RESEARCH AND TRAINIG CENTRE,

For Neuro-Psychiatric

A thesis presented to the Department of

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by

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DECLARATION

I, SOWUNMI, Olanrewaju Olugbenga of Department of Architecture, Faculty of Environmental Design, Ahmadu Bello University, Zaria, Nigeria, hereby declare that this dissertation is an authentic and original synthesis of my research work under the Supervision of my mentor: Arc. M. Abdulkarim of Department of Architecture, Ahmadu Bello University, Zaria, Nigeria, and all the quotations and information utilized and their sources have been duly acknowledged by means of references.

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Student's Signature

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Mentor's Signature

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Head of Department's Signature

CERTIFICATION

This thesis project entitled "Research and Training Centre for Neuro-Psychiatric Hospital, Aro, Abeokuta" meets the regulations governing the award of degree of Master of Science in Architecture (M.Sc. Arch.) of Ahmadu Bello University, Zaria, Nigeria, and is approved for it's contribution to knowledge and literary presentation.

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Dean, Postgraduate School Date:............

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— Sowunmi Olanrewaju

DEDICATION

-- To my Late Father, J. O. Sowunmi
May Your Soul Rest-in-Perfect Peace (Amen)
I wish you were around to bear this a withness
I will always emblem the solid background you
afforded us.

-- My Dearest Mother, M. M. Sowunmi
are wonderful, thanks for your support, kindness,
inspirations and the love for all.

Above all to my CREATOR,
Almighty GOD, who in his
Grace gave this great
opportunity.

R.L.L.D. In Memoriam

"With equal passion I have sought knowledge. I have wished to understand the hearts of men. I have wished to know why the stars shine. And I have tried to apprehend the Pythagorean power by which number holds sway above the flux. A little of this, but not much, I have achieved.

From the Autobiography of Bertrand Russell.

A B S T R A C T

Philosophy

In view of the importance of mental health care to the human life and the socio-economic stability of a nation, the development and adaptation of mental health technology, in which major attention will be given to the development and evaluation of appropriate models for mental health care, should be of primary priority in Nigeria as a developing nation.

The words mental health have become house-hold words. They have come to stand for a great variety of human aspirations. For the efforts to restore to full and healthy functioning of those who are mentally ill:-

- for the active pursuit of humanhood of man and a peaceful world;
- for both the co-operation of all the human sciences in effect to improve functioning of human beings, and
- for that state of human being which he can be said to be functioning with his full capacities, mentally and physically.

It is saddening to note however, that people are not really interested in this aspect of medicine and it has not been given much attention in Nigeria, Even medical doctors are not given incentives to go into the field of psychiatry, most of them prefer going into other parts of medicine especially the physical medicine rather than the psychiatric medicine. These and other reasons have led to the few number of psychiatrists we have in Nigeria today compared to the number of physical medicine practitioners.

Also considering the mental health centres we have in Nigeria one would findout that they are inadequate.

All these have made it difficult to improve on the mode of treatment of the mentally ill and to develop ways of preventing or reducing the psychosocial problems which is the main course of mental retardation, which increases everyday.

If we take a look into the present situation in Nigeria today and in most African countries, we shall findout that due to deteriorating economy of Nations, more people are getting mentally retarded everyday.

This situation calls for an immediate attention in which:

- test and promotion of models of care should be carried out suitable for conditions in Nigeria;

- efficient research geared towards better estimates of prevalence and distribution of mental and neurological disorders;

  research aimed at giving the populace an insight into the psychosocial problems, giving information about their types, courses and out comes. This would provide a base line data for planning and for evaluation of the success of interventions;

- research on effective treatment methods to produce important information about the optimal dosage of essential psychotropic drugs, their side effects and therapeutic efficacy in conditions prevailing in Nigeria;

  and above all, a research centre which will provide new ideas prevalent to development, co-ordination on mental health research efforts, in the country and outside, and collaboration with other countries. This centre would serve as a forum to carry out the above mentioned ideas and training of more psychiatrists and scientist to promote mental health research.

For the outstanding position Nigeria has among developing countries, in this respect, the World Health Organisation has proposed the establishment of a mental health research centre at the Neuro-psychiatric hospital, Aro, which at present in the largest, most equiped and the pioneer psychiatric hospital in Nigeria.

