GENERAL HOSPITAL, BENIN CITY

BY

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D E C L A R A T I O N

I hereby declare that this thesis has no bearing for any work done by any individual or group of individuals which has been presented and accepted for a higher degree. It has been composed by me and is a record of my own research work. All quotations are distinguished by quotation marks and all sources of information have been acknowledged by means of references.

EBEMEATA, ENIOLA, OKOJIE.

C E R T I F I C A T I O N

This Thesis Report entitled General Hospital, Benin City, by Ebemeata Eniola Okojie meets the regulations governing the award of the degree of Master of Science in Architecture (M.Sc. Arch) of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

Chairman, Supervisory Committe	Date
Member, Supervisory Committe	Date
Member, Supervisory Committe	Date
Head of Department	Date
Dean, Post-Graduate School	Date

D E D I C A T I O N

To God,

For guidance and Infinite mercies,

My Parents,

For love and Support,

My Brothers, and Sisters,

For Encouragement.

M O T I V A T I O N

"It has been said that before 1950, the hospital were better from the point of view of buildings than the patients homes;

It is now the reverse, and in consequence, people demand something very different. Hospitals are changing from being custodial places some what better or worse than prisons.

The modern hospitals are a highly efficient health Factory; It should be designed to reflect the home environment of its patients, the culture of the people and a source of great inspiration for the sick and the helpless"

– Tropical Architecture, – Maxwell Fry Jane Drew.

A C K N O W L E D G E M E N T S

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Lastly to my Mother and my Sister- Adesua also my grandmother Mrs A.I. Phillips for there constant support and for all those who prayed for my success. May God Bless you all.

A B S T R A C T

An hospital is an intergral part of a Social and medical Organization, the function of which is to provide for the population, complete health care both curative and preventive and whose out-patient services reach out to the farmily and its home environment.

The modern concept of a hospital is not only for the treatment of the sick but a comprehensive system of preventive and curative medicine and also devoted to ambulatory and domicilliary causes.

General hospitals like other hospitals are devoted solely to the prevention and cure of all diseases except those that are not within their scope and which therefore need services of bigger hospitals.

Aims and Objectives.

To design an hospital of 200 beds that meets the needs of the population of the immediate vicinity and can be expanded to meet future needs.

To have various units working in conjunction to accelerate the services needed.

To ensure smooth movement flow pattarns of patients in the Out-Patient Department; also instead

of multiplying the number of consulting rooms, they could be designed in such way that two doctors can work in one consulting room.
Emergency areas should be able to accomodate increased and varied medical problems and most probably minor surgery.

snerally the design of the Out-Patient Department won't deviate totally from the conventional design but useful chances would be made but from the functional and aesthetic point of view.

As a contribution to architecture, the design thesis is concerned with natural lighting and adequate ventilation to reduce infection; also tne provision of landscaped courtyards to provide visual comfort and homelessness to the patients.

It is hoped that this architectura1 design through the analysis carried out, and suitable solutions achieved would make it a worthwhile exercise.

TABLE OF CONTENTS

TITLE	Page
Title Page	i
Declaration	ii
Certification	iii
Dedication	iv
Motivation	v
Acknowledgement	vi
Abstract	vii,-viii
Table of Contents	ix
List of Table	x
List of Figures	xi
List of Plates	xii

CHAPTER 1

INTRODUCTION

1.1 Standard of Hospital

1.2 Categories of Hospitals

1.3 Health Care in Bendel State

1.4 Bendel State Health Service Systems

1.5 General Hospitals

1.6 Form and Ventilation

CHAPTER 2

THE HOSPITAL

2.1 Hospital Development and Planning

2.2 Hospital Systems

2.3 Traffic Patterns in the Hospital

2.4 Types of hospital Layouts

CHAPTER 3

SCIENTIFIC ADVANCEMENT IN THE MEDICAL WORLD

3.1 Architectural Planning

3.2 Development in Medical Science

3.3 Surgery (Operating Suite)

3.4 Delivery Suite

3.5 Radiology

3.6 Laboratory

3.7 Communications (Medical Records)

CHAPTER 4

The General Hospital Departments

4.1 Inpatient Area

4.2 Function

4.3 Variety of Accomodation needed

4.3.1 Principles of ward Design

4.4 Out-Patient Department

4.4.1 Location

4.4.2 Accident and Emergency (Casualty)

4.5 Radiology department

4.6 Physical Theraphy

4.7 Pathology department

4.8 Pharmacy department

4.9 Central Sterile Supply Department

4.10 Mortuary Department

4.11 Administrative Department

4.12 Catering Department

4.13 Maintenance Department

CHAPTER 5

Case Studies

5.2 Central Hospital Benin City

5.3 General Hospital Lagos, Lagos State

5.4 Ahmadu Bello University Teaching Hospital - Zaria

5.5 Ahmadu Bello University Teaching Hospital - Shika

5.6 Hermann Hospital Houston Texas U.S.A.

CHAPTER 6

Data Analysis

6.1 Range of Cases Handled

6.2 Out-Patients

6.3 In-Patients

6.3.1 The Bed Compliments

6.3.2 Bed Occupancy

6.3.3 Operations

6.4 Sources of New Patients

CHAPTER 7

The Site

7.1 Site Location

7.2 Geographical Setting

7.2.1 Climate

7.2.2 Vegetation

7.2.3 Soils

7.2.4 Population

7.2.5 Occupation of the People and Economic Activities

7.2.6 Availability of Utilities

7.2.7 Health Care Facilities

7.2.8 Site Selection Criteria

7.3 Site Analysis

7.3.1 Site Location

7.3.2 Access

7.3.3 Size and Future Expension

7.3.4 Topography and Drainage

7.3.5 Present Land use and ground cover

7.3.6 Top Soil Suitability for Foundation

7.3.7 Trees

7.3.8 Climate

7.3.9 Utilities

7.3.10 Niusance

7.4 Factors for Site Consideration

7.5 Planner Concept used in Layout

CHAPTER 8

Architectural Solution to the Project

8.1 Goals and Objectives

8.2 Scope

8.3 Bed Statement

8.4 Out-Patient Department

8.5 Schedule of Accomodation

8.6 Design Report

8.6.1 Design Concepts

8.6.2 Design Considerations

LIST OF TABLES

Tables		Page
1.1	Health Establishments in Bendel State	4
5.1	ABU Teaching Hospital Statistical Returns January 1986	57
5.2	In Patients	58
5.3	Operations	58

LIST OF FIGURES

Figures		Pages
1.3	Bendel State showing General Hospitals	5
1.4	Benin City Showing built up areas (Land use)	7
1.2	Flow Chart acute General Hospital	10
2.1	Linear Plan	14
2.2	The Reclinear Plan	17
2.3	The Dispersed Plan	18[a]
4.1	The Four Bed Ward	28
4.2	Main reception area in O.P.D.	31[a]
4.3	Physical Therapy	33
4.4	Functional relationships Laboratory/ Emergency Suite	35
4.5/4.6	Functional relationships Pharmacy/ Physical Medicine	37
4.7	Medical/Surgical patients Flow Chart	39
4.8	Processing hospital liner	42
5.1	Hermann Hospital Schematic site layout	64

LIST OF PLATES

Plate		Page
I	Out Patient Department of Ahmadu Bello University Teaching Hospital Zaria	53
II	Out Patient Complex of the new A.B.U. Teaching Hospital, Shika	60
III	The Site	74[a]

C H A P T E R 1

INTRODUCTION

1.1 Standard of Hospital

The general standard of hospital in Nigeria has fallen considerably, apart from the non-availability of drugs and of skilled manpower are also inadequate facilities for specialist care. These deficiences are found practically in very Government based hospital.

Modern hospitals like the University of Benin Teaching hospital have been built, but like all government projects maintenance is a problem.

1.2 Categories of Hospitals

Hospital are classified into six categories according to the level of services they render. The three main levels are termed primary, Secondary and tertiary.

1.2.1 Primary Care

At the Primary care level are all those health services which are based in the community and relatively accessible to patients and their families.

They are at the periphery of the system. These services include preventive health measures such

as immunisation programmes, antenatal and child care and simple diagnosis and treatment. They are operated by Doctors, nurses, auxillaries and social workers based in dispensaries, clinics and health centres, they serve small number of people and are situated as close as possible to their homes.

1.2.2 Secondary Care

At the secondary level is the general hospital to which patients from a wide surrounding area are refered; when necessary by primary care units for more sophisficated diagnosis or treatment.

Hospitals are an indispensable part of the provision that is made for health because there will always be a proportion of patients who need the particular skills and equipment that can be concentrated in them because they are essential centres for medical and health education and research.

1.2.3 Terhary Care

Terhary Care includes highly specialised services not normally found at secondary level. Including super specialities such as plastic surgery, neuro and heart surgery. These are hospitals of between 300 and 1000 beds. Tertiary care is at regional level in the more highly specialised hospitals.

This is usually larger than the gener l Hospital and has a greater emphasis on teaching, particularly of doctors. In most cases there is a close relationship with a medical school with medical reserach.

1.2.4 Classification of Hospitals

The highest level in the health pyramid is the Teaching Hospital-. They have facilities for teaching and research; also facilities for general health care delivery.

Specialist Hospitals:- That is Orthopaedic Maternity, eye hospitals e.t.c. they render treatment only to the specific brands of medicine which they are specialised for.

General Hospitals:- These are Institutions devoted solely to the prevention and care of all diseases, it consists of all departments of medicine, they render almost all types of treatment except those that need higher level of medical attention.

District Hospitals:- Health centres, Dispensaries they are more for the lower level in medicine, these exhibit the primary health care viz small colds, malaria not major operations, or a high level in modern medicine. Not withstanding they all work in conjunction with the other.

1.2 Health Care in Bendel State

(a). The Federal Government owns the U.B.T.H which touches on every part of medicine. Since its a hospital on the terhary level it usually serves as a teaching hospital for medical students.

(b) The specialist hospitals: these as well as teaching hospitals fall into the terhary care unit: an aspect of health care delivery. It is a hospital that can be looked at as being devoted to the care of one or a group of related diseases.

(c) General Hospital is in an Urban Centre providing all forms of preventive and curative services except for very complex cases. The General Hospital serves over 100,000 Out-Patients annually.

(d) Private Hospitals - these could be specialist or general these have become very common, they are normally owned by individuals or a group of people, their services are normally good they charge high fees and they have adequate medical facilities and para medics.

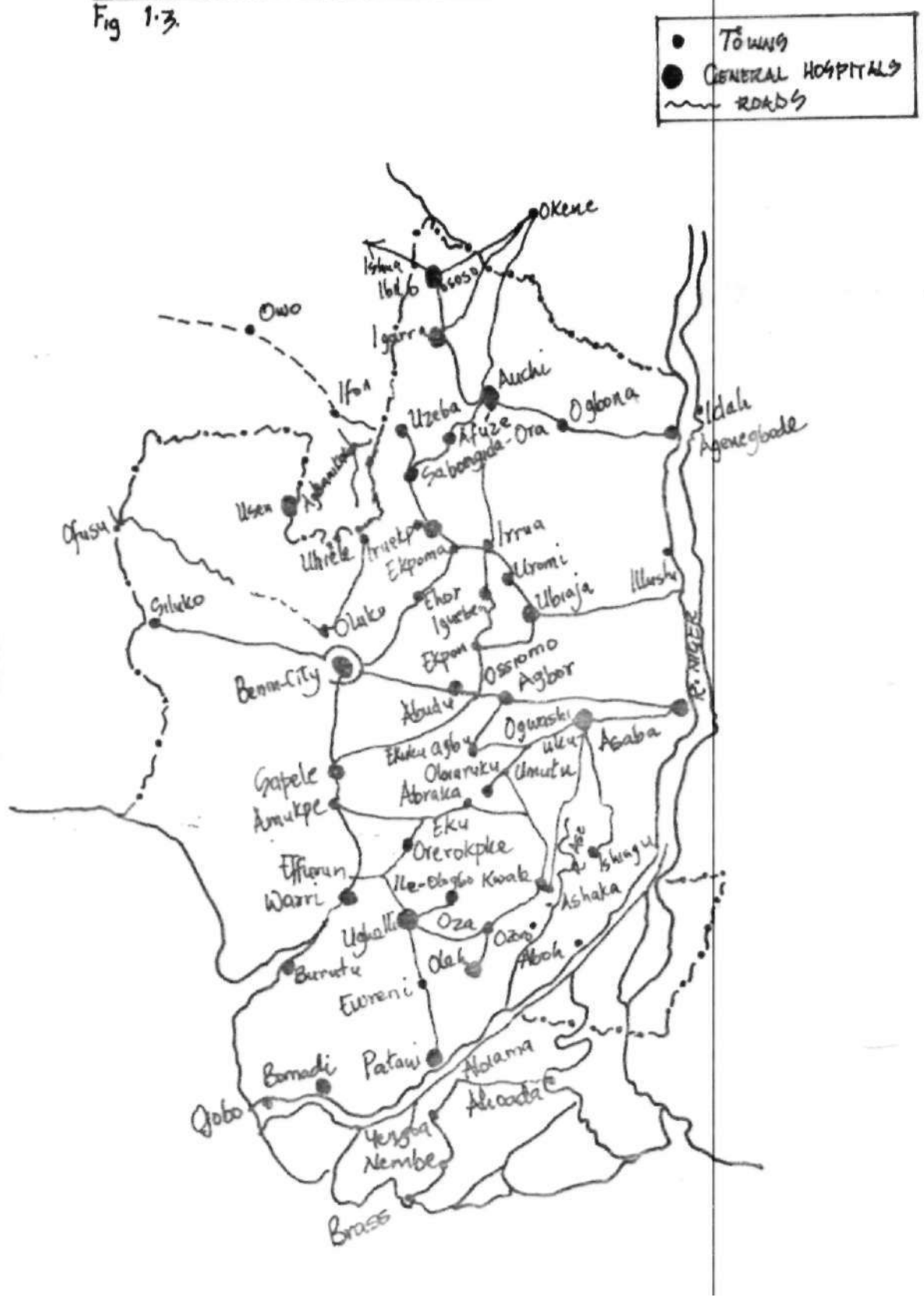
Health Establishments in Bendel State

Table 1.1

General	Maternity	Infectious Diseases	Teaching	Pyschiatric	Other	Total
82	249	-	1	1	507	840

BENDEL STATE SHOWING GENERAL HOSPITALS

Fig 1.3.



BENDEL STATE SHOWING HOSPITALS ACCORDING TO LOCAL GOVERNMENT AREAS

I	OWAN	-	1 Uzebba
			2 Afuze
			3 Sabongida-Ora
II	ETSAKOR	-	4 Auchi
			5 Agbede
			6 Ogbona
III	AKOKO-EDO		7 Igarra
			8 Ibillo
IV	AGBAZILO	-	9 Uromi
			10 Ubiaja
V	OKPEBHO	-	11 Iruekpen
			12 Igueben
VI	ORHIOMON	-	13 Abudu
			14 Urhonigbe
			15 Ossiomo Specialist
VII	OREDO	-	16 Central Hospital
			17 Uselu Psychiatric
VIII	OVIA	-	18 Usen
			19 Iguobazuwa
IX	IKA	-	20 Agbo
			21 Umunede
			22 Ekuku Agbor
			23 Abavo

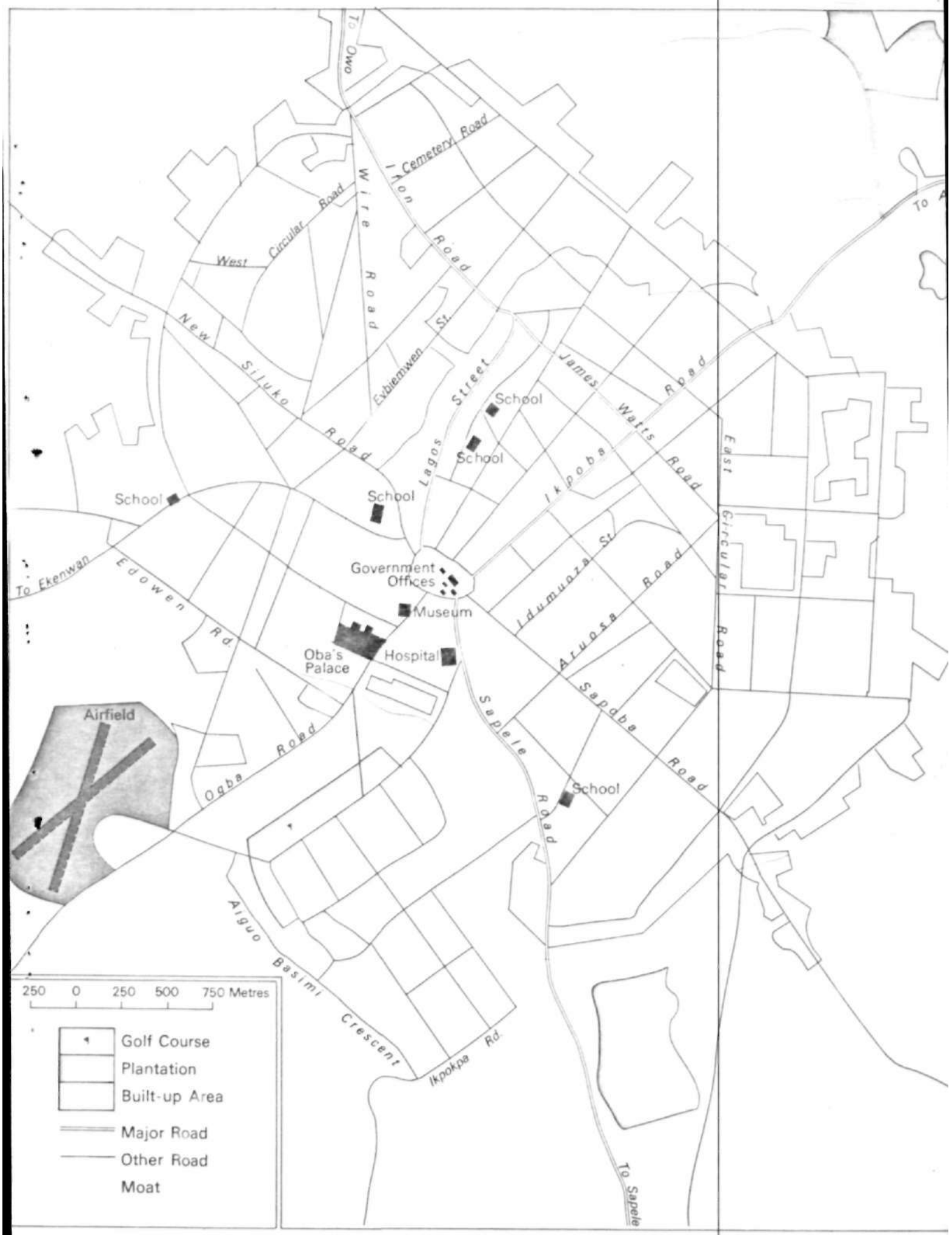


FIG. 4: BENIN CITY CENTRE

X	ANIOCHA	-	24 Ogwashi-Uku
			25 Akwukwa-Igbo
			26 Ishiagu
XI	OCHIMILI	-	27 Asaba
			28 Ebu
			29 Ibusa
XII	NDOKWA	-	30 Kwale
			31 Obiaruku
XIII	ETHIOPE	-	32 Oneroköpe
			33 Ekpan
XIV	OKPE	-	34 Sapele
XV	UGHELLI	-	35 Ughelli
XVI	ISOKO	-	36 Olleh
			37 Ilue-Ologbo
XVII	WARRI	-	38 Warri
			39 Koko
XVIII	BOMADI	-	40 Bomadi
			41 Ojobo
XIX	BURUTU	-	42 Burutu
			43 Forcados.

1.4 Bendel State Health Service Systems

The Government controlled medical units are as follows:-

Benin City

University of Benin Teaching Hospital

Central Hospital Benin

Mucro-Psychiatry Hospital Uselu

Privately Owned Hospitals

St. Philomeua's Hospital

Ediale International Hospital

Azuwa Hospital

Suna Medical Centre

Benoni Hospital

All the Sixteen local Government areas each have one General Hospital and a few private hospitals.

The Hospitals Management Board which is under the Ministry of Health maintains and manages the hospitals the Chief Medical Officer is solely in charge. The Commissioner is the overall head in the Ministry.

1.5 General Hospitals

General Hospital fall into the secondary tier of the health pyramid. The size of general hospitals varies considerably, depending principally on the population of the area.

