis 1976)

The number of beds in any Hospital determines its size and the provisions of other supporting services.

Generally, bed-need varies as a result of community differences, such as age - distribution, marital status, sex distribution, degree of urbanization etc. Some countries, with the above factors taken into account establish a standard with which hospital planning is done. Egypt had made in 1965, 3beds/1000 population as its standard planning guide.

America used 10beds per 1000 population while NIGERIA has recently recommended (1975) 5beds/1000 population for its current development plan period. However, the NIGERIA MEDICAL ASSOCIATION, after considering our local problems of lack of enough medical personnel and low technology, as well as people's response to medical care, recommended the use of 2beds/1000 population in rural areas; and 3beds/1000 population in urban areas.

THE PROPOSED FUNCTIONS GENERAL SYSTEMS IN A HOSPITAL

For the purpose of looking at the Hospitals functions with a critical eye, it arbitrarily divides it into six systems.

(1) THE PATIENT HOUSING SYSTEM

The basic reason for the Hospital existence and the focus of all its operations is the PATIENT. The greatest part of his stay, sometimes all of his stay; is spent in a bedroom. Most of the things that happen to him in this room are things that could happen to him in his own bedroom at house. The Hospital must then contain bedroom which may be considered the patient's housing system.

(2) THE THERAPY SYSTEM

Another block of functions comprises those things that are done to or for the patient in a diagnostic or therapentic sense. The INPATIENT is usually brought to the areas where there things are done, while the OUTPATIENT usually walks to them. Since all of them contribute to the curative processes, these functions may be called the therapy system.

* All other activities in the Hospital while no less and no more important; function in support of housing and therapy systems. But because they occupy space and employ people, they must also operate mutually in support of each other.

(3) THE SUPPLY SYSTEM:-

Because every activity requires things to work with, there must be a system to supply a wide variety of merchandise. The problem function within this system is that of distribution. This function is complicated by the far-flung locations of the units that comprise the patient housing and therapy systems and also by patient needs that tolerate no delays.

(4) THE HOUSE-KEEPING SYSTEM:-

Patient and worker alike must have their domestic needs provided for while they are away from their homes. The functions that satisfy these needs are involved with cleanliness and feeling.

(5) THE UTILITIES SYSTEM:-

All the Hospitals functions must be sheltered and protected against the elements. They require some degree of controlled environment; that processes power to be supplied in various forms. Thus the major function of this system is operation of the mechanical plant.

(6) THE ADMINISTRATIVE SYSTEM:-

The final group of functions to be indentified comprises the administration and business system. These operations of course include those of ultimate co-ordination and flow of the Hospitals economy. Through its admitting function, this system controls the influx of patients and their disposition through the housing system. Through its purchasing function merchandeise is required to feed the supply system.

* All the systems above, or allied groups of operations fall into two groups:-

(a) PATIENT CARE OPERATIONS- Composed of patient housing and therapy-

(b) SUPPORTING OPERATIONS:- Composed of supply; housekeeping; utilities; administration and business, (Also called the ANCILLARY SERVICES.)

VIEWS OF DIFFERENT HOSPITAL ARCHITECTS PLANNING THE DISTRICT HOSPITAL BY "ROY HUDENBURG"

THE HOSPITAL TRAFFIC:-

Because of the fixed location of the patient, the personnel of the Hospital seems to be endlessly in transit. Now that few workers perform useful labour when they travel around, the goal of good planning must then be to eliminate the need to travel and to shorten travel distances. For this reason, a fresh view of who travels in the Hospital may be helpful.

The planning of Building in General consists of devising spaces to shelter people and to facilitate their activities. In order to device such spaces the planner must ascertain who should be employed, where they should perform their duties, and what those duties should be.

The five classes of people who create the traffic in any Hopsital are the - IN?PATIENTS; OUTPATIENTS; EMPLOYEES; STAFF PHYSICIANS; AND VISITORS.

(1) THE PATEINT ADMISSION TRAVEL:-

Through the admissions office, contact is made with three more employees of the Hospital as yet unseen by the patient. In the process of admission, various forms that will become part of the medical records are initiated and sent to the medical records librarian. Notices of the patients arrival are also sent to the dietition and to the accounts receivable clerk.

As a result of the completed admission, the patient has become a complete responsibility of the Hospital. Even though the patient may be perfectly able-bodied, he now finds his trip must be made in the safety of a wheel chair, which will be pushed by a messenger. * Note that messengers are not necessarily confirmed to one sex; and the patient's weak grin may now become more embarrassed if his escort turns out to be of the feminine variety.

The patient departs to the nursing unit and this journey is interrupted at the nursing unit desk where he sees the ward clerk, who is handed the various documents that were prepared in the admissions dept.

The admitting routine, of course, has variations. Some patients in emergencies must be put to bed immediately for mediaal care, while others must be taken directly from the emergency department to SURGERY, sometimes by way of the X-RAY Dept. Some women for example would be transported immediately to the obsterical dept. if they are about to deliver.

Impatients are not heavy travellers. They are occasionally conveyed to radiology or to Physical therapy; they may even make a single trip to the Surgical or obsterical suite. Out patients travel is tending to become heavier as more members of the Community look to the Hospital for a greater share of their medical care.

BEHIND THE SCENE:-

Many employees of the Hospital are never seen by the patient. The area of Administration and business includes the Purchasing staff; personnell specialists; storekeepers; clerks; accountants; and stenographers. There are production activities with workers in central sterile supply and in the laundry; there are cooks; bakers; and dish washers in the dietary dept; there are Pharmacists and Pharmacy assistants.

Some departments employ attendants with a variety of duties, usually including the movement of patients or things. There is a tremedous flow of paper in the Hospital. One part for the reception of paper is the Medical Records Department, which receives reports from X-ray; from laboratory; and from the nursing units; and handwritten or dictated material from many physicians.

In addition to the clerks who handle, co-ordinate and dispatch all of this medical records material, there is frequently a battery of medical records stenographers who transcribe dictated notes originating with the physicians. The tide of papers also include orders going to various services departments as well as charge memoranda that funnel into the accounts payable centres.

* VISITORS AND PATIENT RELATIVES:-

While visitors and patients relatives do not on the surface seem to complicate the Hospital, design; they must, however, be considered in mnay phases of planning: like - shall the visitors eat in the hospital cafetaria or shall they be limited to a snack bar; will waiting space be required to be adequate for waiting visitors when visiting hours are limited?.

What provisions are to be made for fathers whose wives are in the delivery room; for the relatives of the patients in surgery; for primary; and for consultation with newly bereaved families? Patient rooms and patient solaria should be designed also to accomodate visitors.

THE TRAVEL LINES:-

Mobility becomes the major preoccupation of the planner as he decides on the shape of the building and placement of its major componenets. There are ways in which the effort to move things can be eased. Decisions must be made as to which of the components have the most dense intertraffic, so that these may be placed close to each other.

But perhaps the most important planning decision has to do with the extent to which the Hospitals economy can afford equipment to move people, things, and information.

IDENTIFYING THE PROBLEMS

Because of its permanent quality, there can be no tragedy in the construction of a Hospital, or addition just completed and manifestly inadequate to meet the needs of the community. For example, it may have been perfectly obvious that the Buildings needed more beds, but if more beds were provided without identification of the total planning problem, the resulting imbalance of facilities could not help but aggravate operating problems and result in unsatisfactory services to the community.

The first rule in solving a planning problem is to identify its length and width and breadth. To become aware of the total aspects of the problem, the planner must study it with a fresh eye as though it had never been seen before.