Also due to the efforts of the hospital management in mental health research, it has been discribed as a centre of resource by the World Health Organisation.

The commencement of this project is not yet in sight as moves have just been made by the Federal Government of Nigeria to sign an agreement with the World Health Organisation on the proposal.

My architectural thesis is aimed at:

- providing a feasible research centre for the mental health care to meet the research and laboratory needs of mental health personnels and scientists;

- making a comprehensive research in architectural design and planning of research laboratories, highlight and analyse those aspects which can be best handled to effect some economic savings.

Objectives

1. Planning and designing facilities within a flexible, adaptable and conducive architectural setting and environment which will serve to inspire and enhance progress in the mental health science, will promote and not retard the effective application of this progress to the needs of all concerned.

2. How to put the facilities together so that, as a whole and in itself, the centre would be a tool that serves the therapeutic process.

3. To ensure effective operation, provide flexibility of space, be direct and easily understood in arrangement and to provide an environment that is friendly, intimate and pleasant which would aid the therapeutic process.

4. The facility will be a live, vital place in which the discovery of ideas become existing.

Scope and Limitations

In order for the centre to perform its functions actively, it will comprise of the Administrative Section, Research Laboratories, Teaching Laboratories, Animal Quarters, Observation Wards and Sleep Research Rooms, Training Section which comprises of Audio-visual Classroom, Demonstration Room, Seminar Rooms, Ancilary facilities like Central Storage Maintenance Section and Catering, Co-ordination Centre - Conference Hall, Lounge, Electronic Data Processing Unit, Research Library, Museum and offices.

TABLE OF CONTENTS

CHAPTER ONE

1.1 INTRODUCTION

It is important to realise that a better comprehension of the problems of mental illness in our national life depends upon urgent attention to our mental institutions and this calls for a revision of the case for the mentally ill.

It has been estimated that the country has at least one million people suffering from severe mental neurological disorders and psychosocial problems such as those linked to alcohol abuse and drug addiction.

Estimates of prevalence of other less severe disorders has been difficult to make but there is no reason to assume that they are different from those in other African Countries where it has been established that at least 15 percent of all attendances to general medical services are directly due to mental disorders such as depressive and anxiety states, child mental disorders, mental retardation and so forth. There should not be any attempt to thrust their fate out of our minds and hearts while we concentrate on a better environment for the future.

In view of the public disinterest, lack of funds, lack of knowledge, we can hope to arrive at a concept of optimum mental health in Nigeria and the world as a whole only by facing the full reality of the enormity with which we treat the great bulk of our mentally ill.

Considering the economic situation in the country we shall realise that due to this poor situation, there has been cases of unemployment, poverty and all sorts which leads to people been frustrated and dejected. All these makes quite a lot of people to be drug addicts, alcoholics, juvenile delinquents and so on. There are other causes of mental illness though, but the main thing is that more people are becoming mentally deranged from day-to-day.

It is time to check the number of the mentally ill by devising ways and means of curring them by means of proper research into mental health.

In my contribution to the psychiatric field, the student have decided to examine and propose a research centre comprising of laboratories and other necessary facilities to enhance the advancement into mental health research, of which its pride and success is that, it is a whorshop where sophisticated and increasingly complex assemblage of specialists, working as a team, can apply increasingly sophisticated skills and techniques in increasingly successful interventions.

This thesis is based on research which focus. on issues in laboratory design, study of existing related facilities, study of the site, service distribution system and most of all the issues of flexibility, safety and quality of environment which are the most essential problems to be solved in laboratory design.

1.2 THE PROBLEM

Up to date there is no existing facility taking care of the research into mental retardation in Nigeria.

With the rate of occurence of mental retadation in mind, it is quite necessary to have institution which will study the causes of mental retardation and effective ways of treatment of the mentally retarded. In addition to the development and adaptation of mental health technology, attention will also be given to the development and evaluation of appropriate models of mental health care provision. Also there should be the development of an appropriate infrastructure for research which should give Nigeria research self reliance and chances for an equitable collaboration with other countries.