Whatever the culture and whatever its size and detailed or operational policies it will contain both wards and supporting departments. The wards are categorised by speciality, sex or age of patients.

The form and arrangement of the wards is fundamental and will have a major effection the form of the whole building.

1.6 Form and Ventilation

The form of a hospital building is influenced by many factors. One of which is ventilation. In the operating theatre suite air conditioning is recognised as the highest priority. Air Conditioning in this context is the ability to control the air temperature both above and below the ambient temperature and also to control the humidity with sterile filtration in addition. It reduces infection but air conditioning is so expensive and a constant consumer of energy.

For the basis of this thesis the general hospital being advocated deals with a broad spectrum of related medical care; moreover in a society like ours that health education and hygiene is lacking. It makes the demand for general hospital more acute.

C H A P T E R 2

THE HOSPITAL

2.1 Hospital Development and Planning

The hospital has become increasingly attractive as a place to treat ambulatory patients. The pace of development in the field of medicine has been a source of surprise to man himself for a long time now, and would continue to be until man learns that more things are possible than he can imagine.

Relations with the Public

The hospital occupies a unique place in our society, gained in part by force of recent circumstance, since the begining of this century, hospitals have advanced from being feared to being recognized as a highly technical and professional aid to the doctor and to nature in fighting diseases.

2.2 Hospital Systems

Hospitals can be divided into the following six systems:-

The Administration System: This system, comprises of general administration, medical records and business departments to take charge of the

co-ordination, and flow of the hospital economy, it forms a most important link between patient care and administration.

The Theraphy System: This incoporates all the facilities that are used for the diagnosis and treatment of the patient. This system will include the following department:-

- Operating theatre suite including recovery
- Radiology-Diagnosis including radioactive
- Laboratories including E.KG., E E G, autopsy
- Pharmacy
- Physical medicine - physical and occupational theraphy.
- Out-Patient department and Emergency.

The Supply System: This is the supply of different items like drugs, equipments e.t.c to the hospital through the various departments. This supply system involves the Central General Stores and Central Sterile Supply Departments.

The House Keeping System: This consists of the Laundry and dietary departments, this system is concerned with the cleanliness of the hospital.

The Utilities System: This is to provide engineering services, maintenance of power plant and various mechanical equipments.

The Patient Housing System: The wards with all its ancilliary facilities form the patient housing system. The objective of a good hospital design is to relieve the patients fears and anxieties and to make patient nursing less cumbersome to nurses. It is noticed that each of the six system irrespective of its role in patient care -- direct or indirect is as important as the others in the hospital set-up.

2.3 Traffic Patterns In The Hospital

Traffic within the hospital is a very fundamental issue because traffic routes should be kept as short as possible.

Short Traffic Routes:- If the seperation of different types of traffic is functional it will maintain asepsis in the hospital it would also increase the efficiency of the nurses because itn will make them less tired.

Seperation of Traffic:- this is very important because clean and dirty items have to be seperated hence the traffic for clean and dirty utility is different. Likewise noisy areas like the Out-patient department and quiet zones like the In-patient (Ward) areas have to be seperated.

Control:- It is also important that wards have to be designed in such a way, so that it is very easy for nurses to control from the nurses station and watch the welfare of the patients.

2.4 Types of Hospital Layouts

There are two basic hospital plans, the pavillon type and the multistorey or high rise type.

2.4.1 Pavillon Type

- These are low rise buildings it brings the patients nearer to nature and it harmonises easily with the architecture of the area where the hospital is to be built.

Advantages

- The buildings can be phased into different stages either to meet immediate needs.
- Moreover it has been observed that low rise buildings have a longer life span than high rise buildings.
- Environmental conditions also contribute to the inefficiency of the power supply, the problems that will be encountered when a patient is being taken from the ward downstairs to the operating suite upstairs.

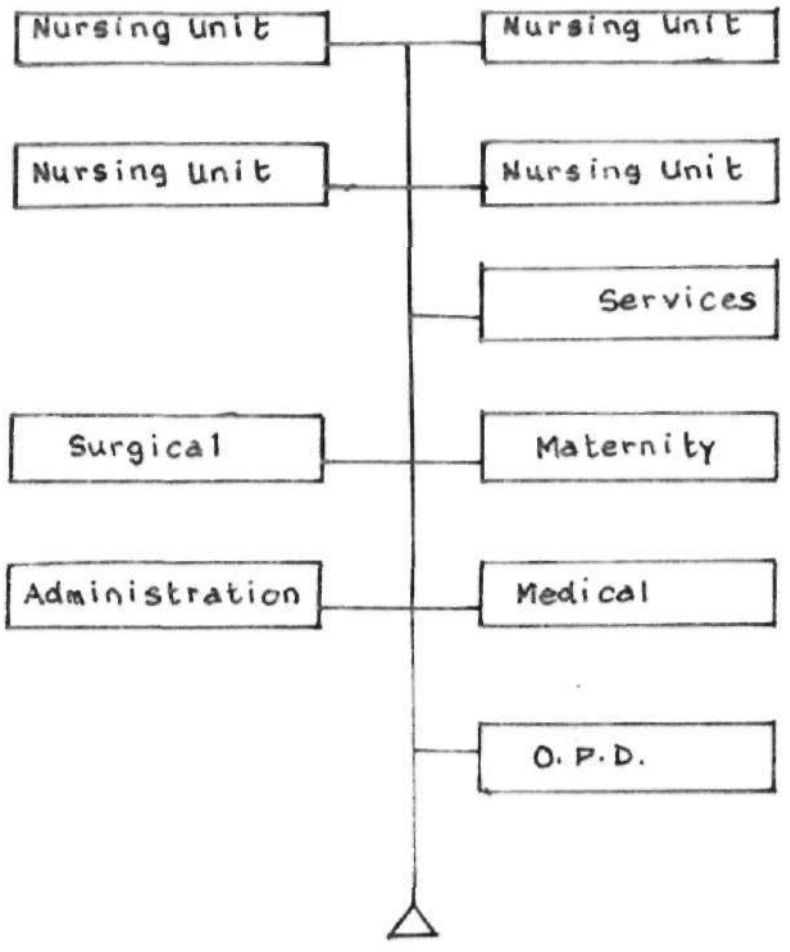


Fig 2.1. The Linear Plan

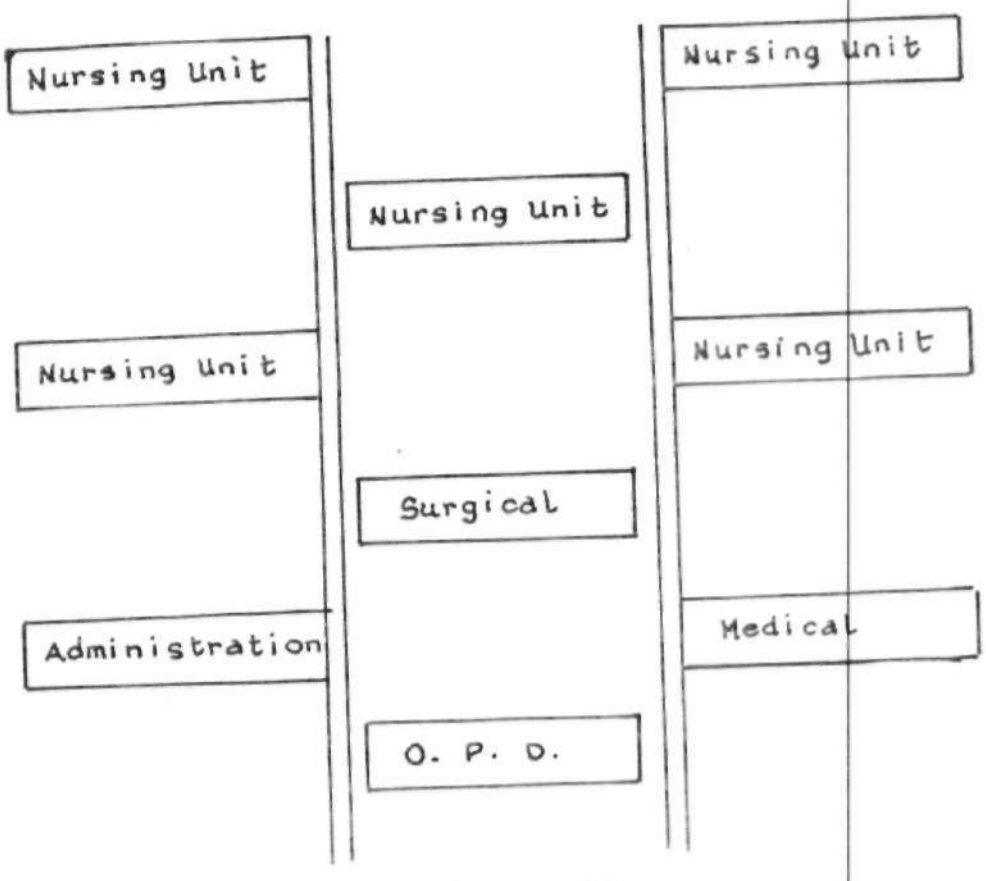


Fig. 3.2. The Reclinzar Plan

- Local materials could be utilised easily than high rise buildings which exhibit steel framework.
- Climatic conditions also contribute immensely.

2.4.2 Multi-Storey Type

This are high rise buildings mono-block with all the services encased in one building.

Advantages

(a) Rational stacking of structure and utilities
(b) The limited availability or high price of land.
(c) Simplification of circulation patterns.

Disadvantages

(a) Elevators are always insufficient and waste a lot of time of patients moving from one department to another and para medics going about their daily jobs.
(b) Inflexible and limited requirements for future expansion.
(c) Environmental conditions
(d) Expensive to build and maitain
(e) Overdependence on mechanical equipment.

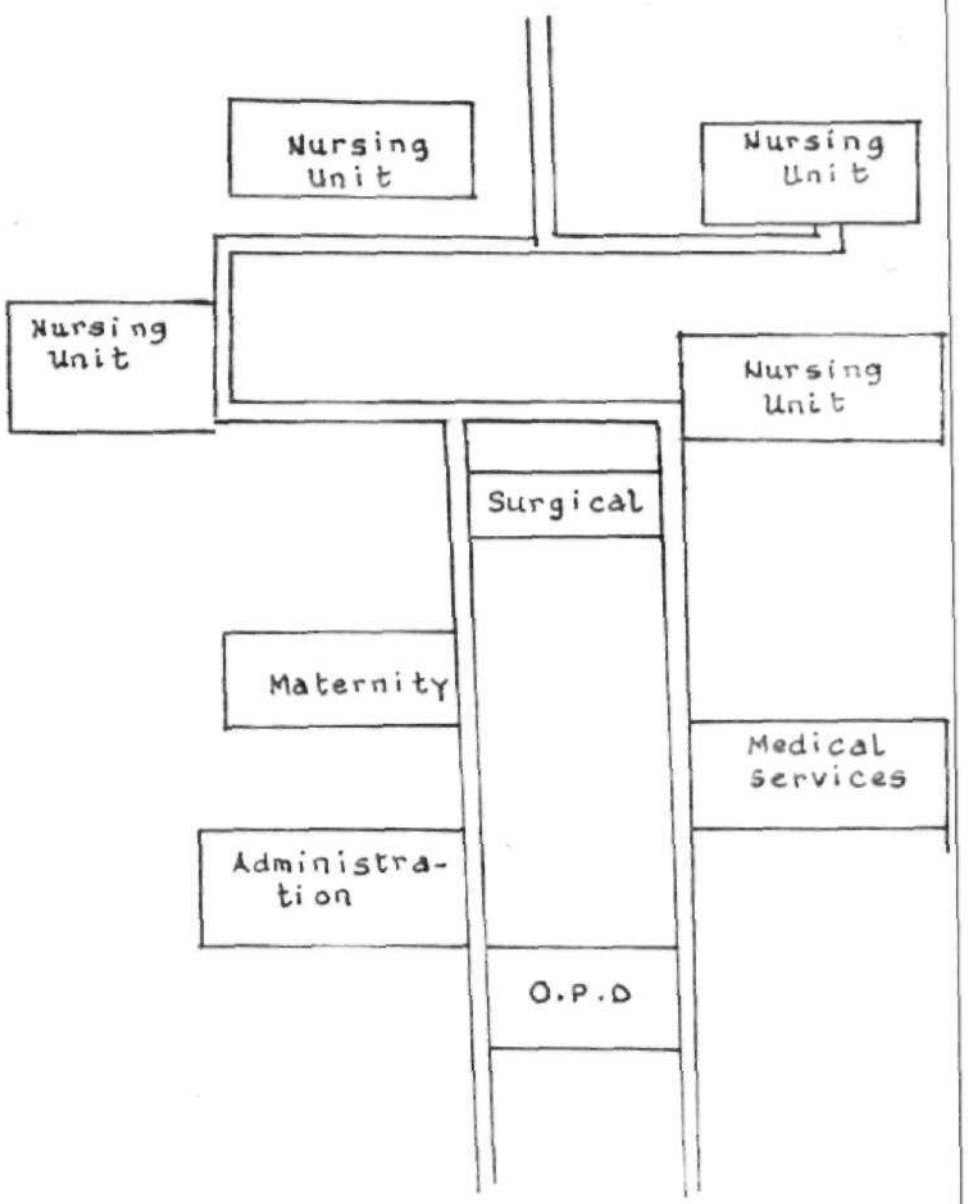


Fig. 2.3. The Dispersed Plan

2.5 Types of Pavillon Hospitals

There are three types of pavillon type hospital:

a) The Linear Plans:- In this plan buildings are placed along a central corridors with the buildings at right angles to it on both sides. It is good for most climates except where winds cause tunnel effect between the buildings. Its advantages are adaptibility to most sites, efficiency or circulation of people and services, and capacity for variation and expansion.

b) The Reclinear:- In this reclinear plan it consists of seperate rectangular blocks positioned to form a chequer board of building with open spaces with circulation along the co-ordinates of the grid which is flexible and easy to expand but extension of existing ones is difficult. It creates courtyards then can easily be landscaped.

c) The Dispersed Plan:- This was used in the past when land was not scarce, the circulation routes are long abd buildings are scattered, the disadvantage of this plan is the large presence of undefined outside spaces.

C H A P T E R 3

3.0 Scientific Advancement In The Medical World

There has been rapid scientific advancement in the medical world, that it has been easy to keep pace with this changes architecturally. Most of the equipments used in hospital change very often therefore amendments have to be made particularly in the aspect of space requirements.

3.1 Architectural Planning

Good Architectural Planning is important for example in the life expectancy of the hospital building. With time the physical structure of the buildings deteriorate therefore they should be designed with a life expectancy of about 100 years while that of the services of the hospital viz - lighting, ventilation, heating. Architectural planning therefore should reduce the physical inhibitions to future and unforseen growth and maximize the possibility for internal changes and room rearrangements.

3.2 Development in Medical Science

Development in medical science has been observed almost in every major branch of medicine, but notably in these aspects:-

(a) Surgery (Operating theatre suite)

(b) Delivery suite

(c) Radiology

(d) Laboratory

(e) Communications (medical records)

3.3 Surgery (Operating Theatre Suite)

Surgery occupies a unique position in the hospital. Clothed in an atmosphere of mystery, pervaded by fear and hope.

There have been improvements in aseptic techniques or chemical antiseptics and this has reduced sterilizin Ultra sound is used in lithotriper to break up kidney stores, also development of radiation techniques and the use of radioactive capsules incatheters have replaced surgery.

Nucrosurgery has increased as synthetic replacements for nerves and for certain organs become possible microwaves at high energy levels use heat to destroy cancerous tissue.

3.4 Delivery Suite

The departure from the archaic mode of obstertrics and ayneacology is inevitable because of the Diagnostic and therapentic know how available now.

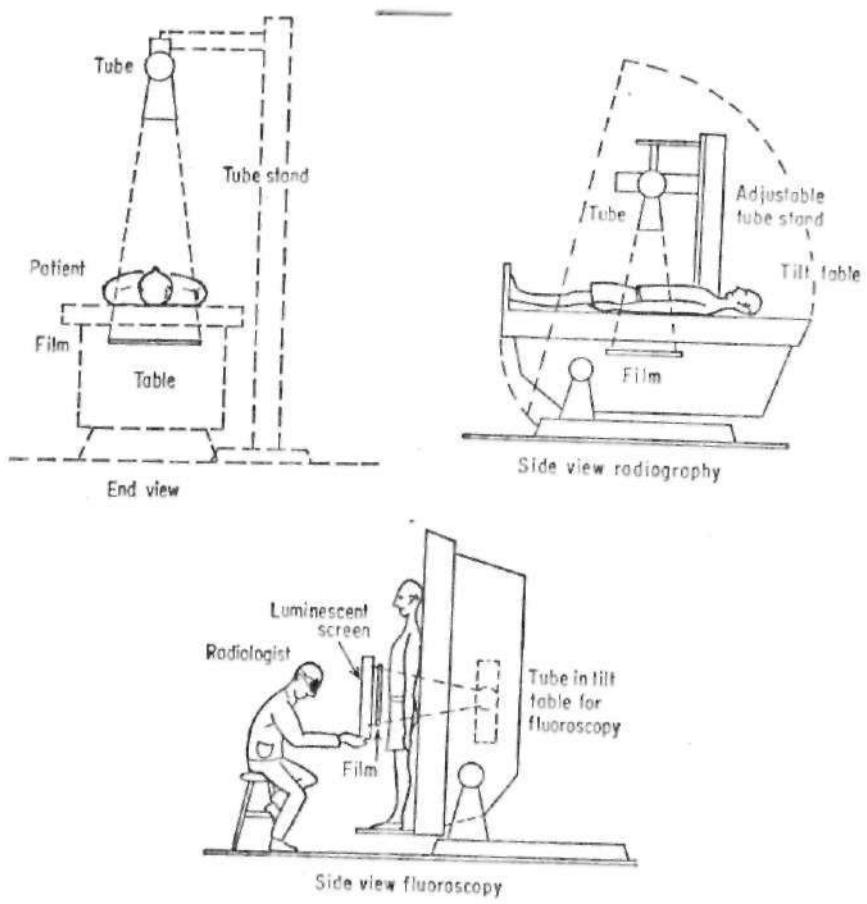


Fig. 4.4. Diagnostic radiology.

FIG. 3.1

Antiseptic agents and techniques have developed therefore asepsis is greatly reduced ultra sound equipment is used in foetus examination to determine sex of baby, or multipie preguances e.t.c for the diagnosis of gynaecology disorders fibre optic lighting in laprascope is used.

3.5 Radiology

The essential function of the diagnostic portion is take shadow pictures of vital parts of the human body. Some equipments used are:-

a) D.S.A. (Digital Subtraction Angiography) Equipment - this combines the function of the conventional fluoroscopic equipment with a computer.

b) Thermography measures the heat given off by the body cooler areas indicating painful parts of the body.

c) Ultra Sound ir which sound waves are used in the examination of foetuses; detection of internal organ abnormalities.

The various equipments like radiographic or fluoroscopic units and increase number of personnel calls for space expansion. The future of radiology is leaving more towards the use of computers.

2.6 Laboratory

The chemical Laboratory which is subdivided into nine parts:-
Chemistry, Bacteriology, Serology, Haematology, Parasitology, Histology, Pathology, Virology (B.M.R, EEG, EKG),. But most of the work carried out is more of automation and computerization. The flexibility in planning the laboratory is most desireable. But off setting this is the need for much built in equipment and also the seperation of some functions for asepsis because of odurs, noise or for protection from fumes or radiation.

In chemistry the new development is the auto-analyser while in microbiology the new innovation is the microproccessor.
The ascendance of automation is inevitable and beneficial. Machines to perform the routine tasks free humans for organization and interpretation.

2.7 Communications (Medical Records)

The Medical Records forms a most important link between patient care and administration. The Medical records also called the chart is initiated upon admission of the patient by typing on a face sheet his name, address and any other personal information,

this is then kept in a folder for future reference on subsequent visits to the hospital.

Another area in the communications systems is the nurses' call or patient nurse intercom, the doctors' in and out recording system, doctors' dictating the general paging system. Telephones also are an important necessity.

Sick room monitors which do not require interconnecting wires, they only need to be plugged into A.C electric supply for instant intercommunication.

Pneumatic tube system - systems connecting numerous locations, carries all forms of paperwork, telexes e.t.c All these improvements in communications reduce walking distance of the personnel and therefor improves their efficiency.