An important dimension of this fresh perspective is time. What is the relationship between the problem today and how its solution is going to affect the needs of the community in far or twenty five or thirty-years to come.

NUMBER OF BEDS NEEDED:-

According to DR. Rourke's comments made at an annual conference of the Maryland-District of Columbia Delaware Hospital association; the following comments will serve very well to sum up his discussion:

1) Admission rates per thousand population
2) Average daily hospital census per thousand population
3) Bed-death ratio
4) Bed-birth ratio
5) Age group utilization
6) Federal government estimates
7) State and municipal estimates
8) Local utilization experience
9) Area-wide planning recommendations.

DETERMINE RESOURCES, MANNING THE HOSPITAL AND STUDYING THE PROPERTIES

Assuming that there has been agreement on "why we want to build", there must then be agreement on "with what are we going to plan and build"?. The answer to this question falls into three categories; DETERMINATION, MANPOWER and PROPERTIES.

Members of the governing body or board, would be called upon, one way or the other, to provide assistance and support during the course of planning, financing and construction.

With determination around, however, the manpower resources must be catalogued to be sure that those members of the staff who are not available within the community, will be secured from outside the community. For the proposed Hospital in Bichi, all facts are in evidence, specific agreement are reached by the responsible parties on:what the future community health plan will be,

- How this programm will be carried out.
- What facilities are to be built.
- and How much money will be spent and what kind of schedule.

* The governing board gave out some restrictions as to how the Hospital should be.

FUNTUA RURAL HOSPITAL BY M. SHEMU

GENERAL PROBLEMS

Difficulties of all sorts - economic, geographic and cultural, hamper the spread of modern health techniques in country districts. Thus., a rural Hospital must be flexible and energetic in action, it must be in the closest possible touch with an urban centre, well e equiped in staff and medicine. Thus, the question of communication is one of Cardinal importance.

TRANSPORT:- It matters little if the area surrounding a town is rural and sparsely populated so long as it is possible to remove patients to the town hospital in less than an hour.

PATHOLOGY:- Rural and Urban pathology are frequently foundamentally different, at least as regards the relative proportion of the different diseases. An intimate knowledge of these variations is essential in order to determine the type of service required in the Hospital, In the under-developed countries, where general health measures are barely beginning to be adopted more or less serious pathological conditions are the rule among the great majority of the people.

For example, in Egypt, about 85% of the people suffer from Bilharziasis. The co-existence of several diseases in one person is a common phenomea. In the tropical zone, gastro-intestinal infections and nutritional deficiencies are wide spread, and are probably responsible for the alarming number of infant death.

MATERNITY:- Child birth is a special problem of medical care calling for separate consideration. Normal birth does not require more than simple equipment and good hygiene habits, nevertheless, involve the life of 2 human beings.

Because of lack of Rural housing in under developed areas, service complications may often follow a relatively normal childbirth. In such surroundings ubbilical tetamis is life. Anaemia due to dietary deficiencies and post-partum haemouhaga also causes many deaths.

In primitive societies, the average post-partum rest is very short. In many districts of french tropical Africa, confinement cases spend not more than 3 days in the local hospital. All these things must be borne in mind when thinking of a big hospital.

SANITATION:- The magnitude of sanitation problems p produced by densely populated areas in under-developed communities indicated only one possible solution, the burning down of the villages and rebuilding them. Water is supplied by wells, or streams that are constantly contaminated by animals and human excreta.

The layout of villages often appears to have been left to change. In Egypt, the village resembles an anthill where at night sea and beasts are huddled together in a labylinth of alleys. In China, the villages pattern is determined by geometry of any other thing, and the houses are orientated to face the point by the compass.

Although this may seem to be more of rural town planning, the best possible siting for the hospital must depend on the type of place. In the case of conglomeration huddled together with no apparent reason, the only course is to choose a sufficiently isolated site outside.

STAFF:-

The most formidable obstacle to the siting of a system of medical care in rural communities in under-developed countries is the small member of medical practitioners who will agree to settle in such regions.

A certain disproportion between the medical density of urban and of rural districts is quite normal. Towards possess specialized hospital services and a health administration justifying the presence of more doctors. Specialist cases are much rarer than the ordinary diseases.

PERSONAL OBSERVATIONS:-

In my personal observations of the traffic patterns within different hospitals as there were no statistical data of traffic intensified within a Hospital generally, the following problems were identified.

a) About 80% of patients traffic to most of the Hoppitals go to the out-patients department.

b) About 10% of patients traffic to the Hospital go to the accident department, the physical medicine dept.

c) A relatively high number of people who are not patients go to the administrative dept.

d) The number of visitors to most of the Hospitals observed at visiting hours are normally too many and some of the wards can be observed to be too noisy and full of visitors during these periods.

e) Very few of the Hospitals observed have clear distinctions between the service entrance and the public entrance serving the patients, the visitors and probably the administrative and medical staff.

DESIGN SCOPE:-

There are two basic ways of choosing the scope of my Design. First is to design the proposed Hospital with all sketch designs produced; and the second attemative is to design the Hospital with a sketch design of an important element; say the ward complex.

BUT:-

1) My approach is to produce the sketch designs of the main and most important buildings i.e. places within the Hospital where patients receive treatments and diagnosis.
2) Then produce detail drawings of an interesting part of the sketch design produced - like the ward complex.

In (1) above, however, I intend to take up the sketch designs of the out-patient department; the accident and emergency department; and the surgical, X-ray, Pathology, Pharmacy and administrative departments

THE BICHI DISTRICT HOSPITAL:-

From the Hospitals functional systems mentioned earlier on I have divided my Hospital into four major complexes or systems: These are:-

1) MEDICAL AND SURGICAL COMPLEX - Consisting of -
   (i) Casuality dept.
   (ii) Out-patients dept.
   (iii) X-ray dept.
   (iv) Surgical Suite.

(2) THE WARDS AND MATERNITY COMPLEX:Consisting of:

(i) General Medical wards.

(ii) Surgical wards.

(iii) Peadearitric.

(iv) Maternity Clinic and wards.

(3) ANCILLARY COMPLEX:-

(i) Pathology.

(ii) Pharmacy.

(iii) Central sterile supply

(iv) Mortuary

(v) Kitchen main

(vi) Laundry

(vii) Works and Maintenance

(viii) Transport

(ix) Admin.

(x) Power and boiler House

CASUALITY DEPARTMENT:-

The sole purpose of providing casuality department is

- Reception and treatment of patients suffering from accidents.
- Providing necessary resuscitation prior to admission to an in-patient unit.

-Diagnosis and immediate treatment for patients suffring from a medical/surgical emergency.
- Out-patients minor surgery.

The location of the casuality department should be near the entrance with a separate entry for ambulances, with stretcher loading/off-loading arrangements. This department should also have an easy access to the X-ray department and main surgical unit.