Considering the nature of the centre being a specialized institution for research, and research, being a search into the unknown, can change in unpredictable ways, the design of the laboratory building should be a response to flexibility, safety and a good environmental quality.

Flexibility being the main theme should be exhibited in such a way that the spaces could take care of growth and adaptable to changes.

There should be flexibility in the introduction of services into the building and the laboratory benches.

The quality of environment should be good enough to inspire the researchers, also, this serves in relaxing the brain since the work done need alot of thinking.

Safety is an important factor in laboratory building because of the risk factor in laboratories Escape routes must be made clear and easily accessible.

1.3 THE PROPOSAL

(a) That the Federal Government of Nigeria (Federal Ministry of Health) in collaboration with the World Health Organization should propose a centre for thorough research into neuro-psychiatry.

(b) The Nigerian Psychiatric Association should set up a board which will co-ordinate research activities in other centres through meetings, organization of exchange of visits, etc.

(c) The Federal Ministry of Health should encourage primary health care all over the country so that research findings would be put into use in there health centres both in the rural and urban areas.

(d) The Research Centre, Aro-Abeokuta will serve as a forum for neuro-psychiatric personnel and scientist to exhibit their skills and techniques to promote mental health. Also for making statistics in mental health.

CHAPTER TWO

HISTORICAL BACKGROUND OF NEURO-PSYCHIATRY

i. Global Perspective

ii. Nigerian Perspective

2.1 GLOBAL PERSPECTIVE

Neurology deals with both organic and functional diseases of the Nervous system and psychiatry deals with diseases of emotions and the mind.

The word abnormal in human behaviour has been in existence since the beginning of Civilization. This was when man started forming communities.

Psychiatry is a much older subject than Neurology. Although the antients wrote about the treatment of insanity, psychiatry, as an independent discipline, with its specialist. Practitioners, the alienists, initially developed in the 17th Century.

Around this time, medicine generally was released from the Shaclles of Galenism and authoritative dogma that presided over the middle ages, and the study of insanity with particular reference to the mind rather than the soul became a part of this intellectual movement.

The trend away from metaphysics towards a more physiological, descriptive and emperical science was heralded by such thinkers as Johann Weyer (1515 - 1518), who was perhaps the first Physician to take a major interest in mental illness to a great extent, Francis Bacon (1516 - 1626), Descartes (1596 - 1650), Hobbes and others.

The mentally ill were regarded either as heretics or if they were lucky, as possessed by some alien 'spirit' from the devil and the treatment was thus by burning or exorcism.

As the centuries progressed, the concept of mental illness being associated with witchcraft grew and those afflicted became feared.

Descartes later provided a solution for the growing problems that were emerging in the

the relationship between the newly developing emperical sciences and the more long established theology.

Haslam (1764 - 1844), medical officer to the Bethlem Hospital, in Berlin, the country's oldest asylum, conducted comprehensive post-mortem examinations on the brain of insane patients. Although it was said that he failed to localize the site of insanity, it is suggested that amongst his observations was the first discription of Cerebral Syphilis, which was however, in Germany where the most significant advances occured.

Griesinger (1817 - 1868) Professor of Psychiatry and Neuro-pathology in Berlin, gave a clear lead to the idea that psychiatry and neurology are not merely two closely related fields, they one but one field in which only one language is spoken and the same laws rules. He drew attention to the brain as the seat of insanity and that as such mental illness should be investigated in the same fashion as other illnesses.

In the Frendian age (1800s), Sigmund Frend contributed immensely to the understanding of man's nature. "His principles of psychological approach in psychiatry was responsible for the emergence of the first theory of personalty based on observation and not merely on speculation". They used the psychological perspective and related abnormal phenomenon with the human mind and it's associated mechanisms of thinking, feeling and relating. Jung (1875 - 1943) and Adler (1870 - 1957) developed their own schools with profound modifications of Frend's ideas. Of utmost importance has been the increasing emphasis on ego mechanisms and less emphasis on the "Id" - Identity, in the control behaviour.

Concentration on aspects of ego functioning that were concerned with adaptation of the individual to his environment and which were "confict free" was predominant after some time.