C H A P T E R 4

4. The General Hospit l Departments

The medical and health needs of the people have implied architectural implications. In s much s some form of physical accomodation should have to be provided;. Therefore the General Hospit l Benin shall consists of the following Departments:-

Out--Patient

/ccident and Emergency

In--P tient Surgical W rds

In--Patient Obstetrics and Gynaecology Wards

In--Patient Paediatrics Ward

In--Patient Isolation W rds

In--Patient Medical Wards

Pathology

Radiology

Physical Therapy

Pharmacy

Administrative

Central Sterile Supply

Catering)
Mortuary) === Services
Maintenance)

4.1 In-Patient Areas

In-Patient areas are the distinguishing Characteristics of hospital as distinct from other types of health buildings. With the exception of Out-Patient Departments each major hospital operational function relates to the In-Patient areas. In-Patient areas are generally the largest single component of a hospital, although the proportion of space they occupy and the area allocated to each bed varies between countries as shown below:-

Table 4.1

	In-Patient areas as % of total Hospital area	In-Patient area m^2 per Bed
United Hingdom	41 - 56	21 - 27
Brazil	44	20 - 24
Africa	40	8

4.2 Function

The prime function of inpatient areas is to provide accomodation for patients at the point in an illness when dependence on others is at its highest. Three broad functions are obeerved:-

- Normal body activities for which the inpatient unit serves as a substitute for the home.

- Treatment, including examination, drug administration, ambulation as a therapy
- Preparing the patient to return to domestic life including rehabilitation and retraining.

4.3 Variety of Accomodation Needed

There are certain medical specialisties which are normally treated in special accomodation for medical or social reasons, these include communicable diseases like tuberculosis, leprosy e.t.c. Whether wards are for men, women or children or whether they are for medical or surgical cases does not affect their design, similarity of design also improves their flexibility potential.

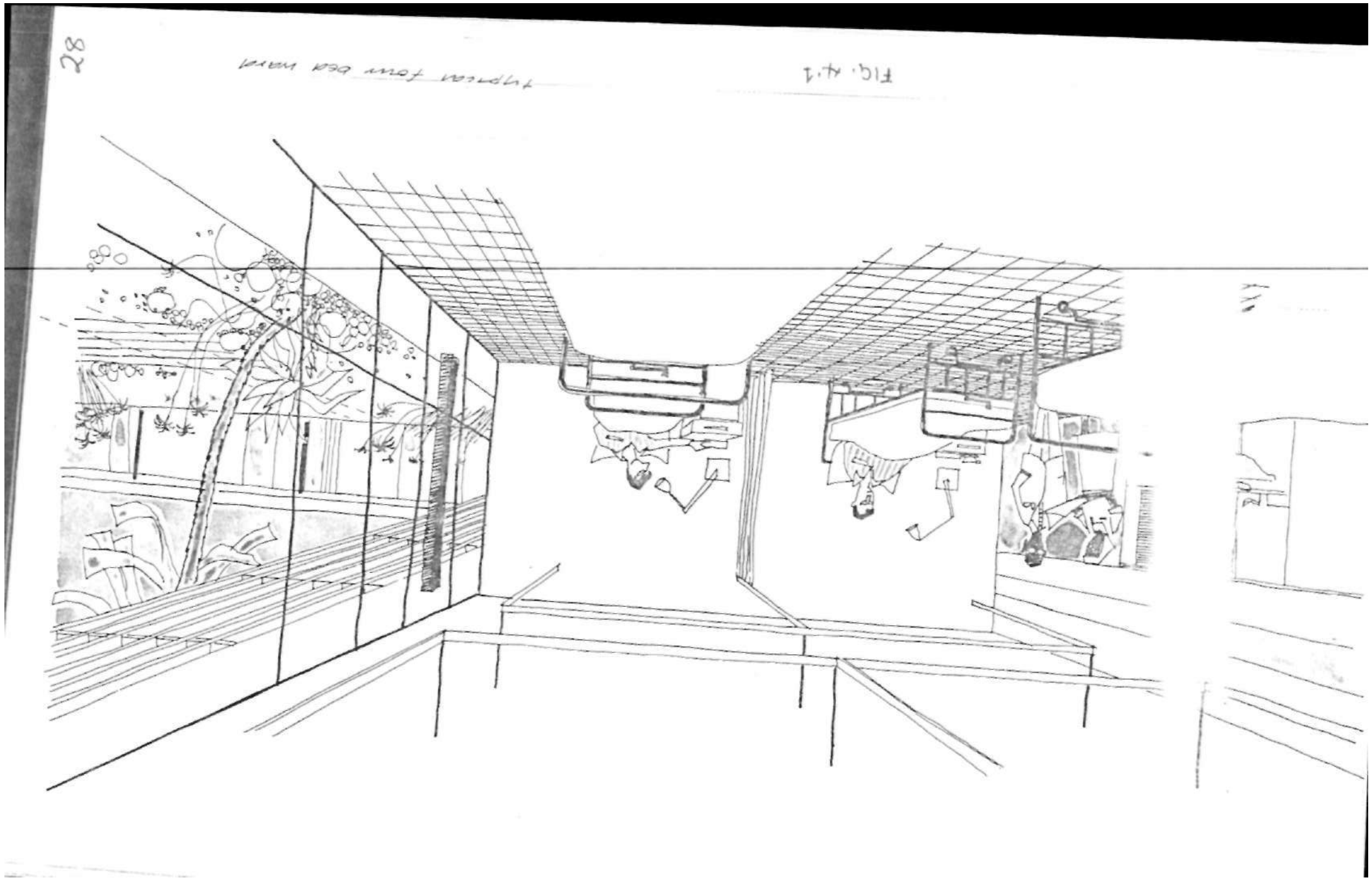
4.3.1 Principles of Ward Design

a). Due to the shortage of skilled labour and the overcrowdedness of our hospital putting the range of beds controlled by the ward sister is 28 - 32.

b) Single rooms are necessary for some reasons like clinical or for privacy but should be few in number for economic reasons and for its relative inflexibility.

Typical four bed room

Fig. 4.1



c) The Nurses station which is a nerve centre in ward design it is a useful control centre because on complete clarity and should be accessible to the patients.

d). Sanitary Facilities should be proportional to the beds and

e). Surgical Wards should be close to operating suites while the maternity should be linked to the Labour/Delivery suite not at one end of the ward.

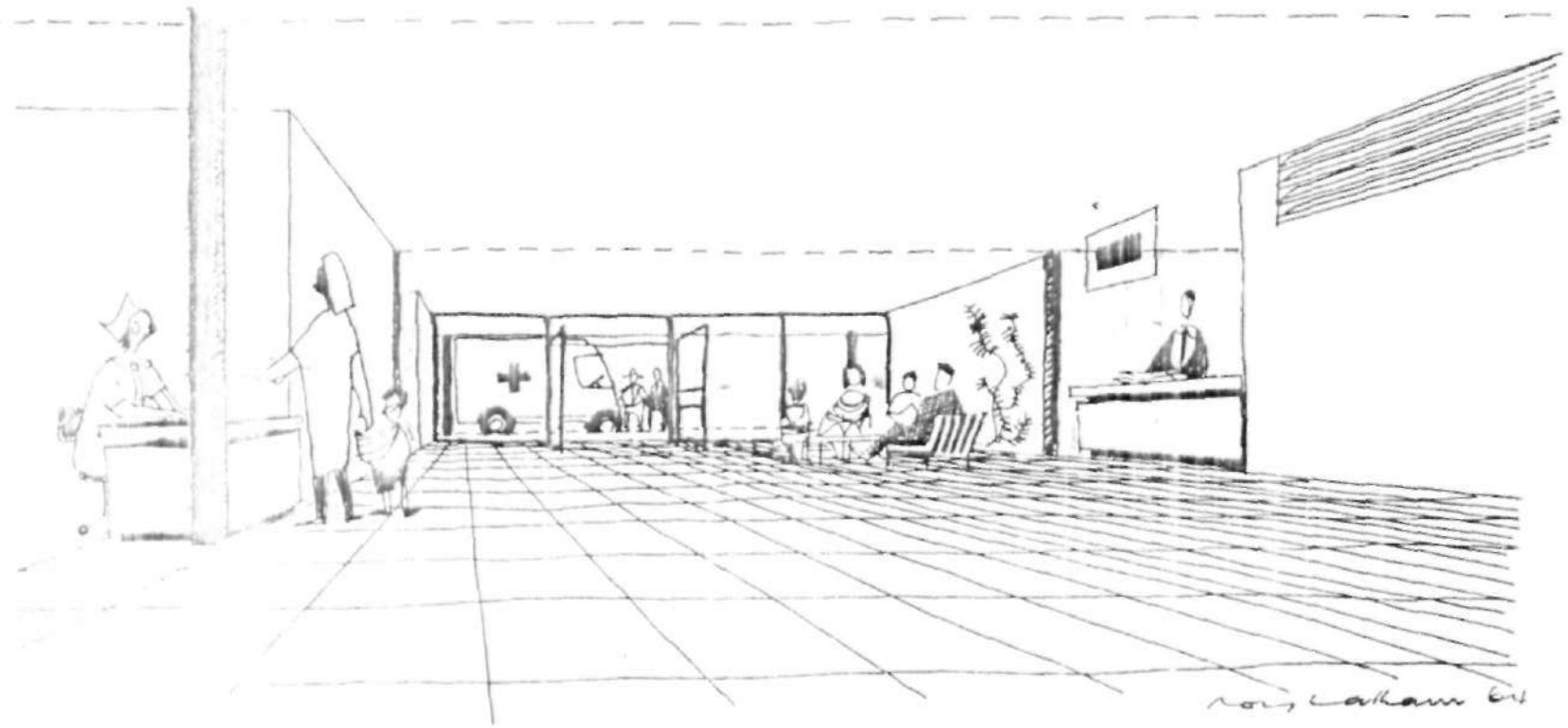
f). Fire hazard is also an important factor, where accomodation is planned at ground level only, escape through doors to the verandahs courtyards or into the hospital ground is readily available.

4.4 Out-Patient Department

An Out-Patient is a person given general or emergency diagnostic, therapeutic or preventive health services provided through a hospitals facility who at the time is not registered as an in-patient in the hospital. The patient can be refered by appointment, examination or treatment.

4.4.1 Location

Concerning the Out-patient Department to be an integral and major department of the hospital.



main reception area in out patients department

Planners are locating such facilities inclose proximity to other services. The Emergency Service Unit a major responsibility of the Out-Patient services has been found to be best located at a part of the total Out-Patient area.

Physical arrangements such as patient flow patterns sufficient waiting areas, entrance ways, design of emergency areas to accomodate increased and varied medical problems. Well designed areas for filling and storage of medical records and various other rooms for special and particular clinical work are also essential. The Department should be situated so that is easily reached by both the walking public and vehicles. Out-Patient should not have to pass through any other part of the hospital to reach the department. The sequence of treatment is reception, registration waiting, consultation.

There are two types of consulting suite and a consulting examination rooms or smaller consulting rooms with adjoining examination rooms.

The department consists of clinic in all the branches of medicine.

4.4.2 Accident and Emergency (Casualty)

This has a direct link with the Out-Patient Department, but the hospital must be able to deal with casualties and emergencies with mixing them with other out-patients; for this they need:-

/ Reception/Waiting Space partially screened from the entrance.

/n entrance seperate from hospital entrance.

/n adequate drive and parking space for the ambulance.

Examination and Treatment rooms

/ minor operating Surgical Suite

/ few Observation beds

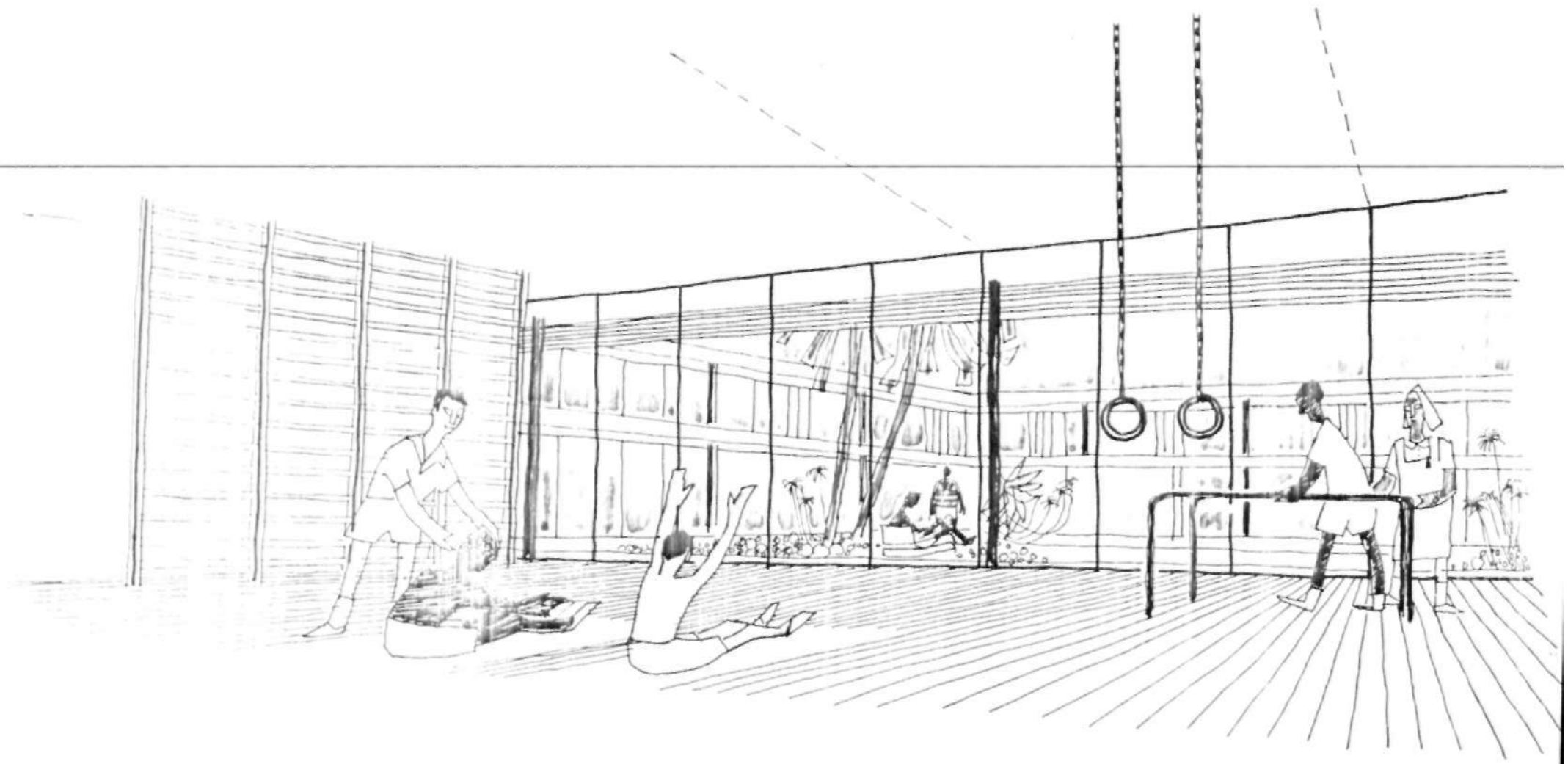
/ small office for the clerk.

4.5 Radiology Department

This department is a prime diagnostic aid,and also offers radeation theraphy, it receives in-patients, out-patients and casualties.

Its function is to photograph shadow pictures of vital parts of the human body, process film and provided facilities for its interpretation and storage.

Xray rooms are equiped with photographic machinery of considerable sophistication, some of which need ceiling support.



~~Part of second floor~~ of physical medicine ~~block~~

FIG 4·3

Dark rooms are used for processing of films Ancillary accomodations like offices for radiolagists, changing cubicles, storages of current exposed films Barium examinations require seperate preparation rooms for rectal washing, with toilets. Immediately adjoining and small recovery rooms in which out-patients can rest before leaving the hospital.

4.5 Physical Theraphy

The function of this department is the rehabilitation of patients, this includes exercise manipulation, message, thermal treatment e.t.c Each treatment may take considerable time and hence this department does not handle large numbers of patients daily.

The Department comprises two related sections Physiotherapy - principally treatment by massage exercise, heat or electricity for the restoration, for instance of the limbs after injury.

Occupational Theraphy:- is the treatment of physical and mental disorders, by means of craft or manufacturing activities frequently related to the patients lifestyle outside the hospital.

The facilities for the physiotheraphy include an exercise room, which serves as a mini gymnasium,

a section for hydrotheraphy, office for phyciatrist, changing rooms with locker rooms for the Staff.

While facilities for the occupational therapy include a main therapy room, which serves as a workshop for woodwork and light metal work its usually supervised by a technician, this room is likely to be noisy it should therefore be isolated, another light workshop is also needed, storage for heavy equipment and lockers for Staff. There might also be an access to a protected space of out doors.

4.7 Pathology Department

The essential function of the department is to carry out diagnostic tests on specimens from out and in-patients.

These specimens are taken from patient blood, urine e.t.c. Laboratory work is carried out in self contained sections of large open areas and smaller offices. For design considerations allowance should be made for growth and change. It should most probably be located in the ground floor area; planning shouldn't inhibit anticipated change in space between one clinical area and the other.

Uncontaminated air should'nt blow in the direction of the kitchen or operating suite.

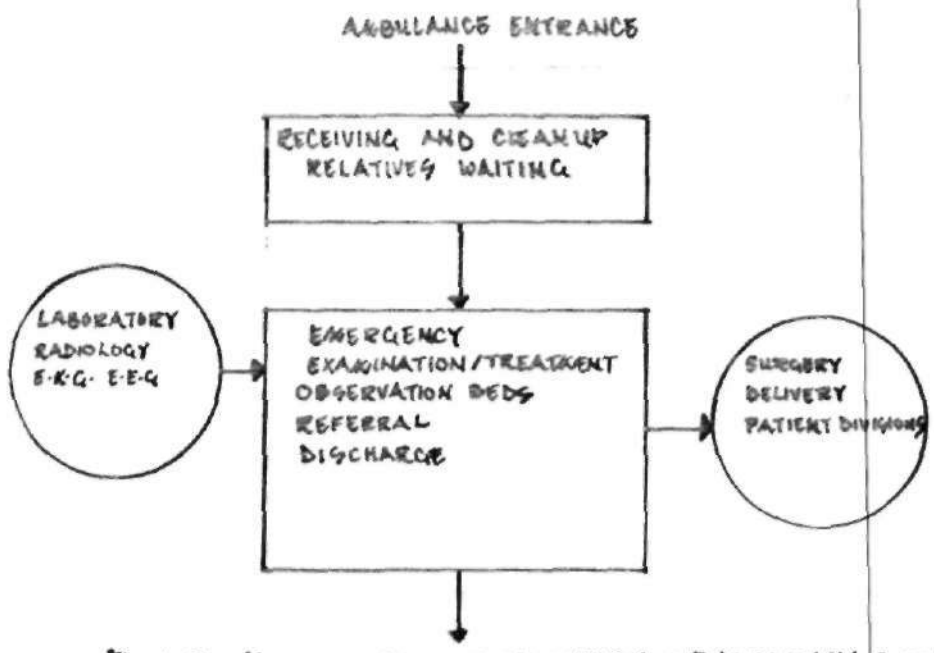


Fig 4·3. FUNCTIONAL RELATIONSHIPS,- EMERGENCY SUITE

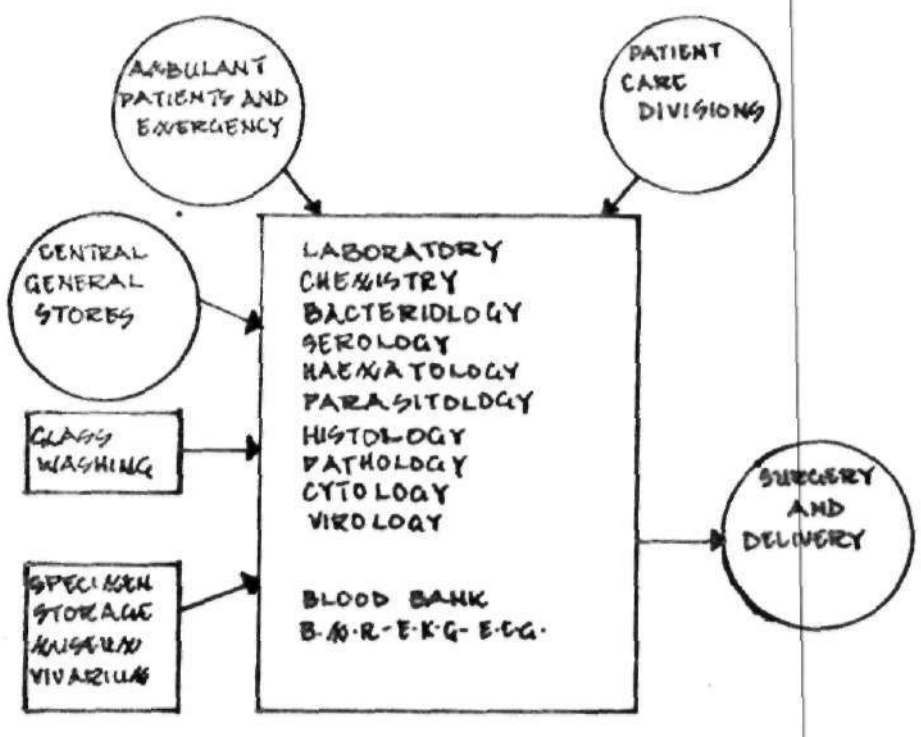


Fig 4·4. FUNCTIONAL RELATIONSHIPS,- LABORATORY

5.3.2 Accomodation

It is low rise hospital building, pavillon type a few of them are of one storey hieght. The hospital has a 276 bed compliment.