STAFFING PROPOSAL:-

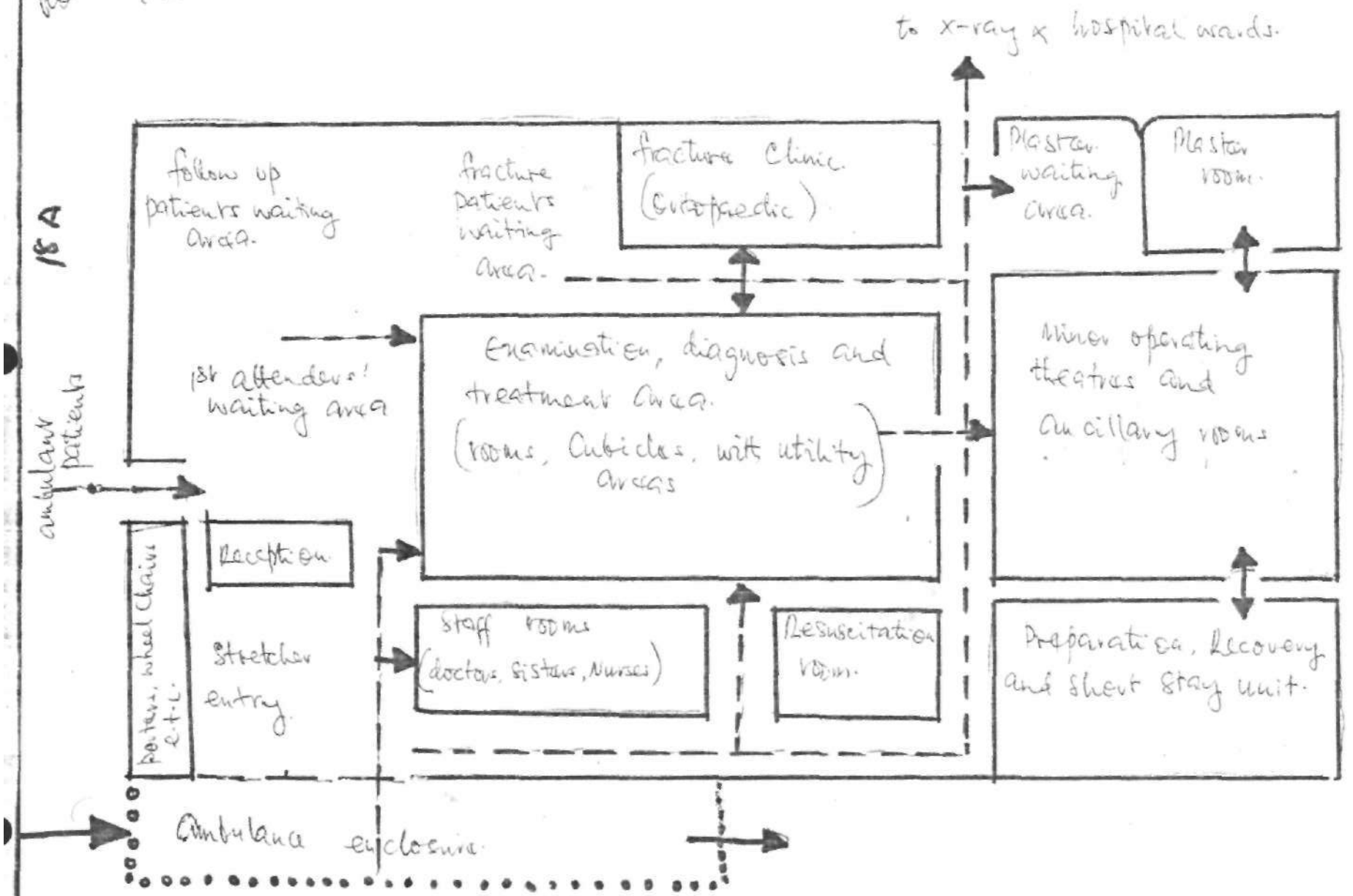
The unit should be administered directly by the medical superitendent, with a nursing sister assisted by six or eight nurses providing 24hrs service among them. A resident Physician and a resident surgeon should be an call with two house doctors being stationed there full time alternatively. A further allocation of service staff including stretcher bearers is also required for this department.

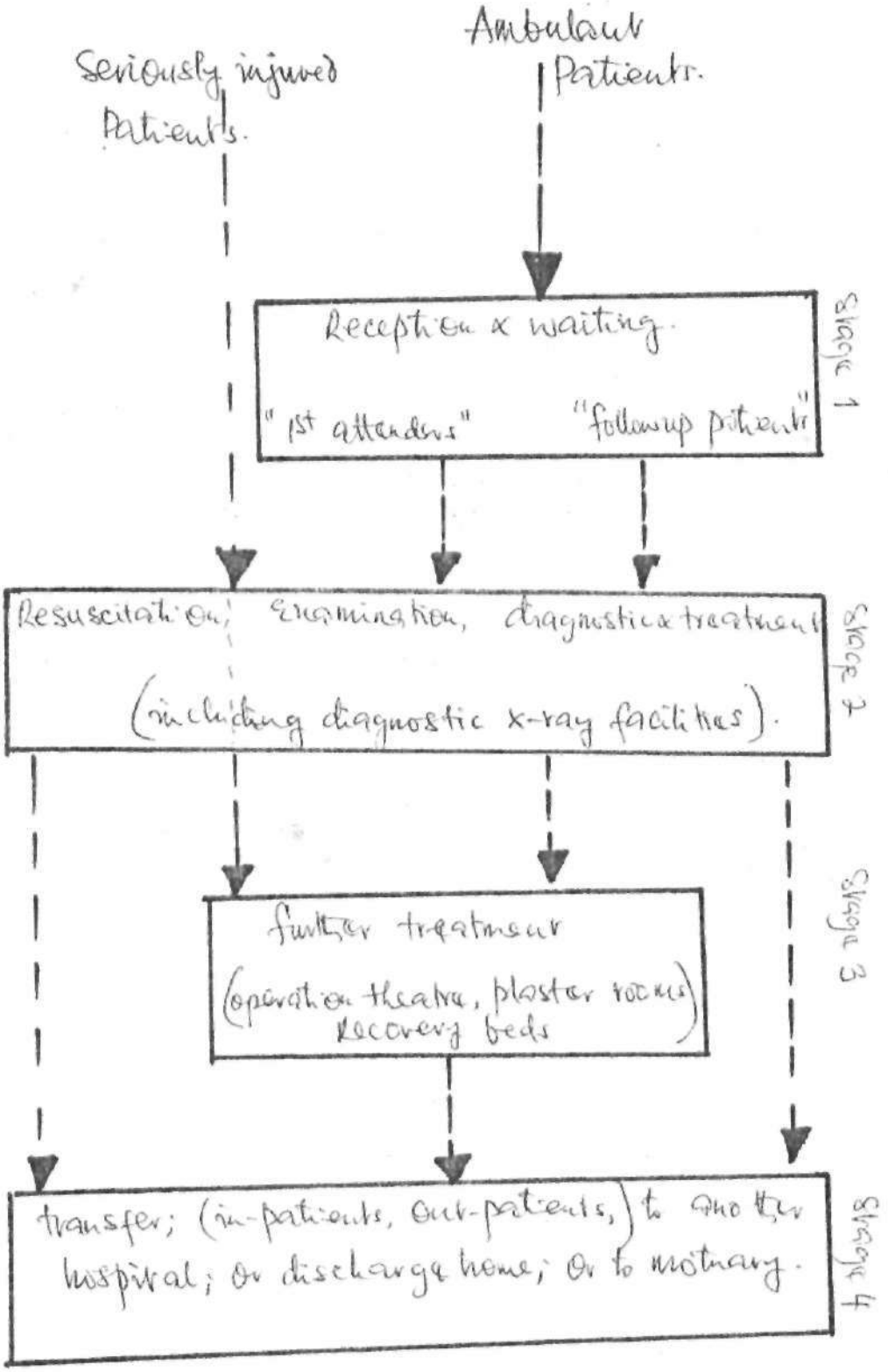
- The proposed accomodation requirements area.
- Reception, record and waiting areas, offices.
- First aid, plaster room.
- Examination and treatment room.
- Operation theatre, recovery and observation, anesthesia scrub up.