Recent developments in the fields of Neuro-chemistry, the discovery and wide spread use of a number of powerful psychotropic drugs and the elucidation of some of their possible modes of action and the more widespread reintroduction of departments of psychiatry into general hospitals, has led once again to a clearer understanding of relationships between psychiatry and has indicated a way for the future development of Neuro-psychiatry[1].

2.2 NIGERIAN PERSPECTIVE (Aro)

In 1907, the first Nigerian asylum was opened in Yaba, Lagos with 48 patients. The buildings were not originally designed for this purpose, they had been adapted for custodial care of the mentally ill from the former headquarters of the Nigerian Railways. Large assylums were in Vogue all over the world then, and the Yaba asylum followed the customary pattern in being situated far from the towns. At that time, Yaba and Ebute-metta, areas in Lagos, were still outlying bush villages from Lagos Island.

The treatment of psychiatric patients also followed the psychiatric practices found else where. Difficult cases were chained down outside or locked in a base room, the only medications given were paraldehyde and potassium bromide;

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1. The Majority of this Part of the Chapter is based on extracts from Neuro-psychiatry by Michael, R. Trimble, 1981.

occupational therapy, if it existed at all, consisted of sweeping the yard.

Dr. F. B. Home was the first alienist medical officer to be employed in Nigeria. He was attached to Yaba in 1927, but did not take up residence at the asylum. He was not called a "psychiatrist" but rather an "alienist". This title reflects the climate of opinion toward mentally ill patients who were considered to be alienated from the rest of the community.

In 1936, Dr. R. Cunyngham Brown visited Nigeria for the Colonial Office and thereafter wrote 9 Report; care and treatment of lunatics in the British West African Colonies, Nigeria.

In 1944, 13 attendants were transferred from Yaba to the newly instituted Lantoro Asylum in the outskirts of Abeokuta. Prior to this, Lantoro was a native administration prison and for a short period of time had been used as an Army Camp for Nigerian Soldiers. The first patients admitted were seven soldiers repatriated from Burma because of psychiatric illness.

Dr. Cameron, an alienist, was the first psychiatrist to be in charge, taking up the appointment about 1949. It was at about this time that the idea of establishing a mental hospital was born.

In 1948, Dr. G. B. Walker, Director of Medical Services for Nigeria and his successor, Dr. Manuwa (then Regional Deputy Director for the Western provinces) selected as the site a 300 acre area, two miles outside Abeokuta in the opposite direction of Lantoro.

Aro hospital was designed to be a treatment centre rather than a custodial asylum and as an institution where facilities would be available for training staff to care for mentally ill persons.

Prior to the constitutional changes of 1955 which divided Nigerian into different regions, Aro Hospital was a Federal concern, under the allocation of functions agreed upon by a Constitutional Conference in 1954, mental health was not included in either the Federal or concurrent legislative lists. It was Dr. Manuwa, who insisted that Aro Hospital should remain a Federal responsibility since it was and is the only hospital of its kind in Nigeria.

The hospital was designed to accomodate 200 patients initially with an expansion capacity for 500 total.

At present, Aro is the collaborating centre for the World Health Organisation in Nigeria[2] it has even been proposed to establish a Research Centre their which would help in searching for mental health for the Nation.

2. Extracts from Aro Hospital in Perspective by T. Asuni, M. D., D.P.M.

CHAPTER THREE

CASE STUDIES

3.1 Institute for Basic Science Research in Mental Retardation, Staten Island, New York.

3.2 National Hospital for Nervous Diseases, London.

In order to boost the author's knowledge in this study, the author have decided to study some of the existing related facilities around the world especially from the United States and the United Kingdom.

Unfortunately, these has not been any facility of it's kind in Nigeria and none to lay hands on in Africa too but with the ones available, would benefit a lot in this study.

There are many methods of evaluating buildings. Some are very formal requiring a team composed of a variety of professionals, numerous interviews, questionnaires and observations and they take as many as five years to produce a voluminous report.

Others are very casual requiring a minimum criteria and the involve maximum subjectivity.

In this study, the method adopted is one which evaluate a building from the stand point of it's function mostly, i.e., how a building works to do the job it is supposed to perform with respect to the quality of it's space and the building's time quality. In this type of study, it is important to evaluate buildings on flexibility in their planning.