Access to the wards is through the stairs. In addition the hospital has the following facilities, surgery, medicine, labour rooms, operating theatre suite, X-ray. There are about 10 units that have a breakdown of various consulting rooms.

In the Eye clinic thex are 5 consulting rooms and 1 treatment room and Nurses bay, One of the consulting rooms for 3 junior doctors and the other 3 for consultants the one left is for the Opticians.

The Surgical Department has 6 consulting rooms, 3 nurses rooms, and 1 injection and dressing rooms.

The Medical clinic has 8 consulting rooms, 3 nurses rooms and 1 treatment room, 2 out of these consulting room is for junior officers.

The Gynaecology clinic 2 consulting rooms.

The E.N.T. clinic has 2 consulting rooms.

The General Out-Patient Department has 6 consulting rooms not all are being used though because of shortage of doctors. In this unit patients are seen and referred to the various departments.
In the Casualty department there are some conculting rooms reserved for staff while the rest are reserved for the public.

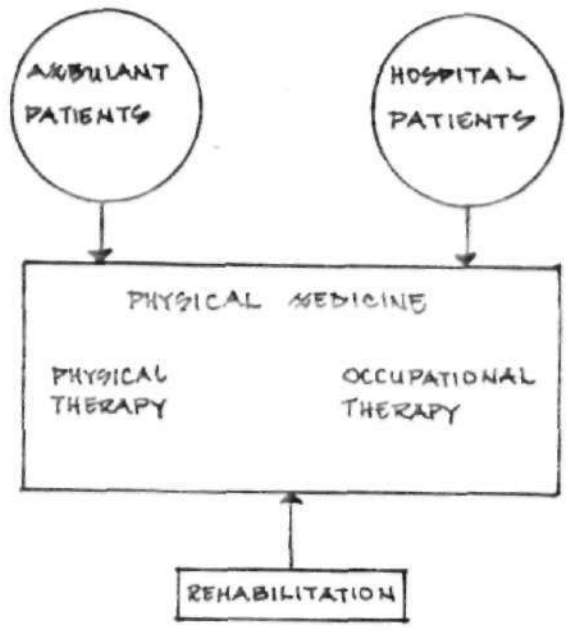


Fig 4.5. FUNCTIONAL RELATIONSHIPS - PHYSICAL MEDICINE

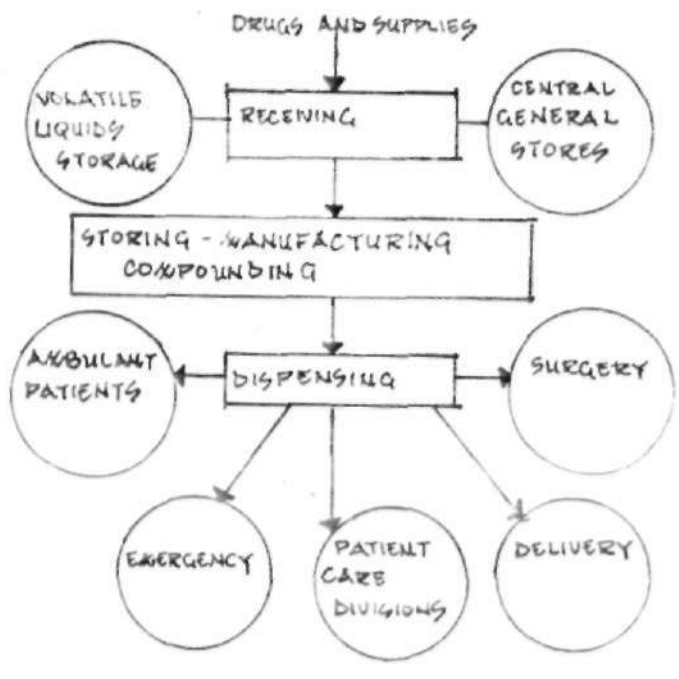


Fig. 4.6 FUNCTIONAL RELATIONSHIPS - PHARMACY

these areas need clean air, therefore considerations needs to be given to this during planning.

4.3 Pharmacy Department

The hospital pharmacy department is the department in the hospital from which all medications are supplied to the various nursing units and out-patient department. The essential functions of this department are:- Dispensing, Compounding and manufacturing; it is also a department where the medical, dental, nursing and other staff members find helpful consultative advice relative to current drug theraphy.

The Pharmacy should be located on the ground floor in the centre of activities. A convinient location for the dispensing window is on the route followed by the ambulant patient as he leaves the hospital, proximity to the Out-Patient department is very important.

The facilities required include storage space for goods to be dispensed, a dispensing window, waiting space for the customer. The pharmacy should be close to the hospital central stores for convinience.

4.4 Central Sterile Supply Department

In this Department items have been returned from the departments these are cleaned, assembled

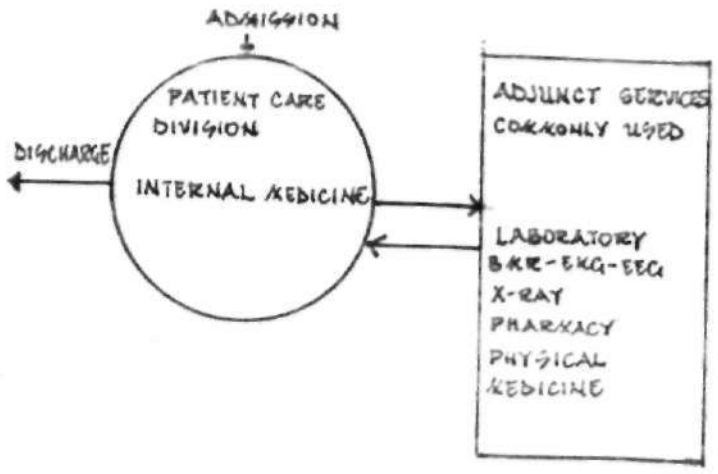


Fig 4.7 MEDICAL DEPARTMENT(PATIENTS FLOW CHART)

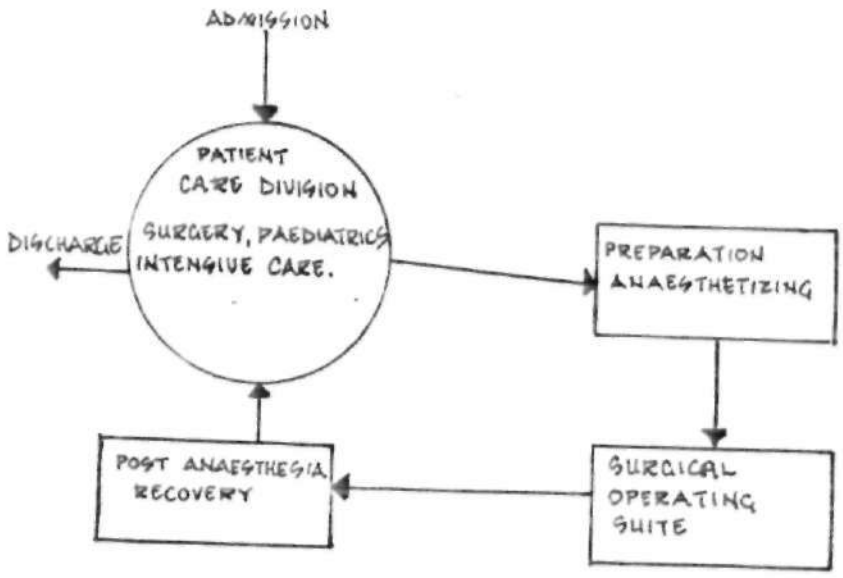


Fig. 4.8 SURGICAL PATIENTS

put in packs, sterilized and stored for distribution when needed.

The department should be in the hospital's service zone to simplify the reception of goods, proximity to the central stores and other departments of the hospital are essential.

4.10 Mortuary Department

This is the Department in which corpses are kept, it has two distinct functions:-

(a) The reception of corpses from wards and refrigeration until they can be collected by relatives and undertakers.

(b) Carrying out post morterm examination to confirm or establish cause of death.

Proximity to the morbid anatomy section of the Pathology department is necessary. Facilities needed include Post Mortem table, also there should be downward ventilation through tables for prevention of contamination as infected bodies are dissected.

Body Storage is in three tier refrigerated compartments. Seperate compartments should be provided for infected bodies.

Location: It should be located on the ground floor and the external access for undertakers vehicles should be screened.

4.11 Administrative Department

The Administrative Department forms a most important link between patient care and administrator it has a special concern for public relations conciously and continually.

It normally consists of the hospital administrator or Secretary, Clerk and the Medical Records department which is an important branch.

Most of the facilities needed here will be in the form of filing space and cabinets for the medical records and offices mainly for the administrative department.

4.12 Catering Department

The functional elements of food service include procurement preparation, distribution, and disposal. Food Services to patient areas may be by a pre-set tray system or by bulk food trolley.

Central Staff dining room should be related to the cooking area of the kitchen. Subsidiary dining rooms or snackbars may be provided elsewhere in the hospital.

The catering department should be located near the access because of supplies and frequency of delivery of large quantities of unproccessed food.

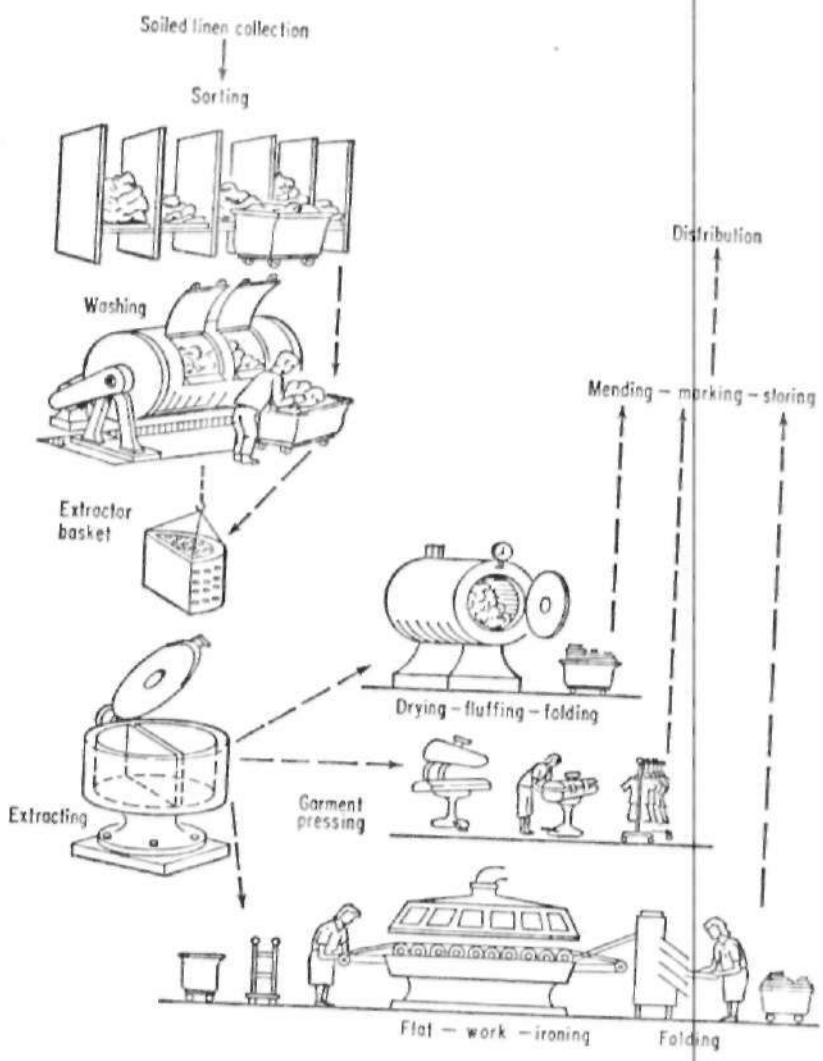


Fig. 5.8. Processing hospital linen.

FIG 48

4.13 Maintenance Department

In modern hospital building as much as 50 percent of the total capital investment is represented in the mechanical and electrical installations, and these need regular attention and occasional service; this is done by the maintenance department.

There could be a large workshop which will include carpentary, painting, Electrical e.t.c It should be located in a area where it is readily accessible to those they serve, yet out of sight of the public and patients generally.

The Out-Patient Department in front closes off the other parts of the hospital.

The buildings are low storey buildings except some of the wards are one storey buildings.

Landscaping: There is no elaborate land scaping within the hospital itself. The hospital layout achieves a courtyard system and within these court-yards are landscaped lawns.

Parking:- There are no visual parking problems but the parking is not planned but most of the staff park close to the buildings or by the flowers hedges Visitors' parking wasn't taken into consideration also.

5.2.1 Circulation

Circulation within the hospital is by means of corridors linking the various departments most of the corridors are tiring and also reduce efficiency workers. The Out-Patient department though is not linked to other departments except the pharmacy and medical records department.

5.2.2 Accomodation

The hospital provides accomodation for the following wards which are divided into specialties viz: medicine, surgery, paediatrics, obstetric and gynaecology, ear, nose, and throat (E.N.T) special care Baby Unit e.t.c.

The wards are located in the quiet zones away from the roads or noise from the out-patient department The wards are the open wards Florence Nightingale type with a nurses station at the centre of the wards, the wards have windows on the two main walls thus allowing for maximum cross ventilation. The wards are of 30m beds capacity and there are few wards that are of 28 beds in the open ward and two single rooms.

Out-Patient Department

This is low-rise building (ground floor), it is linked to the accident and emergency unit (casualty department) which offers 24 hours service The out patient department consists of general out-patient clinics; obstertrics and gynaecology clinics; Dental and E.N.T. clinic, Eye clinic, consultative out-patient, clinic of medicine; surgery and paediatrics.

The out-patient department is closely linked to the medical records department which is most convinient for easy access to hospital case notes and cards. There are two waiting rooms in the out-patient department, the first is for patients waiting to get their cards and the second one is for patients waiting to be called into the consulting rooms.

There are four consulting rooms, i one room for treatment and dressing, one injection room, This complex is a major traffic generator, its location is therefore significant as it is accessible from both entrances to the hospital and away from the more quiet areas of the hospital. The major problem with the out-patient department is improper natural lighting ventilation. The consulting rooms are not adequately ventilated and they are dark.

The Departments are linked together by long corridors which make walking round the hospital tiring, thereby reducing the efficiency of the hospital staff.

Most of the patients are from close catchment areas or referred from local government areas in Bendel State and some from outside Bendel State.

Treatment and Diagnostic Services:

This include the pathology radiology department e.t.c Most of the service are located on the ground floors, they are easily accessible to both in-patients and out-patients.

Operating Theatres+

The operating theatres are divided into suites, there is a minor operating theatre attached to the accident and emergency department.

There are two other operating theatres which are minor. There is clear separation of clean and dirty areas for the maintenance of asepsis. There is an anaesthetic room before the operating suite. Visual contact between the anaesthetic room and operating suite is by observation panels.

Services:

The laundry kitchen, Generator house are located towards the back of the hospital, but the kitchen is not far from the wards, the foods is served by trolley service.

/dministration

The administration department is located close to the out-patient department. There is a well kept lawn in front of it and this is the only area where the parking is planned.

The building is a low rise building that is linked to the circulation core of the hospital.

5.7.3 Construction

The Structure is of reinforced concrete columns finished with concrete hollow blocks it is plastered and painted to finish, some buildings are also built with wood.

Finishes:-

Wall finishes are mainly paints on cement plaster except in the buildings finished in wood and also in the X-ray room where special precaution against radiation calls for the use of concrete on barium plaster floor finishes are mainly terrazzo, grano and ordinary screed floors.

5.2.4 Expansion Facilities

The layout of the hospital does'nt allow expansion, expansion facilities are almost nil, because most of the available land has buildings on it.
The site is advantageous in the sense that it can a easily be accessible from different areas of Benin.

5.3 General Hospital Lagos

History

General Hospital Lagos was established in 1926, it is owned by the Lagos State Government and managed by the State Hospital Management Board. The out-patient department was opened in 1963.

5.3.1 Site

The hospital is located on the broad Street (Odan) it is bounded on the other side by Marina. The location is in an area where there is usually traffic congestion, and expansion is difficult this is the Central Business district where land is scarce and expensive.

5.3.3 Administration

The general administration is under the hospital Secretary. He takes care of staff complaints, purchases maintenance etc. The hospital secretary is responsible also for correspondence of hospital with the outsideworld and the daily running of the hospital.

5.3.4 Patients

Most of the patients are referred by Health Centres and some from nearby environs to Lagos State. While some come on their own directly to the hospital

Patient Travel

A patient coming into the hospital for the first time will enter the entrance/registration/ patient waiting area, register and wait to see the appropriate doctor. The doctor examines the patient and then refares him/her for adjunct services viz laboratory tests, X-ray etc. or to the clinic responsible for his ailment after he has seen the doctor he is billed and precription is given which if the pharmacy has he can collect if not its (drugs) bought outside the hospital.

5.3.5 Quality

For the span of the buildings the quality can be said to be good though it doesn't conform with the modern design of general hospitals and the

buildings close to it. The hospital is clean, it would just need some renovation.

5.8.5 Problem/Shortcomings

The location of the site in the city centre where land is expensive and scarce imposes a restriction on expansion, moreover there are no expansion facilities because the hospital is bounded on all sides by major roads.

- Due to the lack of technology know how in the country most of their X-Ray services cannot be carried out because of the breakdown of machines therefore diagnostic tests (Laboratory tests inclusives) are carried out outside the hospital therefore placing the reliability of the results in doubt.
- The medical records office is adjascent to the waiting halls in the out-patient department and like other hospitals the spatial requirements are not adequate, most of the files (case notes) are thrown about making it difficult looking for patients files.
- The parking problems encountered are by visitors to the hospital they have to utilise off street parking. There is adequate parking for the staff inside the hospital compound.

- There is no landscaping per se in the hospital but there are a few courtyards that are within the the wards, this acts as a source of ventilation; glare is reduced because the wards are ell oriented.

5.4 Ahmadu Bello University Teaching Hospital Tudun-Wada Zaria

Ahmadu Bello University is located in Tudun-Wada Zaria its on hospital road which leads into Zaria City. The site has an Ingress/Engress from hospital road. There is another access which leads directly to the administration and Dental Clinic. Branches of the hospital are in Malunfashi and Kaduna.

5.4.1 The Site

Layout:- The hospital design though low rise pavillon type, buildings are located on either side of the street in parallel and perpendicular directions. The Out-Patient department in front closes off the other parts of the g hospital.

5.4.2 Circulation

Circulation within the hospital is by means of corridors, some shaped like ramps. There is a main street on which the wards are housed they are perpendicular to the road. There are walkways close to the road which staff and visitors pass.



PLATE I

OUT- PATIENT DEPARTMENT OF THE NEW A.B.U TEACHING HOSPITAL ZARIA

5.4.3 Accomodation

Wards:- There are fifteen wards accomodating 446 beds. The wards are divided according to specialities; viz Cynaecology, Maternity with delivery suite Paediatrics, N.P.U, Casualty, New accident wards etc. They are placed away from the out-patient department and other noisy areas. Their location ensures a good view of the greenery between the wards. Generally the, location gives a feeling of contentment to the patient.