ACCIDENT & EMERGENCY DEPT. (DIAGRAMMATIC LAYOUT)

note

18A





FLOW DIAGRAM OF PATIENTS THROUGH AN EMERGENCY DEPARTMENT

- Sterilizing room/store/supply.
- Stretcher/linen/general stores.
- Nurses/doctors and staff changing rooms.

OUT-PATIENT DEPARTMENT:-

The most important facility that the Hospital is to provide is that of an out-patient diagnosis service to the large population living in the vicinity.

This becomes necessary in order to separate patients who can be treated at the Hospital, from patients who are to be reffered to other specialist hospitals. There should be two levels of consultancy at the out-patient department, one that requires only simple medical advice, treatment by nurse/doctor and simple medication; and the other which requires specialist advice and/or treatment. This would optimize the functioning of the out-patient department and save the specialists' time to a great extent.

It is proposed that the out-patients department should be located as near the main entrance as possible and there should be a further check for the onward traffic to other related departments, e.g. X-ray; diagnostic and pharmacy in order to avoid unnecessary crowding at such departments.

It is not proposed to provide any X-ray and diagnostic facility within the out-patient department. Any break-up, repetition or duplication of X-ray and diagnostic facilities would be highly un-economical. Patients deeemed to require X-ray and other diagnostic investigations should be referred to the appropriate department.

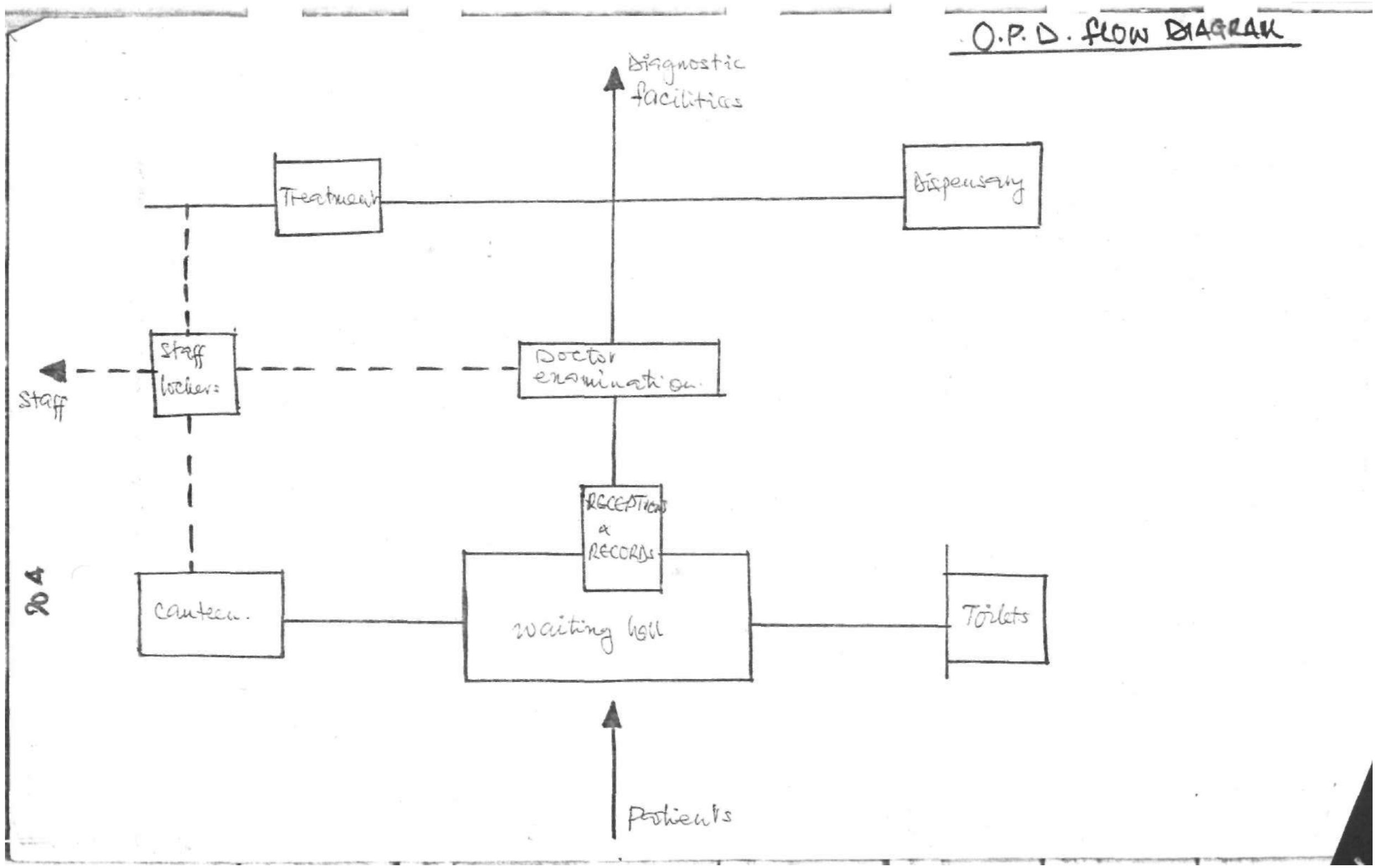
PATIENTS FLOW IN THE OUT-PATIENT DEPT:-

- The patients arrive and send a waiting area-
- some form of sorting e.g. preventive and ddiagnostic medical care etc.
- Some form of registration takes place.
- The patients is examined.
- He may be sent for further examination to other medical personnel or to the laboratory.
- He then returns to the examiner.
- The patient may be referred for some form of treatment such as dressing or injection.
- He collects medicine from the dispensingy.
- He leaves the unit.

The out-patient department should contain in its accomodation;

- A large entrance lobby (with a clerk at the desk who guides the patients to doctors)
- A waiting hall, with male and female waiting areas, with benches for seating.
- A record room (where medical records of all the patients is maintained and provided directly to doctors/Specialists.
- Consulting/treatment/examination rooms.
- Doctors/Nurses officers; lockers.
- Public toilets.
- Syores
- Dispensaries
- Canteen (seperate hall for staff and public may be provided).

O.P.D. FLOW DIAGRAM



THE X-RAY DEPARTMENT:-

It is proposed that the X-ray services be centralised to save the capitals ans staff costs. The location of the department should be near to the out-patient department, so that it is directly accessible to out-patients and the in-patients without the traffic being routed through or disturbing the Hospital ward area.