3.1 INSTITUTE FOR BASIC SCIENCE RESEARCH IN MENTAL RETARDATION, STATEN ISLAND, NEW YORK

This centre most relates to the study. It is located on Staten Island adjacent to New York's Willowbrook State School for the mentally retarded.

It is the first institution of its kind, in the state and perhaps in the world, to focus programmes in disciplines in Basic Sciences entirely on mental retardation with all facilities housed in one complex.

The brief consisted of departments such as:

- Administration
- Research Laboratories
- Wards
- Animal Quarters
- Library
- Conference Hall

- Computer Room
- Dining Area
- Mechanical Workshops
- Records Department

3.1. Description of Functions

The complex consists of a five story Research tower, to which are joined three single storey wings.

One wing contains administrative offices, another house wards for 40 patients and the third wing houses experimental animals.

Administration

Two level support facilities houses general administration and operating spaces. There is a divisible multi-purpose room for scientific meetings in addition to interview rooms specially designed and equiped with instruments and projectors.

Wards

A small patient wing in which selected patients from nearby Willowbrook State hospital for the retarded are housed during some phases of research.

These wards are solely for patients under observation.

Some special rooms for controlled atmospheres and pressures which aid patient research are also provided.

3.1.2 **Observations**

Functional Planning

The approach is very pleasant. There are different entrances to different departments.

The laboratories have been laid out so that any scientist can get from his work area to the administration section or to the wards without passing through any other scientist's work area.

Good placing of functions - the ancilliary facilities such as the mechanical shops, the records department, stores and the bath rooms are placed on the basement floor so that they would not disturb the areas where tranquil is needed.

Departments are seperated but linked properly by some related functions.

Access to the laboratory building complex and the administration is totally pedestrian, the car parks are divorced from the complex. Loading bay is provided for the Animal quarters and the shops for easy access.

3.1.3 Planning for Flexibility

Laboratory spaces are planned to accomodate changes in research techniques and diversity of procedures of many disciplines.

The structural module in the laboratories is quite adequate.

Rearrangement of space within modular system with the aid of movable walls.

Laboratories are with wide ceiling span for unlimited options in placement of partitions according to discipline requirements.

The wards exhibits in-built flexibility - patients selected from the Willowbrook population can be studied under controlled conditions in groups of two to forty.

3.1.4 Service Distribution System

Planning

Vertical distribution system for utilities at module intervals.

Each laboratory floor has a 5 foot mechanical space above its walk-on ceiling.

Knockout pannels - for access so that utility lines can be serviced without turbing
distributor laboratory work.

3.1.5 Form

The form has been dictated by the functions the building is serving. Rectilinear shapes are adopted althrough.

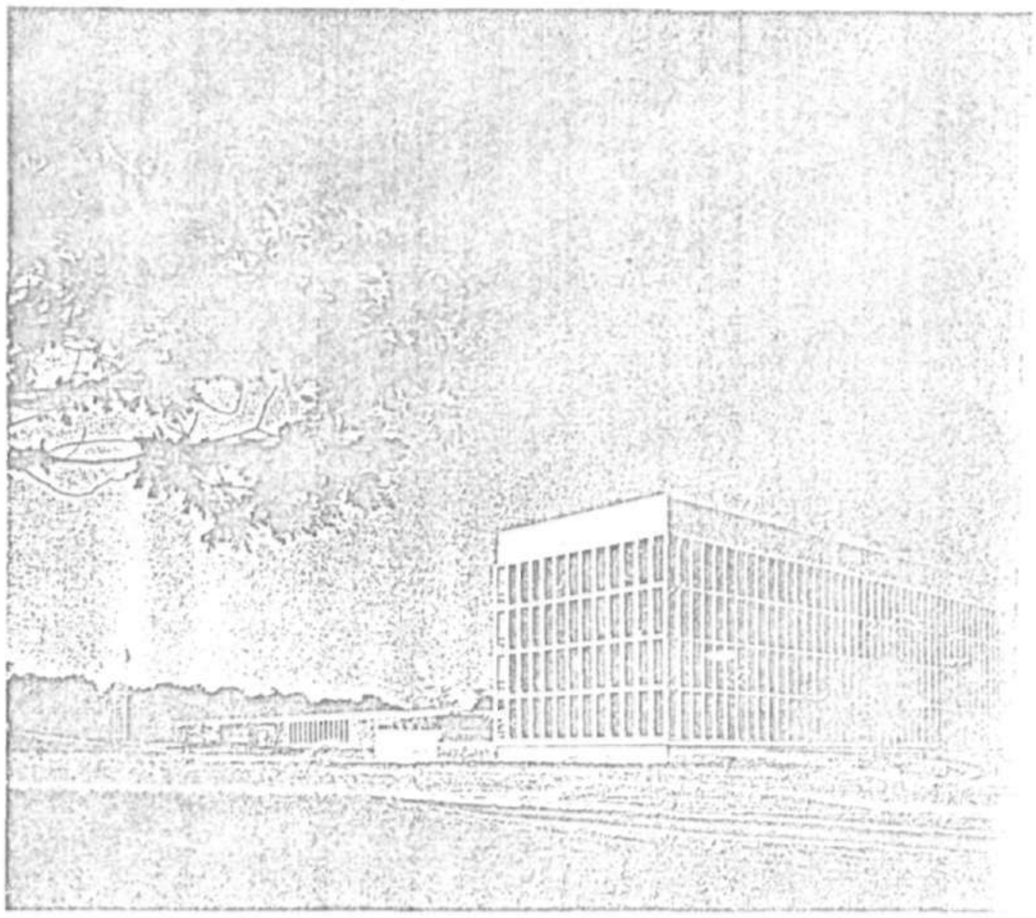
Good architectural landscape design achieved.