Out Patient Department

This is a low rise building close to the entrance, it is a linked with the casualty, (accident and emergency), to the pharmacy and to the Surgical out-patient department which compress ENT and other surgical clinics. It also consists of the Obstetrics and Gynaecology clinics, Eye clinic, the general out-patient department clinic, the dental clinic is a modern building with an internal courtyard it is quite detached from the out-patient though, The general out-patient department has its own Laboratory= and office for the unit head, Injection and dressing room, treatment room, and waiting areas for patients that want to see the doctor.

There is a records office room close to where the cards are issued to patients.

There is also three consulting rooms. The consulting room is quite bright because it is ventilated room both sides. The area is about $5m^2$ there is a screen to cover the examination table, a wash hand basin for the doctor, 3 chairs - one for the patient and the other for the auxillary nurse who normally assists the doctor in consulting.

Treatment and diagnostic Services:

These includes the radiology, pathology department etc. They are located near the out-patient department, the facilities are very good, patients get results of laboratory tests, and X-ray results therefore they don't need to go out of the hospital for any of these functions.

Accident and Emergency:

This is located close to the general out-patient department, there is actually a direct link to the accident and emergency it is connected by a ramp, the resuscitant are up to standard but "demand is greater than supply" as patients were seen lying on matteresses on the floor, though a few were on the bed, that means these patient were an outflow from the observation rooms. Most of the patients were rushed in due to one emergency or the other.

Services:

The laundry, kitchen, generator, supply departments are located far away from the quest zone that is the

302798

ward areas, food is served to the patients but most of the patients have relatives bring in food for them during visiting time because of the normal complaint - the poor quality of food.

Administration:

The main administration department of the hospital is located opposite the medical library it is a low rise building, adjacent to the cultural car park. The building houses all the offices of the administrative workers. There is a corridor for general circulation within the building. It is linked to the hospital by a pedestrain walk way.

5.4.4 Construction

Structure:- The structure is of reinforced concrete columns with reinforced concrete floors. The infilling material is of hollow blocks plastered and painted to finish.

Finishes:- All finishes are mainly paints on cement plaster, it painted and rendered both internally and externally.

Floor finishes range from terrazzo to cement sand screed.

5.4.5 Problems

Expansion Facilities:- All avenues for expansion facilities have been exhausted most of the areas have been closed up by one department or the other, hence

a bigger and modern hospital complex is being constructed in Shika in Zaria.

Landscaping:- Though landscaping is not adequately taken care of; there exists a few lawns and courtyards between wards and departments; this aspect definitely needs more improvement.

Parking:- Though its adequate for staff/Visitors, a problem exists during park hours, but this is not a major problem as some departments also have their own car parks.

Synonymous also to other government hospitals there is a shortage of drugs and equipment also there is the shortage of doctors therefore one consulting room in the general Out-Patient Department is not being used.

The buildings of the hospital could have been multi-storey to reduce the long walks made by staff round the hospital.

The wards don't have a common room for relaxation and interaction among patients.

For these and other problems suffered by the hospital the new site is very necessary.

5.4.6. A.B.U. Teaching Hospital Statistical Returns January, 1986

Table 5.1.

	FEMALE		MALE		
	New	Total	New	Total	Total
G.O.P.D.	868	1420	931	1772	3327
Paediatrics	690	1212	555	1023	2235
Road Traffic Accident		146		25	171
Total Acct. Emergency		388		421	809

In Patients

Table 5.2

	Male	Female	Total
Admissions	362	461	823
Discharges	365	417	712
Deaths	47	31	78

Table 5.3

Operations	Major	Minor	Total
Gen. Surgery	157	106	263
Obstetrics	59	415	474
Gynaecology	119	--	119
E. N. T.	2	--	2
Traumatic Orthopaedics	34	--	34

Table 5.4

Radiological Examination

Number of Patients X-rayed

(a) Out-Patients 517

(b) In-Patients -- 660

Total No of Patients X-rayed = 1177

- A.B.U. Teaching Hospital Statistical Report 1986



PLATE IV

WARD BLOCK OF A.B.U TEACHING HOSPITAL SHIKA

5.4 Ahmadu Bello University Teaching Hospital Shika

5.4.1 History

This is the new site of the Ahmadu Bello University Teaching Hospital, it is located in Shika on the Zaria - Sokoto road.

The Hospital though its near completion its still under construction; the contractors are the New Nigerian Construction Company.

The construction is divided into two Phases:

The Phase 1 of the hospital consists of 1 ward block of 293 beds; Phase 1A is a further bed compliment of 244 beds making a total of 537 beds.

5.4.2 The Site

The Site is in Shika which is close to Samaru where the University is located. There are two distinctive main gates for ingress/Engress. Access into the O.P.D. complex is not yet distinct but from the main internal road there is a link.

Layout:- The hospital design is complex, the ward block behind and the out-patient complex in the front closes off the other parts of the hospital. The buildings are of 3 - Storey height with a basement, this houses the ward block. The out-patient department is a low-rise Octagonal shaped complex parallel to this there is the central supply stores.



PLATE II

OUT- PATIENT COMPLEX OF THE NEW A·B·U TEACHING HOSPITAL SHIKA.

Landscaping:- This is non existent since the debris of construction has'nt been cleared moreover the lawns are still unkempt and trees still occur haphazardly all over the site.

Circulation:- This is by long corridors and ramps some of which slope at an acute angle. Elevators are going to be used in the hospital, but stairs are located at conspicous points to discourage the over-independence on lifts.

Accomodation:- The Bed compliment as of now is 208. Facilities available include 1 ward block- Obstetrics and Gynaecology, Central Kitchen, Staff dining room, Central Medicine Stores, C.S.S.D., maintenance Mortuary and Laundry.

The Phase 1A with a further 244 beds will have to operating suites and 2 C.P.D theatres and the C.P.D. is projected to accomodate 1000 patients/ day.

5.6.2 The Out-Patient Department

These are a complex of Octagonal shapes housing also the accident and energency unit they are all linked together, they all have openings like courtyards between them, this therefore acts as source of ventilation.

Since the O.P.D. is a generator of traffic its location is therefore significant as it is accessible from both entrances into the hospital. There are quite a number of openings which contribute to natural lighting.

5.6.4 Construction

The design is quite modest, good aesthelies has been displayed. It conforms with the environment the buildings are well oriented.

Structures:- It is made of light steel frame of reinforced concrete columns arranged in a grid pattern with reinforced concrete beams and floors. The infilling materials is of hollow blocks plastered and painted both internally and externally.

The roof is of softwood board on timber with a parapet running round the length and breadth of the whole building.

Finishes:- Wall finishes are mainly paints on cement plaster. Tiles are used also in the toilets and kitchen.

Floor finishes are mainly terrazzo, cement sand screed.

The ceiling also range from painted under surface to suspended ceiling.

5.6.3 Shortcomings

Presence of too much openings in the ward block might enhance too much glare which is injurous to the health of the patient.

The ramps and corridors measure long distances which make walking tiresome.

5.6.4 Expansion Facilities

The layout of the hospital allows for easy external expansion, there is availability of land for future expansion even after the two phases have been executed.

5.7 Hermann Hospital Houston Texas, U.S.A

5.7.1 History

Hermann Hospital was established in 1925, it is the cornerstone of the texas medical Centre The hospital is a tri-pavillion, that is it has three wings viz - Robertron, Jones, Cullen. It has been the primary teaching hospital for the University of Texas medical school since 1970.

5.7.2 Site

The site is planned such that the existing landscape suffers from the barest minimum interruption. Thus many of the features of the landscape are retained.

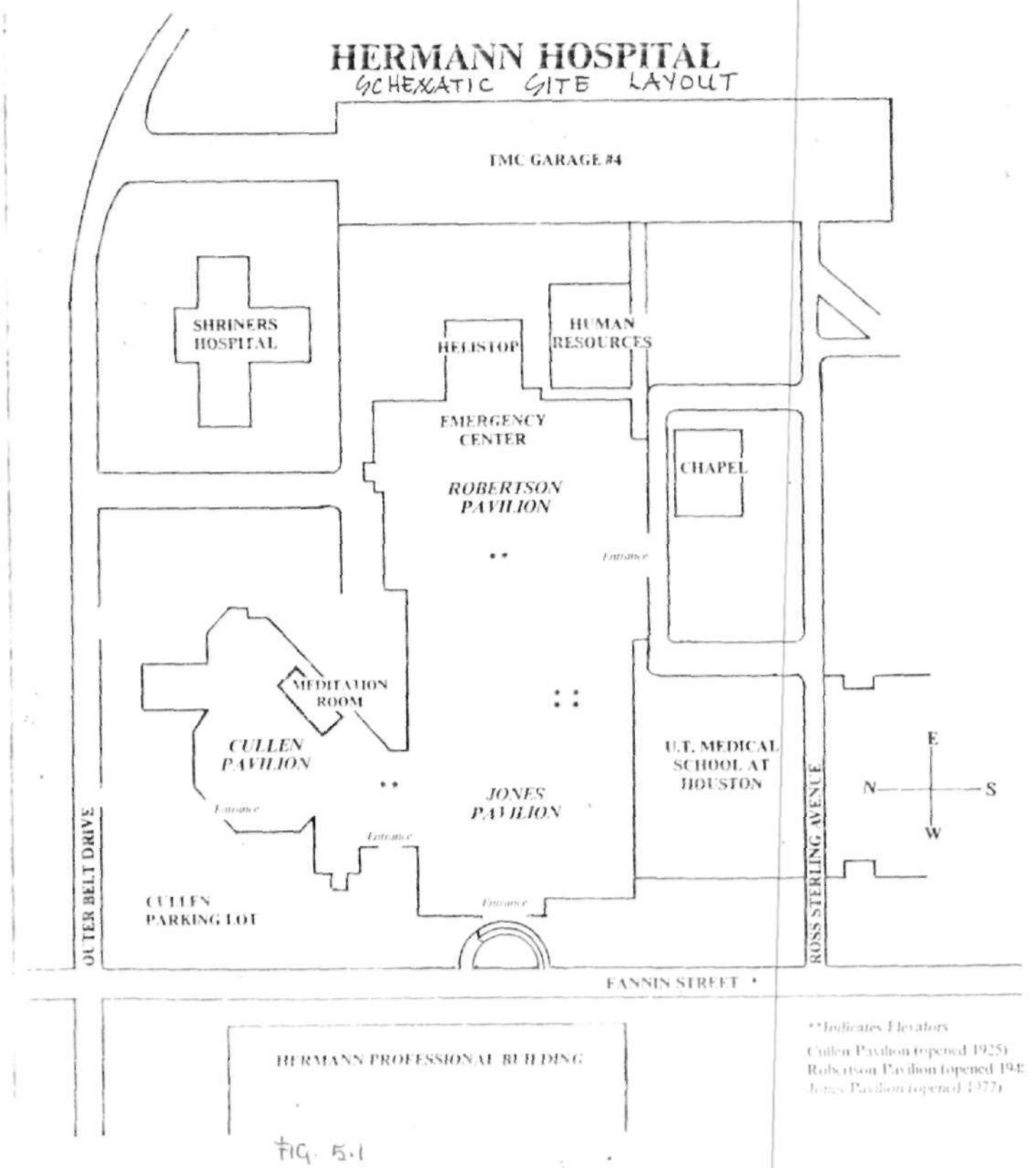

HERMANN HOSPITAL
SCHEMATIC SITE LAYOUT
TMC GARAGE #4
SHRINERS HOSPITAL
HELISTOP
HUMAN RESOURCES
EMERGENCY CENTER
ROBERTSON PAVILION
CHAPEL
Entrance
MEDITATION ROOM
CULLEN PAVILION
JONES PAVILION
U.T. MEDICAL SCHOOL AT HOUSTON
E
N
S
W
OUTER BELT DRIVE
ROSS STERLING AVENUE
CULLEN PARKING LOT
FANNIN STREET
HERMANN PROFESSIONAL BUILDING
**Indicates Elevators
Cullen Pavilion (opened 1925)
Robertson Pavilion (opened 194
Jones Pavilion (opened 1977)

FIG. 5.1

Expansion is possible because in this part of the world vertical expansion is more common and since the building are multi-storey this won't be a problem.

5.7.2 Accomodation

Hermann hospital is a 908 bed hospital. The Ground Floor: provides accomodation for, Pahrmacy, Admissions, Cashiers office.

The Basement:- provides accomodation for the Pathology and Laboratory medicine.

The First Floor: - Administration, Cafeteria, Operations Theatres, Cardiology clinic, Flight Operations Gift shops, Emergency Centre, Family waiting area.

The Second Floor:- Radiology, E.E.G., ward facilities catering facilities.

The Third Floor:- The Family Centre, Maternity Wards, Gynaecological wards, maternity delivery suite, Newborn Nurseries.

The Hermann Eye Centre is on the Seventh floor in Jones Pavillion while on the nineth floor is the Texas Kidney Institute.

5.7.3 Design

The design is the principle of hospital street or "Harness Zone".

The various departments are interlinked by a hospital street containing lifts, staircases, administrative offices.

5.7.1 Entrance

There are three entrance, the main entrance through Cannin street into Jones Pavillion and one into the Cullen pavillion while the third is through the crobertson pavillion.

5.7.2 Facilities Available

These include medicine, Surgery, Internal Medicine Paediatrics,Obstetrics and Gynaecology, Psychiatry as well as all subspecialties. The hospital also provides comprehensive emergency Services and operates the City's only 24 hours based our ambulance programme called "Life Flight". Currently there are three life flight helicopters which service a 130 mile radius from the hospital and fly a phycician and flight nurse onboard.

5.7.3 Structure

The buildings are made of light weight steel frame and built in brickwork, the department are arranged in a chequer board pattern of departments.

5.7.7 Finishes

External finishes to the departments is facing brickwork. Window zone consists of bands of opaque and clear glazing allowing for maximum flexibility in internal subdivisions and there is a reduction of the scale of the complex. Internal finishes are done with bright colours to liven up the atmosphere. There is effective use of graphics to achieve a good environment.

5.7.8 Quality

The various functions of a complete medical Centre are properly integrated in the design progressive patient care concept is adopted here as seriously ill patients are separated from convalescent or ambulatory patients.

Surgical functions are consolidated in one area. There is provision for orderly expansion. There is direct relationship between the clinical areas and the diagnostic facilities as well as between the diagnostic facilities and the surgical and nursing departments.

The nursing floors are adeparture from conventional standards. Patients are accomodated in 4 bed wards and single rooms for maximum supervision with minimum nurses travel.

C H A P T E R 6

6.0 DATA ANALYSIS

The data analysis were collected from both general hospitals, and teaching hospitals; thought teaching hospitals differ in some functions similarity still exist, and they operate an efficient referred system and their services are very diversified.

The analysis of data therefore is based on the average of the statistical returns of the Central Hospital Benin City, General Hospital Lagos, Ahmadu Bello University Zaria for one fiscal year.

6.1 Range of Cases Handled

There is similarity in the range of cases handled. These include medical and surgical cases, Obstetrics and Gynaecology, Paediatrics, Accident and Emergency, etc.

The range of cases handled is shown in the next tables.

6.2. Out-Patients

The Out-Patient department in the three hospitals under consideration they are divided into clinics consultation in the various branches of medicine and non-consultative out-patients.

The Clinic sessions are run for all the range of cases enumerated. Most of the clinics are run on a particular working day of the week.

6.3 In-Patients

6.3.1 The Bed Compliment

The Bed compliments are divided into specialities In the hospitals handled the surgical beds are usually about 27 - 30% of the total bed compliment.

6.3.2 Bed Occupancy

There is high occupancy rate in the four hospitals to the extent that the beds are inadequate. Moreover none of these hospitals operates a progressive patient care policy. If this was done it might have been possible to reduce the average length of stay.

TABLE 6.1 Bed Occupancy

	A.B.U. Hosp. Zaria	Central Hosp. Benin	General Hosp. Lagos
Admission/year	15,094	13,173	6,940
Average daily Bed Occupancy	468	430	250
Total Bed-Compliment	444	470	276
% Bed Occupancy	100.1%	64%	98%
Average Length of Stay(Days)	10.4	6 days	12 days

CULLED FROM ANNUAL STATISTICS (1984)

GENERAL HOSPITAL LAGOS

JAN - DEC. 1984

UNIT: GEN. HOSP. LAGOS

PERIOD: JAN - DEC. '84

ALLOCATION OF HOSPITAL BEDS

DEPARTMENT	TOTAL	No Of Beds	No of Cots	No Of Credles	Incubators
General (Non Specific	-	-	-	-	
Casualty	12	12			
Medical	82	82			
Surgical (Non-Orthop)	101	101			
Gynaecology	14	14			
Maternity	-	-			
Eye	29	29			
E.N.T.	14	14			
V.D. & Skin					
Paediatric	24	18	6		
Dental Clinic					
Tuberculosis					
Infectious Diseases					
	276	270	6		

Table 6.2

CENTRAL

~~SPECIALIST~~ HOSPITAL.

ANNUAL STATISTICS JANUARY, DEC. 1984

IN - PATIENTS

FIG. 6.3

BEDS COMPLEMENTS	470
AVERAGE DAILY NUMBER OF BEDS AVAILABLE	405
AVERAGE DAILY NUMBER OF BEDS OCCUPIED	259
AVERAGE LENGTH OF STAY PER PATIENT	5 days
PERCENTAGE OF OCCUPANCY	64 %
TOTAL NUMBER OF PATIENTS ADMITTED.	18, 173
TOTAL NUMBER OF PATIENTS DISCHARGED.	18. 091
TOTAL NUMBER OF DEATHS.	836

BEDS STATE.

SPECIALITIES	BED COMPLE-MENTS	STAFF BEDS	AVERAGE BEDS OCCUPI-	ADMISS-ICNS	DISCHA-RGES	DEATHS	% OCCUP-ancy	LENGTH OF STAY
F. AMENITY	10	10	7	183	197	3	70%	13 days
F. MEDICAL	20	20	15	795	711	80	75%	7 "
CH. MEDICAL	47	47	30	2896	2587	339	64%	4 "
CH. SURGICAL	36	36	21	789	755	25	58%	10 "
F. SURGICAL	29	30	20	614	580	22	67%	12 "
GYNAECOLOGY	39	30	21	1273	1313	15	70%	6 "
MATERNITY WARDS	115	68	33	8273	8990	16	40%	1 day
P.B.U.	4	8	6	457	366	101	75%	5 days
M. MEDICAL	30	28	19	963	827	127	68%	7 "
M. SURGICAL	40	30	22	637	608	38	73%	12 "
ORTHOPAEDICS	30	29	18	95	129	2	62%	50 "
E N T	10	10	4	84	85	1	40%	14 "
PAEDIATRIC	31	30	22	880	846	42	71%	11 "
M. EYE WARD	20	21	7	7	8	1	35%	26 "
F. EYE WARD	10	9	8	118	121	-	80%	22 "
GRAND TOTAL	470	405	259	18,173	18,091	836	64	5 "

FIG 6·4

OPERATIONS PERFORMED FOR THE YEAR 1984 (JAN. - DEC.)

MAJOR OPERATIONS (MAIN THEATRE) 839

MINOR OPERATIONS (MAIN THEATRE).....1,054

MINOR OPERATIONS (O.P.D. THEATRE).....2,283

MAIN THEATRE OPERATIONS ACCORDING TO SPECIALITIES

	MAJOR			MINOR			TOTAL		
DEPARTMENT.	MALE	F.	CH.	MALE	F.	CH.	MALE	F.	CH.
GENERAL SURGERY	101	72	33	242	112	70	340	184	103
ORTHOPAEDICS, TRAUMA/PLASTIC	86	33	46	59	25	28	145	58	74
GYNAECOLOGY	-	128	-	-	411	-	-	539	-
OBSTETRICS	-	181	-	-	9	-	-	190	-
OPHTHALMOLOGY	70	50	20	34	17	21	104	67	41
E. N. T.	10	8	1	8	8	10	18	16	11
TOTAL	267	472	100	343	582	129	607	1054	229

DEATH AT ACCIDENT AND EMERGENCY.

MALE	FEMALE	CHILDREN	TOTAL
22	5	5	32

Average % bed occupancy for the three hospitals

= 87.3%

Average length stay in days for the three hospitals = 9.4 per days.