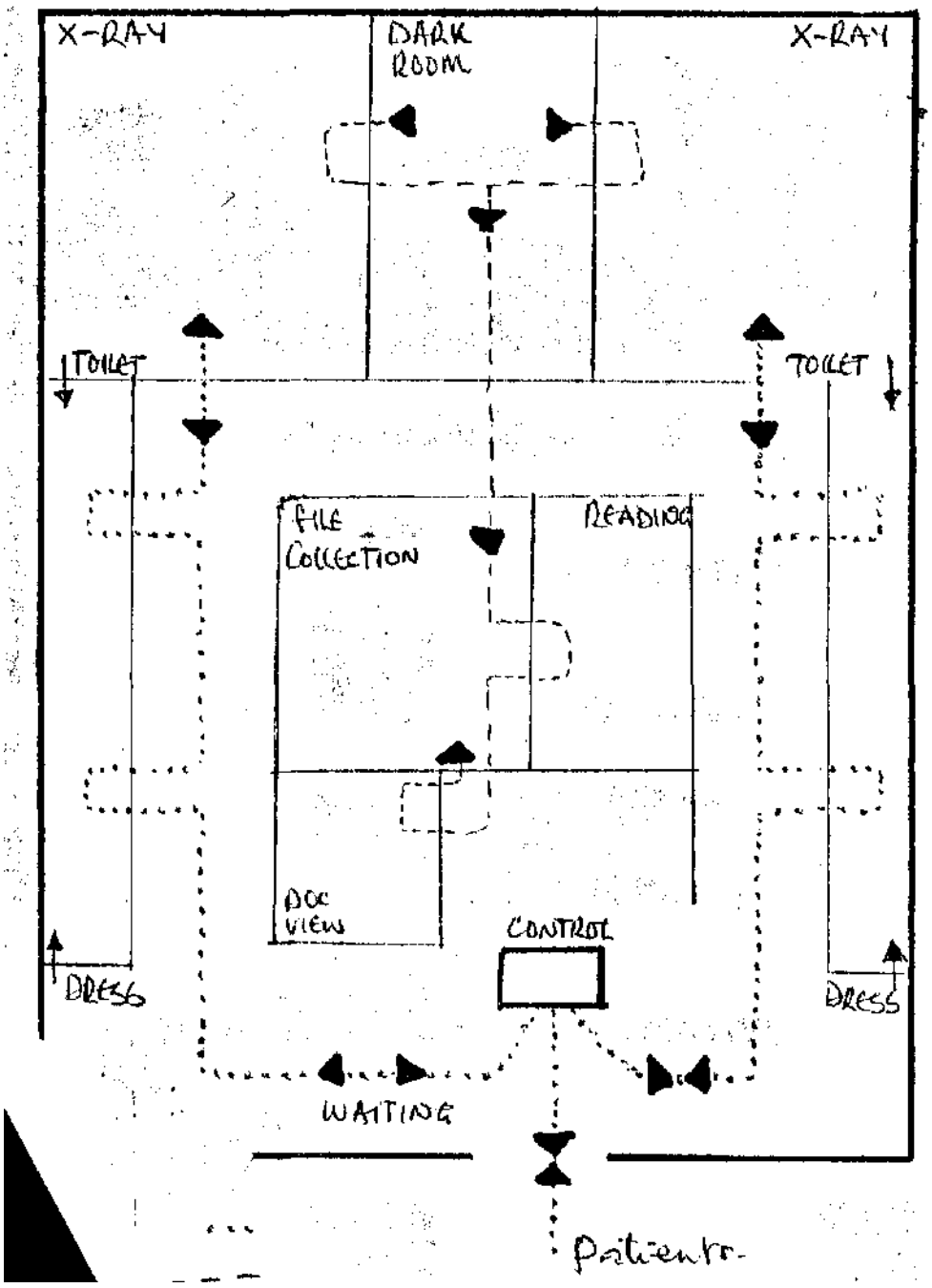
The X-ray department should have abundant natural ventilation and light with arrangements to eliminate internal light for special purposes.

It is also essential that the department should be provided with lead sareens and lead glass windows and radiation proofing wall specification for protection of people and films etc, from radiation.

The department should have these accomodation:-

- Reception Record and patients waiting.
- Film Filling room
- Stores for mobile equipment
- X-ray rooms.
- Dark room and wet-viewing room.

21A



X-RAY DEPARTMENT

cont.....

- Film store.
- Offices for Radiographer and Radiologist

THE SURGICAL UNIT:-

This department is proposed to have two-twin theatre units. These will be in addition to the minor surgery facilities provided in the casuality department. A twin theatre unit would consist of two theatres, each entered through an anaesthetic room, but with a common sterilizing facility in between. A small independent sterilizing unit is proposed for this department in addition to the main central sterile service department.

It is estimated that about 10% of the total patients coming to the Hospital for treatment, would be reffered to the in-patient surgical unit. Therefore, the following proposal of the staff force has been made;

In addition to one department superintendent, four nurses per theatre are proposed. About three to four beds out of the 10 beds allocated for intensive care etc; should be attached to the surgical unit to

accomodate post operation patients for observation and recovery till such time that they can be shifted to the in-patient areas.

PROPOSED ACCOMODATION FOR THE DEPT.

- Operation theatre - two have been proposed.
- Sink room.
- Sterilizing supply/store
- Scrub-up
- Plaster/instrument store
- Changing rooms for doctors/Nurses.
- Visitors/Patients waiting areas.
- Recovery/observation rooms.

PATHOLOGY DEPARTMENT:-

This is the important department in the Hospital for it provides the facilities for the application of scientific technique to the diagnosis and control of diseases. As a minimum, this department will provide a clear picture of a patients diseases which can then be treated at any other Hospital, even if in-patients facilities are not available to all persons requiring hospitalization at a particular time.

The accomodation for this department should consist of:-

- Reception and patients waiting.
- Examination cubicles.
- Pathologyists office/examination room.
- Staff lockers and office
- Micro-biology Laboratory.
- Chemical pathology Laboratory.
- Haematology Lab.
- Histology Lab.
- Bacteriology Lab.

Photomicrography Lab, dark room.

- Blood Bank and transfusion Lab.
- General stores, specimen cupboards etc.

It is proposed that the location of the laboratories should render them easily accessible from all related departments, especially the out-patient depaetment.

GENERAL WARD PLANNING:-

ALLOCATION OF BEDS TO DIFFERENT WARDS:-

A total bed-strength of 250 is proposed after completion. This, I got from using 2.5 beds per 1000 population which means, from a Bichi population of 100,000 and with 2.50 beds per 1000 persons the total number of beds in the Hospital will be 250.

I propose to distribute this numbers of beds into the following wards:-

- General medical wards.....80 beds
- Surgical wards.....64 beds
- Children's wards.....64 beds
- Maternity wards.....32 beds
- Special unit eg intensive care; recovery, observation etc.....10 beds

The 10 beds allocated to the special units will be distributed among the medical, surgical, maternity and even the children units. For contageous diseases in the medical; recovery and observation in the surgical suite;

intensive care and premature delivery in the maternity units; and probably for intension care and contageous diseases in the children's wards.

Cots (about 10 in number) will also be provided for babies in the baby's care unit or be attached to their mother's beds in the maternity wards.

Bed-spacing of 1.6m is su gested based on an 800mm width bed with an 800mm space in between.

Its first multiple (3.2m) has been found to be a reasonable width for most smaller rooms such as office and examination rooms. The further multiple of (6.4m) provides a versatile building width capable of accomodating most medical functions as well as giving an economic roof span.

The wards should be planned in such a way that the male's wards are different from the female's. The children may be mixed and must be a provision for a play space-for them.

A 4-6 bed compartment has been proposed in every number bed-unit of the total units of wards, except where there is provision for a single bed compartment for the intensive care, contageous diseases, and other special care units.

GENERAL MEDICAL WARDS/SURGICAL/CHILDREN'S WARDS:

It is proposed to have one registrar to take care of the whole medical section. One Resident House officer working full time, for each unit. Four or five senior Doctors to share the responsibilityies of all the wards.

The whole nursing section should constitute about six Head-nurses under a matron. It is estimated that with the above staff force, the General wards units will not face medical-care shortage except for drugs and equipment.

The proposed accomodation for each ward is:-

- Four beds units.
- Six-beds unit
- Single-bed units(for infectious diseases)
- Associated ancillaries, treatment, utility, staff rooms and nurses station.
- Consultant's Office
- Visitor's waiting area.
- Wards Kitchen
- Pantry, stores and ancillaries.

THE MATERNITY UNIT:-

It is proposed that the two-units of 16-beds each be planned with a 4-6 bed compartment arrangements. The baby-care unit with the proposed 10 cots should be arranged in such a way that the cots are attached to the beds of their mothers. This will help in space economy, and the fact that mothers in that kind of community would not want their new-born babies away from them.

The accomodation for the delivery suite should be:-

- Delivery room.
- Labour + toilet.
- Scrubbing room
- Anasthesia store.
- Nurses station
- Head Nurse
- Doctor's night room.
- Nurses lockers/Rest room + Doctor's lockers & rest room.
- Sterile store/Non-sterile store
- Reception/records.
- Recovery
- Relative waiting and their toilets.

It is anticipated that the number of deliveries in a year with the population of 100,000 is about 5000 (compared with Kano city G/Hospital). That is about $\frac{5000}{365}$ deliveries per day.

Since labour period is usually 6-8 hrs. the number of deliveries per room per day is then about 4. Therefore, the number of delivery rooms will be

$$\frac{5000}{365x4} = 4 \text{ rooms.}$$

Number of labour rooms is in the ratio of one delivery room to two labour rooms.

Generally, the elements of the delivery suites are discussed under the following headings:-

- Administration and reception
- Staff changing facilities.
- Labour and preparation.
- Delivery room and immediate services.
- Premature nursery,.



274

ADMINISTRATION DEPARTMENT:-

The administration department in the Hospital should provide for the records section; accounts section as well as offices for all senior and support Hospitals administrative staff.

The following principal space allocations are recommended for the administrative Building:-

- Reception and waiting
- Records department
- Accounts department
- Administrative Offices
- Conference room
- Medical Library.

WORKS AND MAINTAINANCE DEPT:-

The various functions of the works and maintainance department should be distinctly defined and persons incharge to look after these should havea fair amount of technical knowledge on maintainance. The smooth functioning of the entire complex will depend ON this department which usually consists of these sections:-

- Mechanical section
- Electrical section.
- Civil section

MECHANICAL SECTION:-

Will be responsible for the airconditioning, boilers etc. This section will also look after the pump house, water supply and sewerage disposal maintainance of all the Hospital vehicles will also be incharge of this section.

ELECTRICAL SECTION:-

Will look after the basic repair and maintenance of electric/medical equipment. The emergency power supply generators and the Hospital's proposed sub-station will also be maintained by this section.

CIVIL SECTION:-

Would mainly be responsible for maintenance and repair of buildings, ground and non-mechanical works, suxh as painting, repair of furniture etc.

MEDICAL & SURGICAL SERVICES DEPT:-

The Hospital is proposed to have this department and be made of the following sub-department:-

(i) Central Pharmacy (Dispensary)

(11) Central sterile supply department.

CENTRAL PHARMACY DEPT:-

Will rprovide dispensing facilities to in-patients and out-patients. The location of this department should be central so as to be accessible to both in-patients and out-patients, but adequate control against unnecassary traffic disturbances to the in-patients departments. The following proposals are made for this department:-

- Reception and lobby for out-patients
- Staff office and lockers.
- Dispensing laboratories
- Bottle wash/autoclave.

CENTRAL STERILE SUPPLY DEPT:-

The purpose is to provide all the Hospital department with the required sterile qquipment and material. From a centralised department for achieving economy in costs of supplies and operations.

It is proposed earlier on to have a small separate sterilizing unit attached to the surgical unit.

The proposed accomodation is to consist the following:-

- Staff office and lockers.
- Sorting and clean up room.
- work room and autoclaves rooms.

clean supply store.

sterile supply stores.

Trolley park and repair room.

CENTRAL GENERAL SERVICES:

This department shall mainly consists of the following:-

(i) Main store
(ii) Kitchen (main)
(iii) Laundry

MAIN STORE:-

Office accomodation for the store keeper and clerk should be provided within the bulk store. There should adequate storage shelves and cupboards along the walls of the store.

MAIN KITCHEN:-

The kitchen in the Hospital is different from anyother institutional kitchen because it has to serve areas dispersed in various parts of the Hospital. This distribution system generates one of the longest service routes and the need for trolleys etc. The location of the kitchen, therefore, is an important factor for consideration at the earliest stages of overall design concept.

The kitchen should have two separate departments, one for food preparation, is to prepare "ready to cook" all meat, fish, vegetables etc. and the other where actual cooking is done.

LAUNDRY:-

The laundry in the proposed Hospital is a large item of expense but an efficient laundry is most desirable; for careful washing will reduce cost and prolong the life of linen apart from providing the necessary standard of cleanliness. The laundry should be located where ample day light and natural ventilation is available.

It should be near the power plant and since it is the biggest user of steam and soft water, it should be close to the main water supply sources and the disposal system.

The main - section in a laundry are soiled linen rooms; washing room; iron room, clean linen room; and small store for soap, starch, bleaches etc.

LIBRARY:

It is proposed that the Hospital should have a library to be divided into two main functions. i.e. medical library and patients library. It is considered important to provide this library, since the provision of recreational and educational reading material for patients contributes to their recovery and welfare. The aim of the medical library, however, is to assist and further the education, reading and research programme of the professional staff of the Hospital. Its location can be in a wing of the administration building, with separate areas for patients and medical staff. In addition, one office and a work room for medical librarian would be provided, Moreover, the patients library should be clearly separated from the admin strative circulation areas.

This can be achieved by having two separate library sections with separate entrances each located contigous to the administration or medical staff areas on one side and patients areas on the other.

THE GATE HOUSE:-

One single main entrance to the Hospital will make it easier to direct visitors and control fraffic entering into the area. It also solves a lot of security problems. Though the site analysis has proposed more than one entrance with the Hospital, it is still necassary to design a main gate-house to fully direct people and traffic to the Hospital. It is proposed that all other gates proposed be made secondary and be used only for the purposes designed for.

The main gate house should be designed to include a reception/inquiry office. Once inside the Hospital compound, separate roads may be provided for access to various departments, such as casuality and out-patient department, and the general wards. A service road can also be taken in for the ancillary departments.

A reasonably high compound-wall is also proposed for security reasons, and provision is also to be made for internal walls/fence for controlling traffic from out-patients to in-patients departments, and from the residential areas tothe Hospital complex.

MOSQUE:-

A mosque is also proposed to be located the site for the praying facilities for people from the Hospital as well as the vicinity population. A pedestrian access should be provided from within the Hospital area. Keeping in view, the finances/donations available for this purpose, the size and accomodation of the Mosque will be worked out later.

STAFF RESIDENCES:-

Residential accomodation for especially, the essential nursing, medical and skilled personnel is proposed to be provided, possibly, on the site, In fact, it is essential that the nurses; Resident medical staff and the senior staff of the Hospital are accomodated on-site. It will, however, depend on the Hospitals staffing plan, to fully know the number of staff houses to be provided, but provisions for

CHAPTER THREE
THE DESIGN

AIM:-

My aims of providing the scheme come under the followings:-

(a) To reduce the huge bulk of the building, and to create a domestic scale to which a human being could relate.

(b) To provide a simple communication system, so that patients and staff could orient at themselves within the complex easily. Wide corridors of about 4.2m are proposed to accomodate this trend of circulation.

(c) To design a very cheap hospital within the stringent Government's cost limits to ensure no post-tender redesign.

(d) To zone all 'hot' (emergency) areas together, and all service areas together.

DESIGN CONCEPT:-

My design is based on the concepts that the simplest diagram for extendible building; is one where primary communication route is a straigth line from which secondary communication links, to dept. branch out at right-angles. These communication links or corridors are open ended so that departments may extend differentially.

To fully exploit this planning concept, I found that a large site preferably flat, is needed.