6.3.3 Operations

Operations performed in the hospitals vary from minor to major procedure which normally last for hours. They include general surgery. Neurosurgery, Orthopaedic, Opthamology, Cardiothoracic etc.

6.4 Sources of New Patients

In most of the hospitals patients were not only got from immediate environs but referred from other States this make up the bulk of the patients that visit the hospital; patients are also got from the catchment areas. In the case of Ahmadu Bello University Teaching Hospital, patients are get most of the time from the ten Northern States.

C H A P T E R 7

7.0 THE SITE

7.1 Site Location

The design for this general hospital can be sited at any place that meets the site requirements. The site chosen in this thesis is in Benin City, Bendel State of Nigeria.
Benin City is situated on latitude 6° 19N and longitude 5° 41'E.

It is surrounded by towns and environs to the North to the North is Auchi and Ishan while to the South is Abudu and Ovia Local Government Area. Benin is linked to other parts of the country by road and air. It has considerable economic growth potential.

7.2 Geographical Setting of Benin City

Benin is situated about 55 miles North of the mouth of the Benin River. The land is a tilted plain which slopes in a South ward direction. It is that part of the South of Nigeria which is about 400ft above sea level.





THE SITE

PLATE III

CLIMATIC DATA FOR BENIN-CITY

FIG 7.5

RAINFALL (mm)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1977	7·5	58·7	68·0	102·3	125·8	351·4	199·4	274·1	229·7	131·9	38·1	41·9
1978	20·5	148·8	149·4	294·6	326·4	289·6	219·4	437·1	242·4	252·5	176·1	53·2
1979	T·R	89·2	44·2	208·9	178·0	285·2	528·0	309·3	359·6	300·1	40·4	T·R
1980	3·2	56·3	77·8	110·4	296·3	298·9	482·3	446·8	401·8	178·1	110·1	0·0
1981	T·R	6·8	108·4	119·6	318·5	180·6	280·0	394·1	276·1	169·4	12·9	1·1

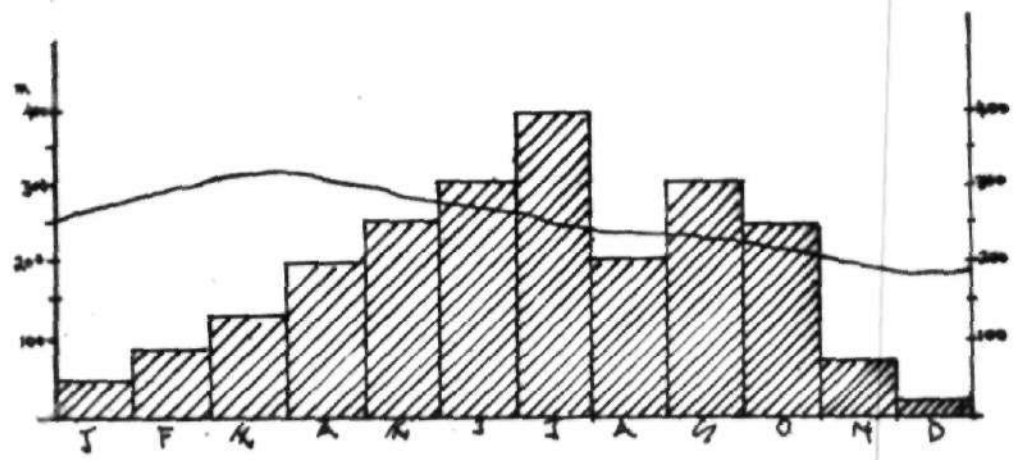
T·R = RAINFALL LESS THAN 0·1 mm

MEAN DAILY MAXIMUM TEMPERATURE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1977	31·3	33·5	33·4	33·4	32·1	29·6	28·1	–	–	29·0	–	31·8
1978	33·4	33·1	22·9	31·6	31·5	30·0	28·6	28·7	32·2	28·0	30·5	32·4
1979	33·0	33·4	33·5	33·6	31·7	30·1	27·9	30·2	32·2	28·9	31·9	32·2
1980	33·2	33·7	33·5	32·8	31·6	30·2	29·1	29·6	31·9	29·1	20·6	31·5
1981	32·2	34·9	34·0	32·9	31·6	31·4	28·9	30·1	32·9	29·1	31·9	33·2

MEAN RELATIVE HUMIDITY

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1977	86	80	77	81	82	88	90	89	–	–	–	74
1978	75	85	82	86	87	89	91	88	89	86	77	82
1979	67	85	82	81	83	87	89	94	88	85	85	79
1980	84	86	84	82	83	88	90	91	89	87	84	69
1981	83	77	81	83	85	80	89	89	89	85	75	84



RAINFALL (in mm)

7.2.1 Climate

The area has a marked dry season which lasts from November to January. During this period the dry North-East harmattan winds is dominant and often brings about poor visibility and high diurnal range of temperatures.

The rainy season is associated with the moist South-West winds from the Atlantic Occean and lasts from April to October. The rainfall is moderate it is about 2000-2300mm. The area experiences a short dry season which is referred to as the August drought. The seasonal variation in temperature is slight. The range between the hottest and coldest months is $6^{o}F$.

7.2.2 Vegetation

The area is in tropical swamp forest zone. Benin was a very important Centre of tropical forest wood. But today roofs, streets, and roads have replaced the giant hard wood in the City. Rubber plantations and arable farms are now features of the surburbs. The traditional wood work crafts can be associated with the availability of this species of trees within easy reach of the city in the past.

7.2.3 Soils

The firm brownish lateritic soils of the area is deeply weathered but has some patches of loose portions in some area. It is therefore advisable that careful studies should be carried out before siting high and heavy structures. Benin soil belongs to the quaternary coastal plains made of sands and clays.

7.2.4 Population

The Benin City Urban area has an approximate area of about 3000 sq/km. It has a density of population of 157,000 varying from very sparsely populated areas like the G.R.A. to very densely populated areas like New Benin or Ekenwan areas.

The population is migrant in nature and see to the economic growth of the town.

7.2.5 Occupation of The People and Economic Activities

The City's periphery is an area of large scale cropping of rubber in peasant holdings, plantations of this and oil Palm could be seen in abundance in Benin City,. Apart from agriculture, trade and Commerce mainly in consumer goods, manufacturing. Construction and other services are done. Though the economic base is not very strong its still developing.

7.2.6 Availability of Utilities

Benin City is the Capital of Bendel State therefore it has an advantage of good infracstructure over the rest of State.

There is a good network of roads linking it to other parts of Bendel State and to other States, and the rest of the country in general.
The public transportation system like in many other cities of the country is hardly adequate.
There is an airport and also a sea port in Warri.

The utility services of water supply sewerage storm water and solid waste disposal though not adequate have room for improvement. It has a good source of energy supply. Other services available are electricity, postal and telecommunications and security services.

7.2.7 Health Care Facilities

Health Care Facilities in Benin City can be divided into three Categories:-

a) Those owned and run by the Federal Government e.g. The University of Benin City Teaching Hospital.
The Nuero Psychiatry Hospital Uselu.

b) Those owned by the Bendel State Government and run by the Health Management Board:-
The Central Hospital.
Specialist Hospital e.t.c

c) The private owned hospital -- uma Medical Centre, Benoni Hospital, Hope Hospital, Azuwa Hospital e.t.c.

Existing health care institutions are grossly inadequate most of them are overstretched.
To meet the increase in demand a new specialist Hospital is under construction on Sapele road.

7.2.8 Site Selection Criteria

The General Hospital like any other hospital shares a common characteristic, it not only has to serve a particular city populations but a wider national population. Therefore a lot of factors have to be taken into consideration.

a) It must be located in a town where access from other parts of the country is readily available.

b) It must not be located in heart of the town but on the parlphery. This is necessary so that patients from other towns don't have to battle with traffic congestion within the town before getting to the Hospital.

c) It must also be accessible by public transport or from its town of location; also this will be necessary to facilitate easy movement of the staff of the hospital.

d) Quality of major and direct access roads to site, direction of most common approach.

e) Zoning and the quality of the surrounding neighbourhood.

f) Size of site in relation to proposed development parking and future expansion.

g) Site configuration and topography in relation to building requirements and integrated use; the site should be fairly level or of gentle slope.

h) Easements and site restrictions as they affect the suitability site development.

i) Views in various directions, the presence of smoke, odours, noise and other niusances.

j) Suitability of subsoil for foundations and drainage.

k) Natural orientation of site and the direction of prevailing winds.

l) Availability of water supply, sewage disposal, electric power and other utilities.

m) Adequacy of fire and police protection

n) Environmental impact of development on surrounding neighbourhood or other areas.

7.3 Site Analysis

7.3.1 Site Location

The site is situated on a surburb on the outskirts of Benin metropolis this area of Benin City is where City planners proposed of being part of the new City Centre.

There are two housing Estates in the vicinity of the site the Bendel Development Planning Authority housing estate in Oregbeni which is located on Agbor road and the Federal Housing Estate on the Benin-Auchi road.

There also exists an army barracks very close to this estates.

7.3.2 Access

The major access to the site is the Benin-Auchi highway, there could be a direct access into the site and the untarred road by the side could be a service

entrance this calls for proper grading and surfacing of the road to prevent mud in the rain season and dust in the dry season.

7.3.3 Size and Future Expansion

The site is a four sided figure with bounding lines of 260m 300m 400m and 279m respectively and has an area of about 91000m^2. This size is suitable for the anticipated development for providing parking and for future development. Though if more land is required more land can be acquired North - West of this site.

7.3.4 Topography and Drainage

The site slopes from the north to the Southern end, there is a major highway in front of the site the Benin - Ishan - Auchi highway. Therefore configuration of the site means storm water drainage channels should be constructed so that it would flow in the direction of the slope.

7.3.5 Present Land Use and Ground Cover

Most parts of the site is being used as farmland therefore most of the land is covered in greenery. Therefore there is reduction in erosion of the lands.

Also the present land use makes it possible to clear the site because the shrubs are only dotted with mangrove trees.

7.3.6 Top Soil Suitability for Foundation

The type of soil which is synoymous to this area clay and sandy soil is suitable for most types of building foundations.

7.3.7 Trees.

As mentioned before trees occurs a lot on the site 90% of them should be cut but could be retained where needed for the necessary landscaping. They will be necessary for noise breakers and sun breakers.

7.3.8 Climate

Heavy rainfalls calls for leakage proof construction and well laid out storm water drainage. Also high temperatures exists therefore there should be moderation of internal environments.

7.3.9 Utilities

Electricity power lines run along the highway which is close to the site. Water supply may be connected quite easily.

7.3.10 Nuisance

Noise from velucular traffic on the highway acts as a nuisance. Noise breakers could be used to curb this.

7.4. Factors for Site Construction

(a) The 3 major hospital in Benin City e.g. the U.B.T.H. is on the outskirts of the City on the Lagos road, the Central Hospital is within the

town and has become congested it has expanded to its maximum.

The new specialist hospital that is being proposed is close to the School of Nursing on the Warri-Sapele road. Hence this site was chosen because most of the land within the township is developed for residential and public facilities to such an extent that there is no land spacious enough to house the hospital. Moreover, Ikpoba slope is a rapid developing area which lacks this essential public service.

(b) Most of the available land on the periphery of the township are unsuitable for hospital development because they are either too slopy or not conducive to the rainy season.

(c) Growth within the township is more or less static new development should be spread out and when the outskirts are developed it encourages the growth of the area.

(d) Public Services are available - viz - electricity, telephone; close to the site is the Nitel Headquarters there is also the availability of piped borne water.

(e) It is also nuisance free- from noise, hotels e.t.c except the road this is reduced to the barest minimum. It is also free from smoke and odours

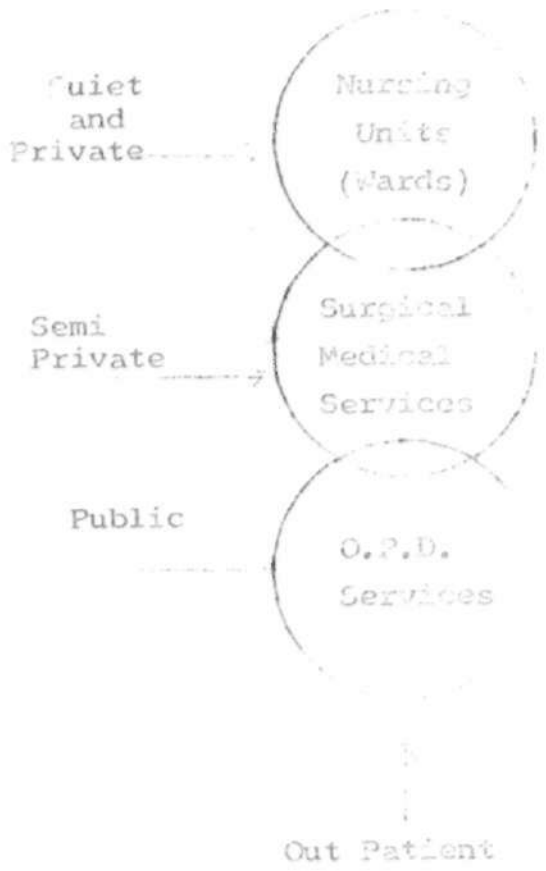
7.5 Planning Concept Used in the Layout

In the layout of the hospital shortest distances between the various components of the hospital is hoped to be achieved.

Also to achieve proper zoning of the hospital into public (for out-patients and the public), semi public (surgical and medical general services) and non-public or quiet zones (for in-patients). In the process, I came up with two basic divisions in the planning of the hospital, one for in-patients and services and the other for out-patients.

Also three entrances are envisaged - one the main out-patient department entrance, the casualty entrance - for Ambulances and other Accident and Emergency cases also a service entrances for the quick and convinient unloading of goods in the Central Stores, Pharmacy e.t.c.

Planning Concept To Be Used In The Layout



Zonning Concept

C H A P T E R 8

8.0 THE ARCHITECTURAL SOLUTION TO THE PROJECT

8.1 Goals and Objectives of the Design

The Summary of the goals is to design an hospital that meets the needs of the population of the immediate vicinity and to have various units working in conjunction to accelerate the services needed also to design an hospital that will satisfy medical and spatal needs within its life span by its adaptation to changes in medical technology.

To arrive at this goal the following objectives have been executed:-

(a) Case studies and investigation into changes in developments in the scientific world in relation to medicine.

(b) To seek a proper balance between capital and running costs by reducing manual tasks and the encouragement of mechanical task for the smooth running of the hospital.

(c) The use of present construction techniques and building materials to create flexibility, and expansion facilities in the buildings.

(d) To create a building that is functional, of good quality and that exhibits good aesthetics.

8.2 Scope

8.2.1 Macro - Scope

The design is of a 200 bed Government General Hospital with special emphasis on the Out-Patient Department. It shall have the following departments:-

a) Out-Patient (Consultative and general)

b) Diagnostic and Treatment facilities (Laboratory, Radiology).

c) Patient care divisions i.e. Surgical Wards, Medical Obstetrics, Labour and Peadiatrics.

d) Operating Theatres

e) Service (Central Sterile Supply, Central General Supply Stores, Pharmacy, Murtuary, Dietary, Laundry, Mechanical Plant e.t.c).

f) Administration and workers facilities.

Micro Scope

On the micro-scope an extensive study was carried out on the Out-Patient Department with aim of designing a similar department that will have a high level of efficiency.

8.3 Bed Statement

The hospital is of 200 beds which are divided as follows:-

Surgical (2 divisions) = 32 beds - 64 beds - 32%

Medical (2 divisions) = 32 beds - 64 beds - 32%

Paediatrics (1 division) = 32 beds - 32 beds - 16%

Obstertrics and Nursing (1 division) = 32 beds-32 beds 16%

Miscellaneous (E.N.T Delivery room)=8 beds-8 beds-8%

Total = 200 beds.

8.4 Out-Patient Department

Population of Benin City as of 1981 - 157.000

- Source National Population Commission subsequent projections of 1963 National Census.

Assumptions made:- Design Population 157.000

1.6 beds/1000 250 beds

Assuming about 60% of the population will require hospital service.

Therefore 94,200 will require hospital service per year

7,850 will require hospital service per month

1,963 will require hospital service per week

280 will require hospital service per day

But a doctor spends 6 hours per day for consultation Assuming he spends an average of 8minutes with each patient that means he can see about 45 patients per day. Therefore about 6 consulting/Examination rooms are required. Base on this assumptions also it cannot be ruled out that patients will come from nearby towns and villages to the hospital.

8.5 Schedule of Accomodation

8.5.1 Out-Patient Department

(a) General Out Patient

(i) Waiting and receiption

Entrance hall = 100m^2

Records/Receptionists = 287m^2

Circulation = 40m^2

(b) Consultative Out-Patient

(i) Obstetrics and Gynaecology Clinic

Patient waiting room = 46.8m^2

2No Consulting room = 36m^2

4No Examination room = 40m^2

Antenatal/Mothers Demonstration room 60m^2

Social workers Office = 14m^2

Health Visitors office = 14m^2

Dirty Utility = 21m^2

Clean Utility = 21.6m^2

4No Toilets and Test room = 25m^2

Circulation = 20m^2

(ii) Peadiatrics Clinic

Patient waiting = 28m^2

Children's Play = 30m^2

2No toilets and Test room 18.2m^2

2No Consulting room = 36m^2

4No Examination and Treatment room 37.2m^2

Reception = 9.5m^2

Store = 8m^2

Dirty Utility = 16.8m²

Clean Utility = 19.2m²

Treatment and Weigh = 23m²

Circulation = 25m²

(iii) Medical Clinic

Patient Waiting = 40m²

2No Consulting rooms = 36m²

4No Examination rooms 37.2m²

Receiption = 9.3m²

Store = 8.7m²

2No Toilets and Test = 19.8m²

Dispensary = 25.4m²

Clean Utility = 21.6m²

Dirty Utility = 14.8m²

Circulation = 30m²

(iv) Surgical Clinic

Patient waiting = 50m²

2No Consulting rooms = 36m²

2No Examination rooms = 18m²

Injection and Dressing rooms = 23m²

2No toilets and Test 22m²

Receiption = 9.3m²

Store = 8.7m²

Treatment room = 24m²

Dirty Utility = 14.8m2

Clean Utility = 23m²

Circulation = 30m²

(v) Opthalmic / ENT Clinic

Patient c waiting = 35m²

Receiption/Records = 19.2m²

Eye Examination/Treatment room 33.6m²

Visual Fields roo = 11m²

Opthalmologist = 17.5m²

ENT Consultant = 17.5m²

Store = 8.7m²

Audiometry room 8.7m²

2No toilets and Test room = 22m²

Hearing and consulting room = 14.8m²

Hearing aid workshop = 14.8m²

Dirty Utility = 14.8m²

Clean Utility = 14.8m²

Circulation = 25m²

(Vi) Dental Clinic

Patient waiting = 14m²

Receiption/Records = 13.8m²

3No Surgery = 45m²

Recovery = 14.5m²

Work room/X-Ray room = 13.8m²

Store = 4.5m²

Plaster room = 11.25m²

Dirty Utility = 6m²

Clean Utility = 11.5m²

Consultant = 13.8m²

Staff room = 65m²

Circulation = 30m²

8.5.2 Diagnostic and Treatment

(a) Pathology

Patients waiting = 40m²

Reception = 17.6m²

Donors + Examination room = 12.4m²

Technologists Office = 13.7m²

4No Laboratory = 52m²

Pathologists Office = 9.8m²

2No Staff toilets = 15.6m²

Staff Lockers = 9.8m²

2No Wash Up + Sterilizing room = 25.8m²

2No Store = 13.26m²

Auto - Analyser room = 7.3m²

Venupuncture Cubicle = 11.5m²

E. E. G. = 16m²

Blood Store = 13.8m²

4No Patients Specimen toilet + Test room = 36m²

Circulation = 30m²

(b) Radiology

Patient waiting = 36m²

2No General Radiography room = 68m²

4No Changing rooms = 6m²

6No Patients toilets = 23.7m²

(d) Physical Therapy

Patient waiting/Receiption = 45m²

8No Changing Cubicles = 14.4m²

2No Hydro Whirl pool = 10m²

8No Massage/Treatment rooms = 40m²

Gymnasuim/Exercise room = 67m²

Equipment store = 5.4m²

Preparation room = 12m²

Consultants Office = 12m²

2No Staff Toilets = 8m²

2No Staff Offices = 16.6m²

Trollies/Wheelchairs = 5m²

Circulation = 40m²

(e) Casualty Department

Entance Lobby = 40m²

Patient waiting = 70m²

3No Observation rooms = 26.2m²

2No Examination/Preparation room = 18m²

Receiption/Records = 50m²

Stretcher store = 8.7m²

X-ray room = 37.5m²

Dark room = 6.5m²

Film Proccessing = 7m²

Sisters Changing room = 8.75m²

Doctores Changing room = 8.5m²

Sluce room = 8.75m²

Clean Utility = 7m²

Operating Theatre Suite = 45.5m²
Sterilizing room = 8.75m²
Anaesthesia room = 16m²
Scrubs up = 8.8m²
Sterile Supply = 8.75m²
Recovery room = 18m²
Snacks/Refreshments = 6m²
Circulation = 35m²

8.5.3 In-Patient Department

(a) Male/Female Surgical Wards

(b) Male/Female Medical Wards

(c) Paediatrics wards

(d) Obstetrics Nursing ward

4No single Bed Ward Unit = 16.2m²
4No four Bed ward unit = 28.8m²
2No six bed ward unit = 38.4m²
Nurses station 27m²
Trollies = 10m²
Clean Utility = 12m²
Dirty Utility = 12m²
Treatment = 12m²
Store = 7.3m²
3No Shower = 5.4m²
Assisted Bathroom = 12m²
3No toilets = 5.4m²
Bathroom = 7m²
Amenity room = 4m²

Staff Locker room = 3.45m^2

2No Staff toilets = 22m^2

Dining Room = 20.2m^2

Kitchen = 13.5m^2

Staff Office = 13.5m^2

Sister's Office = 13.5m^2

Doctors office = 13.5m^2

Day room = 35m^2

Circulation = 30m^2

(e) Delivery Suite

7No Labour room = 74m^2

Major Delivery room = 25m^2

3No Delivery room = 57.6m^2

Special Baby Care Unit = 14.4m^2

Recovery room = 21m^2

Sterile room = 19.5m^2

Wash up room = 9.6m^2

Preparation room = 19.5m^2

Clean Utility = 19.2m^2

Dirty Utility = 18m^2

Nurses Station = 12m^2

Work room = 16m^2

Isolation room = 9m^2

Doctore's Office = 14.19m^2

Doctor's rest room = 14m^2

2No Patient showers/Toilets = 13m^2

Father Lounge = 19.3m^2

2No Staff toilets = 24m^2

Sister's Office = 12m^2

Circulation = 40m^2

8.5.4 General Operating Department

Operating Theatre Suite

4No Operating theatres = 169m^2

4No Serub Up Rooms = 36m^2

4No Anaesthesia Rooms = 36m^2

2No preparation rooms = 21m^2

2No wash Up rooms = 27m^2

2No Disposal room = 30m^2

2No Exit Bays = 27m^2

Waiting/Trollies = 30m^2

Transfer Bay = 12m^2

Reception = 7m^2

Sister's Office = 7m^2

Nurses Changing room/Toilets = 27m^2

Plaster Store = 13,5m^2

Plaster room = 15m^2

Mobile X-Ray room = 10.5m^2

Dark room = 10.5m^2

Cleaners room 9.6m^2

Nurses Rest Room = 15.3m^2

Doctors Rest Room = 23m^2

Doctors Changing room/Toilets = 25m^2

Recovery room 67m^2

Sterile Supply room = 60m^2

Circulation = 35m^2

8.5.5 Administration

(a) Medical Records

Registration/Admissions Office = 20m^2

Records office(Typists) = 26m^2

Medical Records Officer = 13.5m^2

Statistician = 9.6m^2

Medical Records storage = 205m^2

Circulation = 50m^2

(b) Hospital Administration

Entrance Hall/Lobby = 70m^2

Hospital Secretary/Administrator = 27.5m^2

Secretary = 14m^2

Conference room = 60m^2

Chief Matron = 12.2m^2

Assistant Matron = 12.2m^2

Nursing Administration = 14m^2

Staff Office = 14m^2

Accounts Office = 17.5m^2

Accountant = 10.5m^2

General Office = 20m^2

Staff Office = 12m^2

Records = 12.8m^2

2No Toilets = 9.8m^2

Hospital Library = 82.5m^2

Circulation = 60m^2

8.5.6 Services

Central General Stores = 270m^2

Laundry = 447m^2

Central Sterile Supply Department = 220m^2

Boiler House = 236m^2

Electrical Power Plant = 105m^2

Maintenance Workshop = 143m^2

Kitchen/Staff Dining = 246m^2

Mortuary = 150m^2

8.6 Design Report

8.6.1 Design Concepts - Objectives

(a) To seek utmost economics in the whole hospital design and construction of a proper balance between capital and running costs.

(b) Hospital buildings of one storey building with the exception of the two storey ward block and administrative department.

(c) Overall hospital function based on horizontal principle with departments of related functions horizontally bonded. This allows free flow of movement from one department to the other. Vertical movement is minimized only in administrative department ensuring flexibility and economy in the use of space and facilities.

(d) All accomodation is arranged around a network of landscapped courtyards which afford natural light ventilation and external view.

(e) The In-Patient beds are on two sides arranged as seperate units with medical staff corridors linking the wards together.

(f) Towards the outer corridor is a core of highly serviced treatment and diagnostic areas including the central sterile supply department the Pharmacy department and Physical medicine department.

(g) Closely related to the central treatment core are several important departments dealing with both in-patient and out-patients, the casualty department, the out-patient which are in front of the main access road, the entrance hall and reception area, the two storey administrative department and further away is the maternity suite which is in the ward block.

8.6.2 Design Consideration

The design has been executed with the following considerations taken into account.

(a) Design Ideas with respect to Environmental-Considerations

(i) Thermal Comfort and Orientation of Buildings:- The whole hospital complex has been designed as a Village of building with landscaped courtyards green areas and trees penetrating the whole layout to relieve the sick and make the wards comfortable. Buildings are well orientated for maximum cross ventilation, over hangs to cut off direct sun penetration which cause glare.

(ii) Landscaping: In every ward and between buildings there is always an external courtyard. In addition there are generally day spaced to give the patients opportunity to have a good view.

(iii) Wind and Rain: The design has been aimed at blocking out rain. The finished ground floor level is slightly elevated above the f ground level. Adequate drainage has been incorporated to follow the site configuration. Therefore all departments of the hospital are linked by covered corridors and ramps thus minimising the bad environmental effects of weather and corridors are punctuated by light and view from different sides as one moves along.

(iv) Noise reduction: As much as possible noisy areas have been seperated from quiet zones. Therefore in-patient - ward areas have been seperated from the out-patient, Laundry, boiler room areas.

8.6.3 Design Ideas with respect to planning

To facilitate expansion and rapid changes in medical technology, flexibility has been the watchward in the design. The departments are arranged in a chequerboard design and they all have internal courtyard which enhance lighting and ventilation.

Structural Grid:- Within the planning grid, three structural grids have been used:

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(a) A structural grid 12x 5 x 3!5m for all the rooms in the Out-Patient department clinics.

(b) A grid of 6!2 x 5m was used in the 4 bed ward unit in all the wards.

KASHLAND ... 3 FEB 1987

(c) An alternating grid of 6,2m x 6m was used also in the 6 Bed Ward unit in the wards.

The difference in structural grid is as a result of difference in spatial requirements.

Design Ideas

(a) Open ends allows for expansion and growth

(b) Buildings can be attached and individual buildings can be replaced as required.

(c) The relationships are so arranged so that the most intensely used communications are also the shortest.

(d) Natural ventilation for econmy resources and simplicity of constructinn.

Entrances:

For easy patients traffic flow seperate entrances have been provided. Patients coming to the out-patient department come through the main entrance and are referred to the departmental clinic from here. Slightly to the left of this entrance is the entrance to the casualty department and also a side entrance for the visitors to the wards.

The circulation corridor is 3m to allow heavy traffic, the moving of trollies, equipments and other things that need to be transported.

Ward:- The wards have a standard design it consists of 4 bed ward unit and 6 bed ward unit, the internal

corridor measures 1.8m, there also exists day rooms for relaxation,., Nurses station and sanitary facilities.

Diagnostic and Treatment Facilities

There are places that are closely related to the in-patient areas and the out-patient areas they are therefore placed between these areas.

Operating Theatre Suite:

The operating theatre suite is on the ground floor, and its proximity to the Central Sterile supply department is an advantage because its dependent on this department, it is also close to the surgical wards there is link from here to the operating suite. The design of the operating theatre has reduced or eliminated the incidence of asepsis by seperating clean from dirty utility.

Out-Patient Department

The general out-patient department is divided into five departmental clinics viz - medical surgical, Opthalmic/ENT, Paediatric, and Obstetrics and Gynaecology, they all basically have the same design six Examination/consulting rooms, they also seperate waiting rooms, Reception/Records room.

Casualty:- The casualty has Examination/Observation rooms, a mini X-Ray department, a minor Operating suite and a recovery room.

Services:-

Laundry, Central Stores also dietary for the patients and staff, a kitchen/dining room exists not far from the ward block.

There is a service entrance and the back for unloading drugs and supplies into the stores.

Mortuary:- There is also a mortuary this is hidden away from the main facade of the hospital. It is also linked to the internal corridors.

Engineering Services:- Engineering Services are provided and are designed in such a way that wind dons'nt blow noise and smoke to the main hospital complex. The boiler room which contains steam generating boilers to serve direct to steam equipment, in areas such as kitchens, Laundries, sterilising units, and to calorifiers for supplying hot water for heating. Acoustic Isolation of these plant rooms is by use of reinforced concrete construction.

Construction:- The building frame is of reinforced concrete columns and beams in the main hospital complex. In the engineering services area it is reinforced concrete and steel. Some internal partitions in the out-patient department and ward partition is of plasterboard.

The buildings are externally rendered and painted and screen walls are used where necessary.

Window areas are clearly demarcated in bands of glazing to make room for internal flexibility and shading devices are used where necessary.
Roof structure is of steel truss with asbestos cement long span sheet.

Internal wall finishes are brightly coloured paint on plaster to make the rooms homely and lively.

Since floor finishes must reduce wear they should be resilient for comfort, terrazzo floors in the wards, quarry tiles, cork tiles could be used in the operating suite, cement screed was also used in heavy traffic areas like the central supply stores.

B I B L I O G R A P H Y

1. A.B.U. Teaching Hospitals (1984): Annual Statistical Returns Jan-Dec. 1981 to 1984 Unpublished.

2. Afolayan F. O. (1981): Ilorin Maternity Hospital. Unpublished M.Sc. (Arch) Thesis, Ahmadu Bello University, Zaria.

3. Alfred M. K. (1979): Architectural Handbook: John Wiley Sons Inc. U.S.A.

4. Alison S. (1974): General Hospital, Ikorodu Unpublished M.Sc. (Arch) Thesis, Ahmadu Bello University, Zaria.

5. American Hospital Association (1983) Hospital 57 (9)

6, (OX A. and Groves P. (1981) Design for Health Care Butterworth & Co (Publishers) Ltd. London.

11. De Chiara J. And Koppelman L.E (1978) Site Planning Standards. McGraw-Hill Book Company, New York.

12. De Chiara J and Callender J.H. (1980) Time-SSaver Standards for Building Types McGraw-Hill Book Company. New York

13. Gainsborough H. (1964): Principles of Hospital Planning. The Architecture Press. London.

14. Hudenburgh R. (1967) Planning the Community Hospital McGraw-Hill Book Company. New York

15. Kyaagba J. A. (1980) Prototypical Health Centre, Makurdi. Unpublished M.Sc. (Arch) Thesis, Ahmadu Bello University, Zaria.

16. Urombo, U. J. (1985) Specialist hospital Port - Harcourt. Unpublished M.Sc. (Arch) Thesis, Ahmadu Bello University, Zaria.

17. Mclaughlin H. (1964) On how to plan Efficient Patient Rooms. The Modern Hospital 193 (4)

18. Medical World News (11 Oct. 1963) Surgery in the Round

19. Mills D. E. (1979) Planning: Buildings for Health, Welfare and Religion. Butterworth and Co (Publishers) Ltd. London.

20. Neufert E. (1980) Architect's Data Granada Publishing Ltd. Great Britain.

21. Nield L. (1983) On Mt. Druitt Hospital. Architecture Australia 72 (2)

22. Nuffield Provincial Hospital Trust. (1955) Studies in the Functionsand Design of Hospitals. Oxford University Press. London.

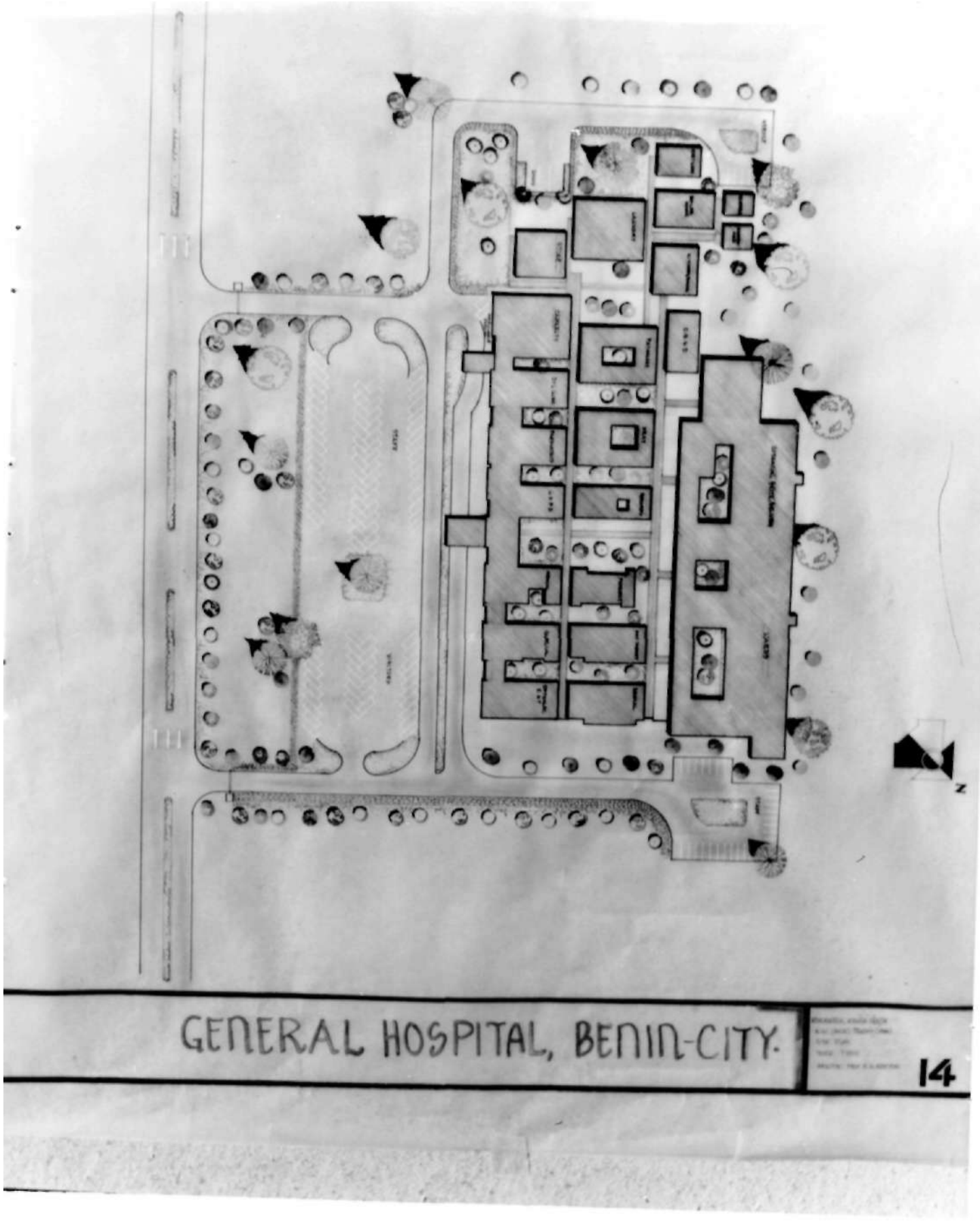
23. Olafimihan A. D. (1979) Pediatric Specialist Hospital Zaria. Unpublished M.Sc. (Arch) Thesis Ahmadu Bello University, Zaria.

24. Osunloye V. B. (1983) Community Hospital Festac Town, Lagos Unpublished M.Sc.(Arch) Thesis Ahmadu Bello University, Zaria.

25. Parsey G. (1979) on A.J. Annual Review. Architects' Journal. 169 (1)

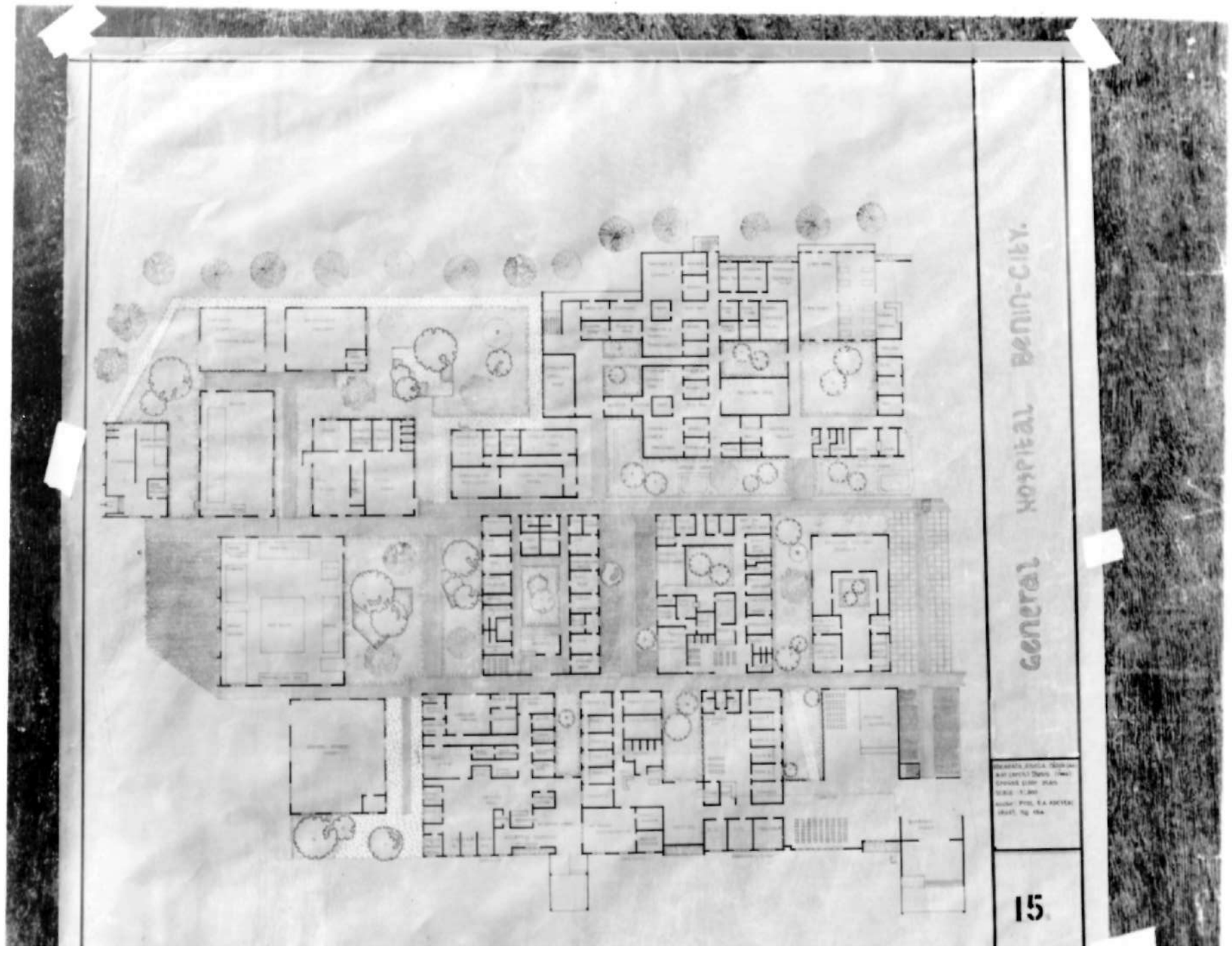
26. Ronsenfield I. (1969) Hospital, Architecture and Beyond. Van Nostrand Reinhold Company. New York.