I have got about 12.5 Hectares of flat land, and so the success of this concept may eventually work out.

OBJECTIVE:-

Bichi is an old walled town human is seale with narrow streets, and even though the master plan is to be successfully worked out into a modern town, the old Bichi remains underdeveloped, and the site for the Hospital is located very near the old walled city. No single building is considerably bulk around the site, so its there force considered important to introduce into this urban fabric, a building complex as

unobstructive as possible (i.e. skyline should not intrude to make the complex look out of place).

* It is, thus, my desired objective to reduce the huge size of the building to a comprehensible scale and design a simple structure that would be able to extend in small increaments as finance and medical needs demanded.

* The concept I chose is of particular interest because it turns out to be as cheap as possible to build. This has been achieved by careful attention to layout and has shown that, in this instance it is possible to construct as economically with rationalised traditional methods as with system b building.

In the design, though, I have borne in mind the religious background of the majority of the people for whom I am designing, and found it essential to conceive the Hospital as whole so as to achieve a sound relationship between the units, and also to have separate male and female wings; each with its services, as one way to serve the problem of privacy of patients as stipulated in the dominant religion in the area.

To summarise everything, there are two ways in which to tackle this problem; one is as mentioned earlier, by having separate male and female wings each with its own services; at least for departments like the O.P.D the casuality, the physical medicine etc. The other way is by providing one single wing and seperating male and female waiting and treatment areas. Using my concept, I found the former very disadvantageous to apply, especially in the circulation problems and the units immediate relationships.

Basically, the proposed four complexes which make up the District Hospital, have been zoned around two important corridors (called Hospital streets) which are as wide as 4.2m each and are parallel to each other. The first street, called the main street (4,2m) runs in such a way that all the hot departments (i.e. all out-patients services) are attached perpendicular to ait. The other one, called the in-patients and services street, (4.2m) runs to have all the wards attached perpendicular to it. Both streets run pararrel to meet the third zone containing the ancillary services.

These two streets are linked by consequent secondary communication routes or corridors, usually attaching the hot or out-patients services with the in-patients services or wards.

All buildings are single-ground floors, except for the admini. block; pharmacy and pathology block and the wards, where they are one-st orey blocks.

* VERTICAL CIRCULATION IN WARDS:-

There are four of wards are all one-storey. Two service lifts have been proposed and are strategically located wach in the first and the last wards-blocks. All the four blocks will have stair cases within their entrance and reception halls.

All the wardswill have, ward kitchens, where foods will be kept in bulk, and then distributed to patients. There will also be attached to each ward room, a clean utility area and a dirty utility area.

These systems will reduce the long distance travelled to the wards from the services departments.

IROPOSED STRUCTURAL METHODS:-

The main construction of the Hospitals units is a reinforced concrete frame with reinforced concrete roofs and floors. The structural collumns are spaced at 3.2m centre. The perimeter beams serve as window lontols and are uptuned and together with the projected roof stab and parapet from rain-water channel.

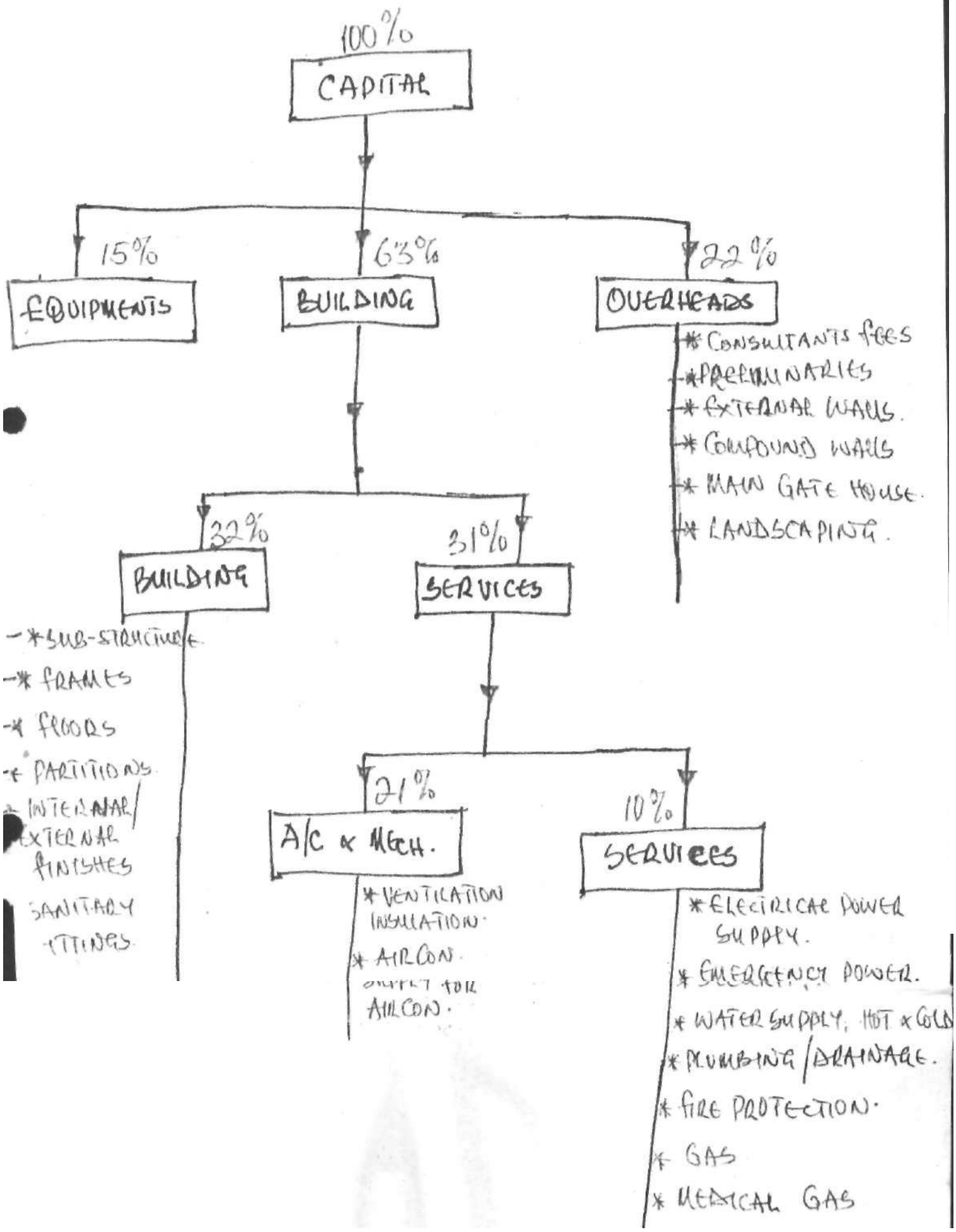
Roof to be double with an underlaryer of R.C. slab and the top layer of double pitched corrugated alluminium sloping towards the rain water gutters on either sides.