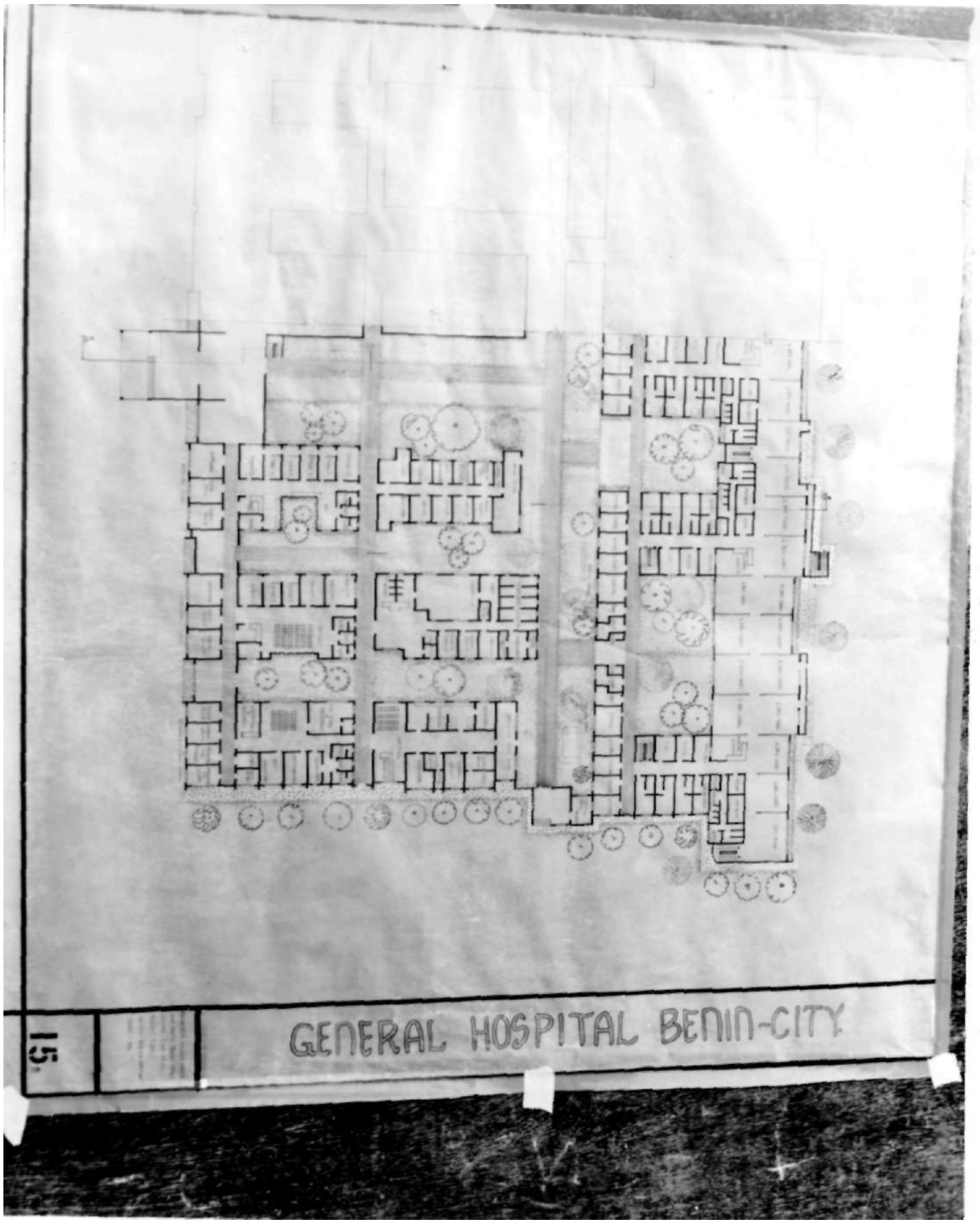
27. Tutt P. and Alder D. (1979). New Metric Handbook. The Architectural Press. London.

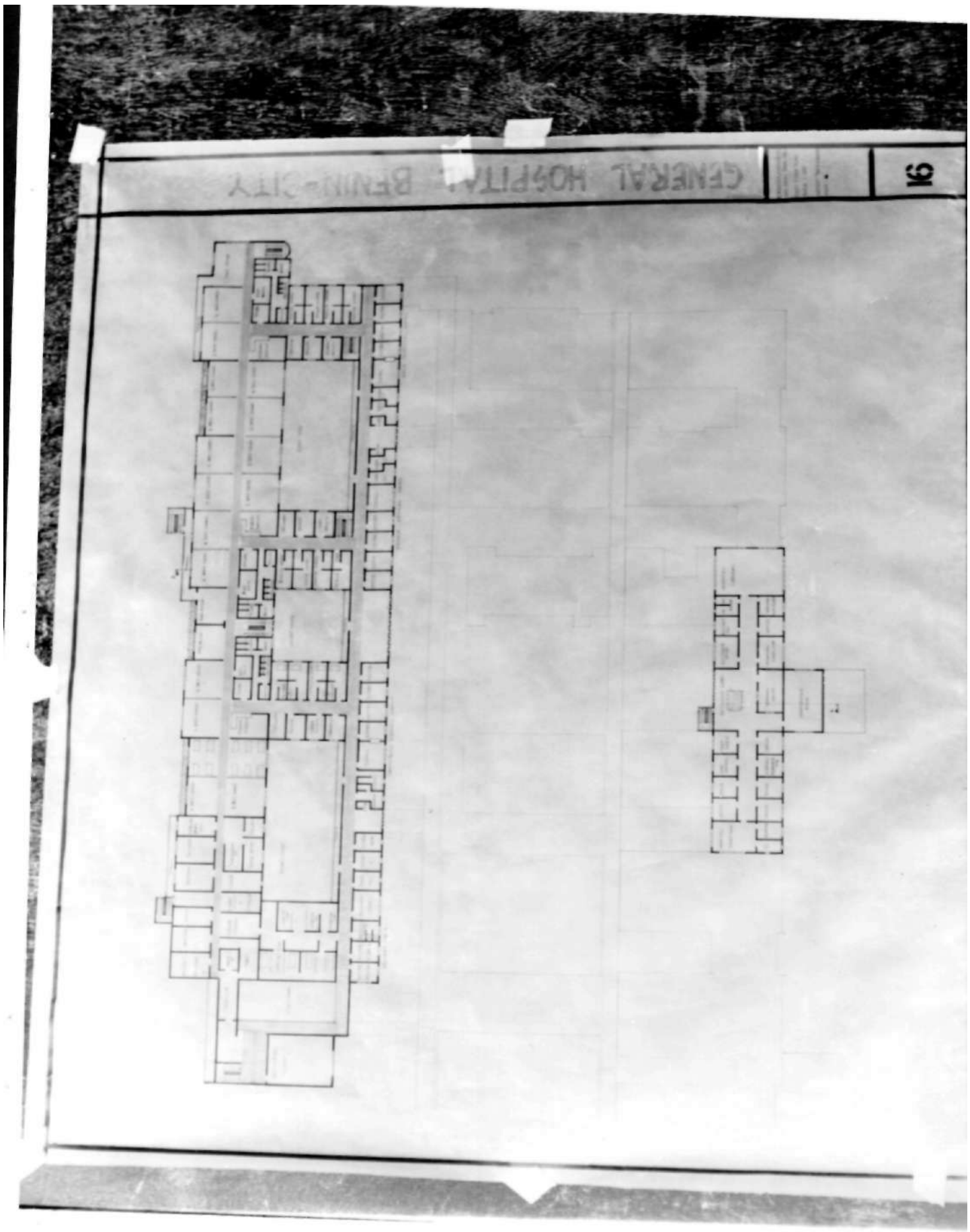


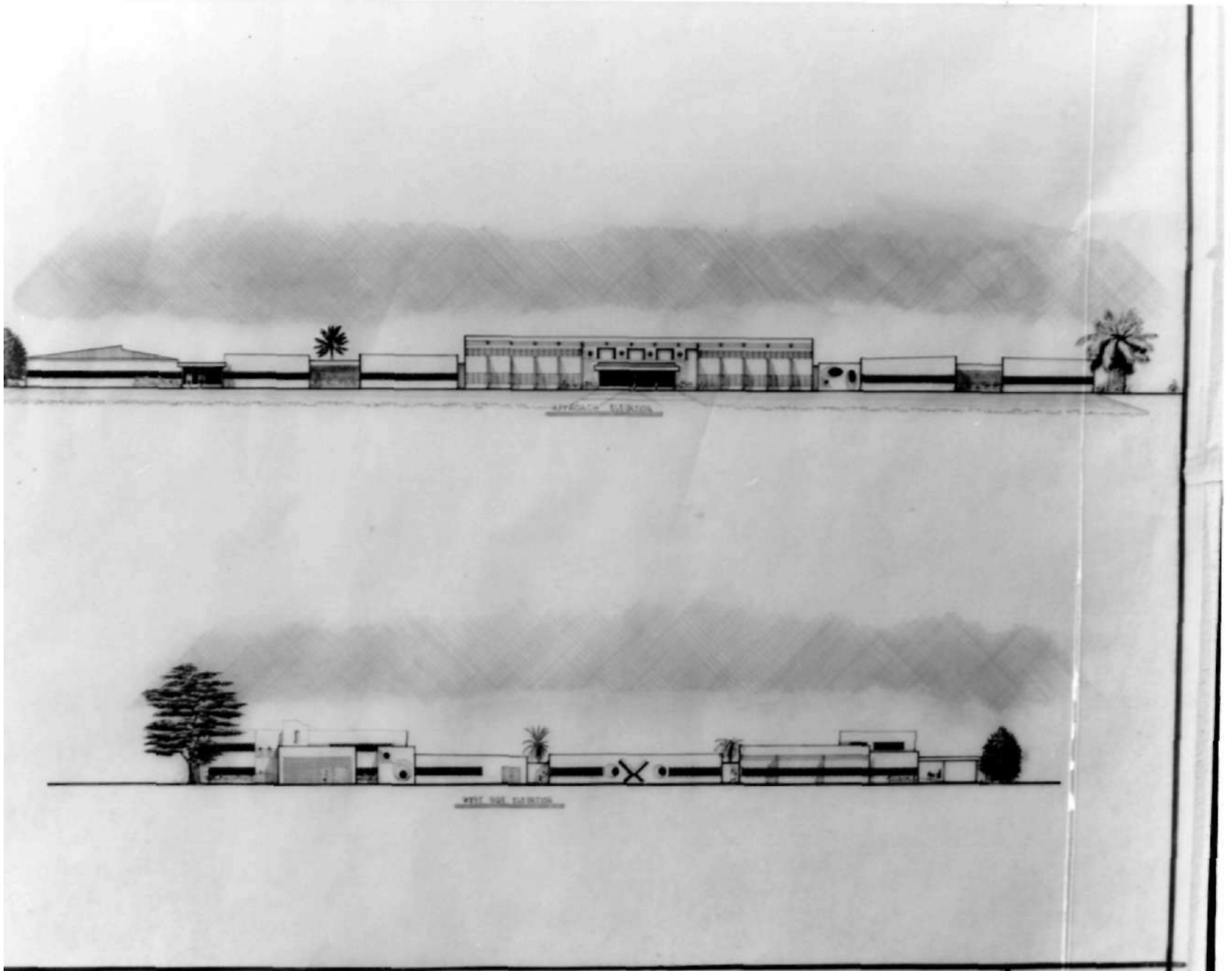
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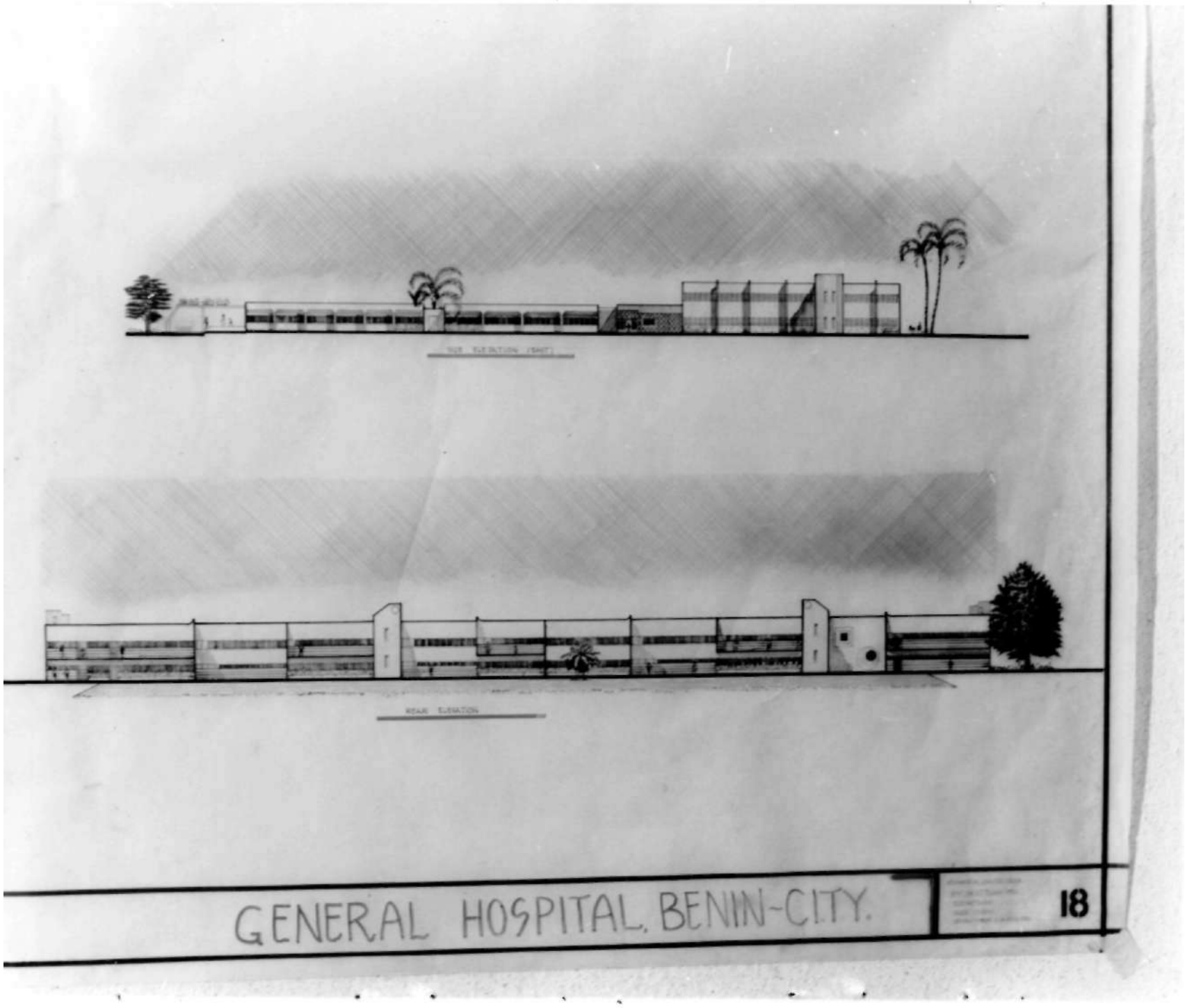

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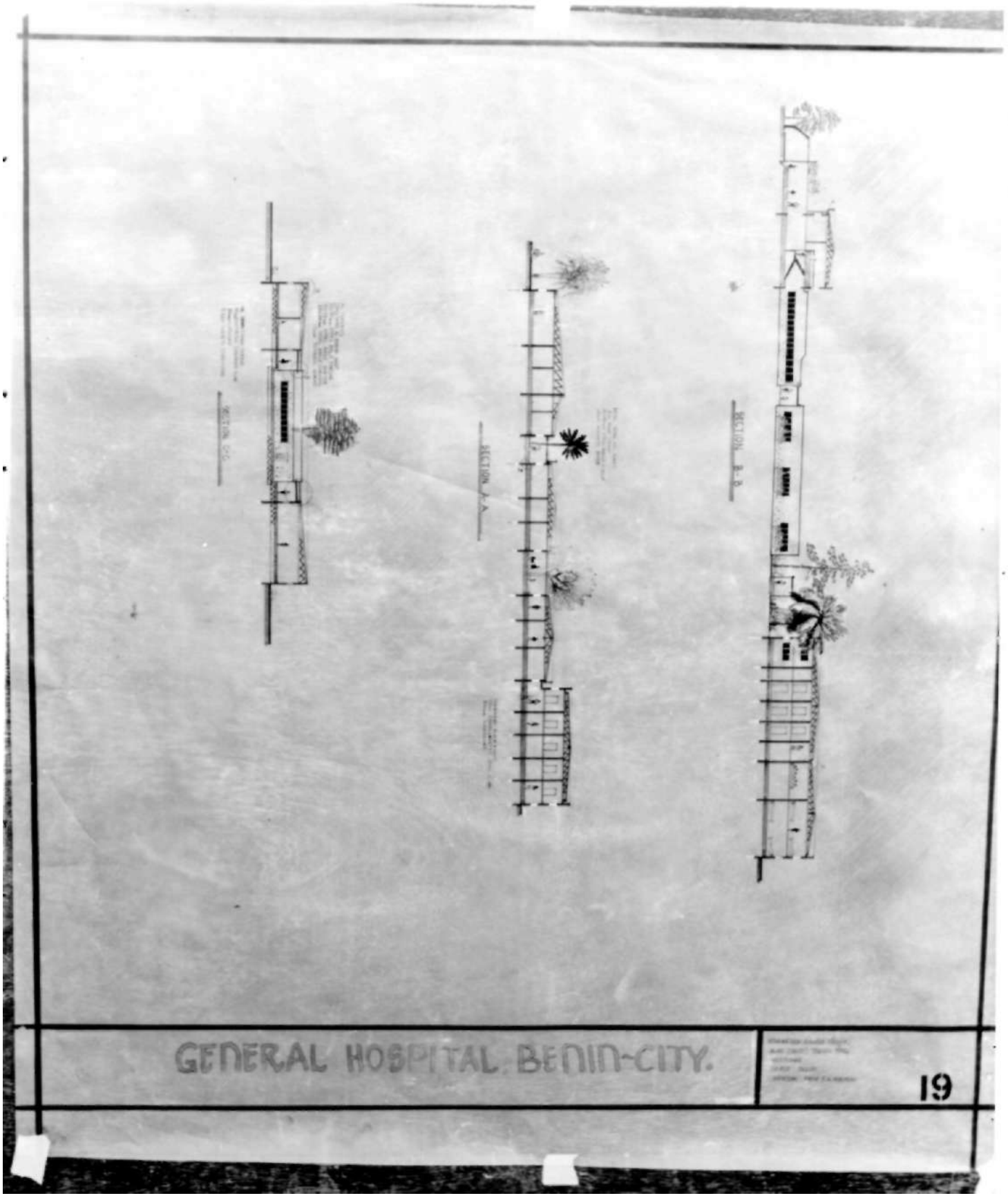
GENERAL HOSPITAL BENIN-CITY.

17



GENERAL HOSPITAL, BENIN-CITY.

18


GENERAL HOSPITAL. BENIN-CITY.
19

28. U.C.H. Ibadan (1984) Statistical returns (1983-1984 Unpublished.

29, U.S. Department of Health, Education and Welfare (1962) Elements of Progressive Patient Care.

30. U.S. Department of Health, Education and welfare (1963) Design features Affecting Asepsis in the Hospital.

31. U.S. Department Of Health, Education and wefare (1963) The Progressive Patient Care Hospital.

32. U.S . Department of Health, Education and Wefare (1963) Planning the Physical Therapy Department.

33. U.S. Department of Health Education and Welfare (1963) Planning the Laboratory for the General Hospital.

34. U.S. Department of Health, Education and Welfare (1963) Surgical Wing of the Clinical Centre, National Institute of Health.

35. Wheeler T.E. (1964) Hospital Design and Function McGraw - Hill Book Company. New York.

36. B. M. Kleczkowski and R.P. BOULENU (1979) Approaches to planning and design of Health care facilities in developing areas.

37. M. Duze (1985) Bendel state Atlas

38. R. Allen/L. Karolyn (1976) Hospital Planning Handbook

39. The Export Group for the Constructional Industries (1964) British Hospital for the world

40. Ibru, Vaughan Richards (1974) Bendel state Master Plan.