IATERIALS AND FINISHES

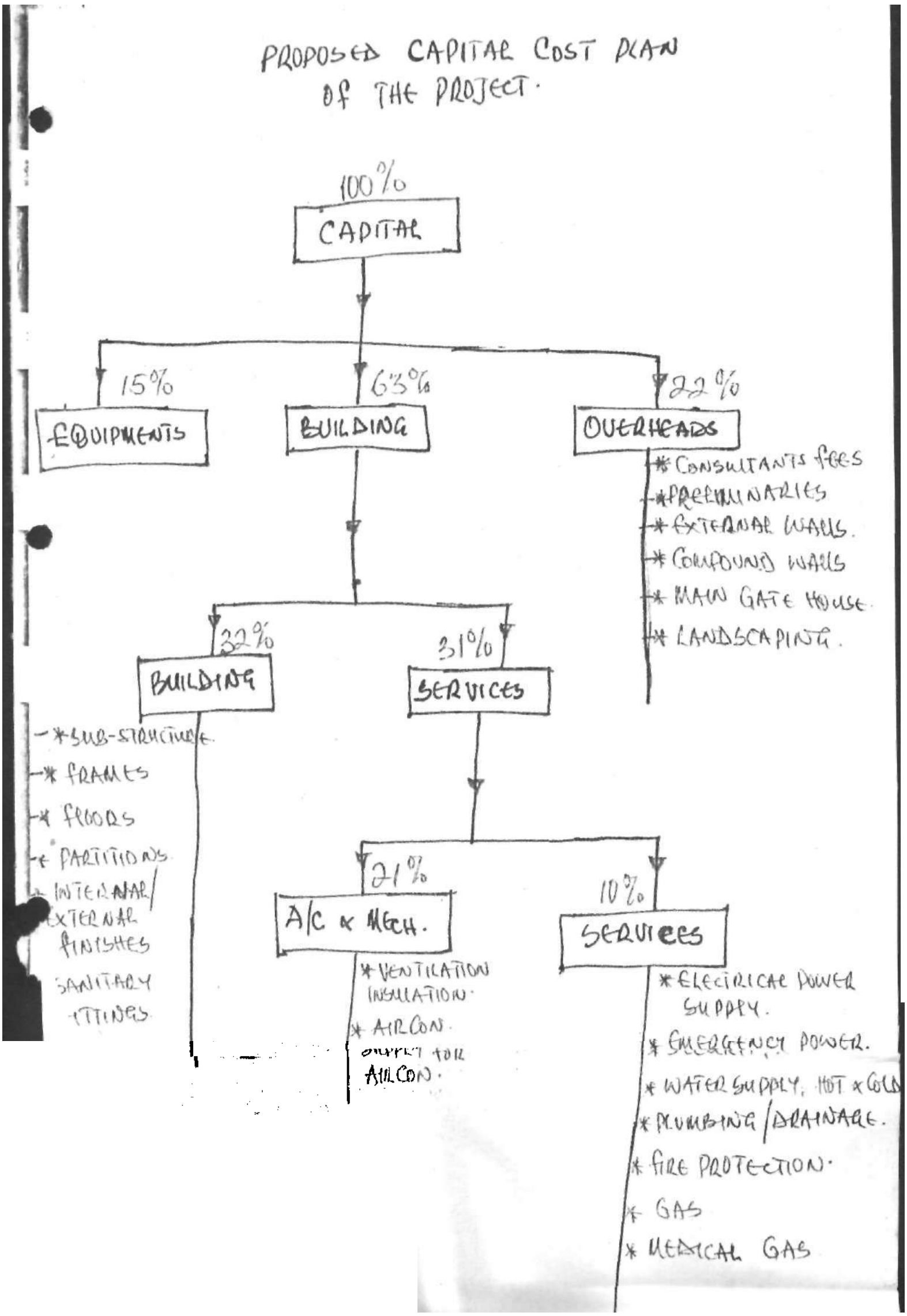
- R.C. Sandcrete blocks, alimínium glees and timber.
- Concrete should be used along the corridors and O.P.D. waiting and treatment rooms.
- Rubber lalex based, cement fleximar with marble chippings used for the offices and concultation rooms.
- Terazzo with bronze strips used for X-ray and theatre - for the latter, the bronze acts as an earth wire against any electrical sparks during operations.

- Semastic floor tiles to be used for the wards.
- Aluminium louvres (adjustable) are provided above the floor in wards; waiting rooms; to ensure through ventilation when the windows are closed at night.

PROPOSED CAPITAL COST PLAN OF THE PROJECT.



PROPOSED CAPITAL COST PLAN OF THE PROJECT.



CHAPTER FOUR

SCHEDULE OF ACCOMODATION AND SPACE REQUIREMNETS

OPD

- Examination Room = 24.0m^2
- Dressing Room = 20.48m^2
- Injection Room = 20.48m^2
- Dirty Utility = 20.48m^2
- Clean Utility = 20.48m^2
- Dispensary = 60.92m^2
- General Waiting area = 81.92m^2
- Sub-waiting area = 40.48m^2
- Office/laboratory = 20.48m^2
- Store = 10.24m^2
- Toilets (patients) = 20.48m^2
- Staff Toilets = 9.6m^2
- Staff and Doctors Rest room = 40.96m^2

ACCIDENT AND EMERGENCY:

- Nurses duty Rest Room = 36.0m^2
- Patients toilet = 20.48m^2
- Reception area = 20.48m^2
- Ambulance patient wait = 40.48m^2
- Ambulance entrance wait = 25.0m^2

- Resuscitation Room = 20.48m^2
- Accident Room Cubicles = 9m^2
- Plaster and fractive room = 20.96m^2
- Examination Room = 24.0m^2
- Recovery room = 154.0m^2
- Dirty Utility = 9.6m^2
- Clean Utility = 9.6m^2

CHAPTER FIVE
CASE STUDY

HEALTH-CARE IN KANO STATE

Health care in Kano state is provided by the Government. A few clinics run by private practitioners exist, but these are only attended by the few people who can afford the financial expenses. There is still one General Hospital situated in the old City, and a new one is now under construction at Gedi-Gedi area of Kano, along Kano-Zaria road.

The present Government in Kano State seems to be committeed to the provision of Basic health-care facilities to all the local government headquarters, and right now about five local Government areas have already a General Hospital each. In Kano metropolis, for example, the city Hospital is actually heavily loaded with patients. It used to be a 600 bed hospital in 1977, but now it is more than 1000 bed in strength and so congested that it is becoming tedious to administer.

ENVIRONMENTAL CONSIDERATIONS
(FOR STAFF TO PERFORM EFFECTIVELY)

NATURAL LIGHTING:-

General guidelines for the illumination requirements for good seeing in different rooms in the Hospital is as follows:-

Clinical Rooms:-

Examination rooms)
Consultation rooms)
Injection rooms)
Dressing rooms) = 400 Lux
Surgery rooms)
Delivery rooms)

NON- Clinical Rooms:-

Wards = 100-300lux
Nurses Station = 300 lux
Corridors = 300 lux
Circulation = 100-200 lux

OTHER ROOMS:-

Labs = 400 lux

Dispensary = 400 lux

Sorting and Registration = 400 lux

Offices = 400 lux

Kitchen = 200-400 lux

Laundry = 200 lux

Bathroom + Toilet = 100 lux

HEALTH MANPOWER AND FACILITIES IN NIGERIA

(BY:- MEDICAL STATISTIC DIVISION - LAGOS

Females in Reproduction Age Group = 15% of population

- Paediatrics beds in an Hospital = 15% of total Beds
- Nursing Staff = 1/1000 People
- Bed compliments = 2-3beds per 1000 people
- Medical Practitioners = 1/10,000 people
- Dental Practitioners = 1/100,000 people
- Pharmacist/other technicians = 3/100,000 people
- Technologists = 1/10,000 people
- Social welfare officer = 2/100,000 people
- Social welfare workers = 6/100,000 people.

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3) PLANNING THE COMMUNITY HOSPITAL-	ROY HUDENBURG
4) FUNTUA RURAL HOSPITAL	SHEHU M.
5) PLANNING THE SURGICAL SUITE-	WARWICK SMITH