The topography of the site has been used in achieving the basement floor.

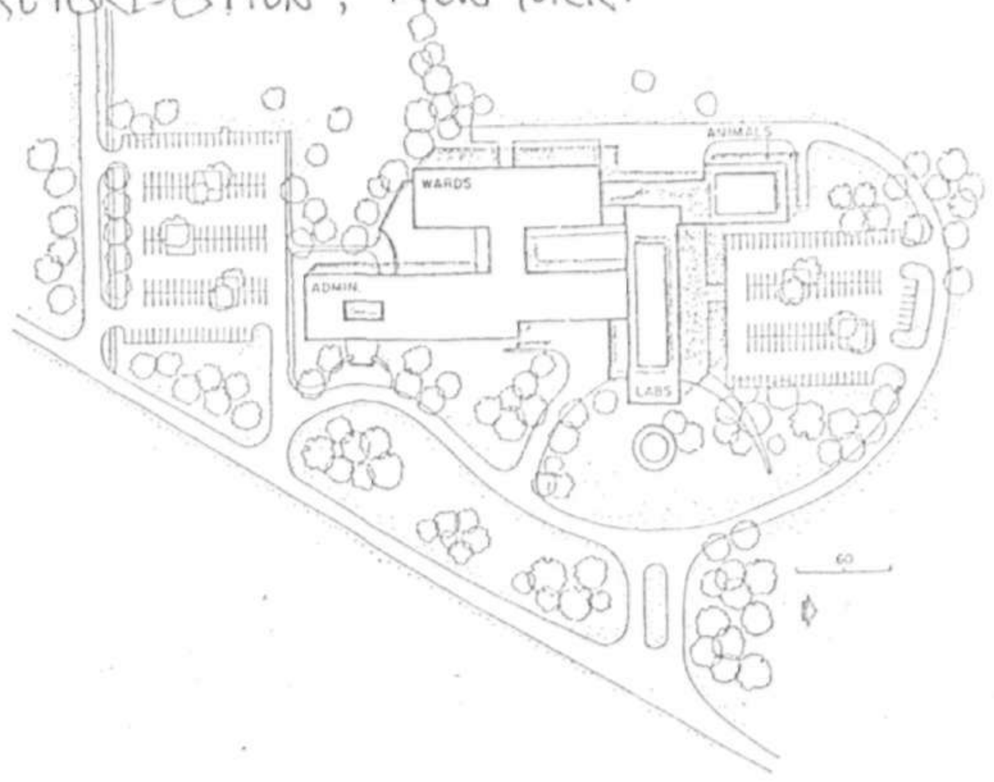
The laboratory building has a dominating effect on the other buildings - prominence of functions.

3.1.6 Economy

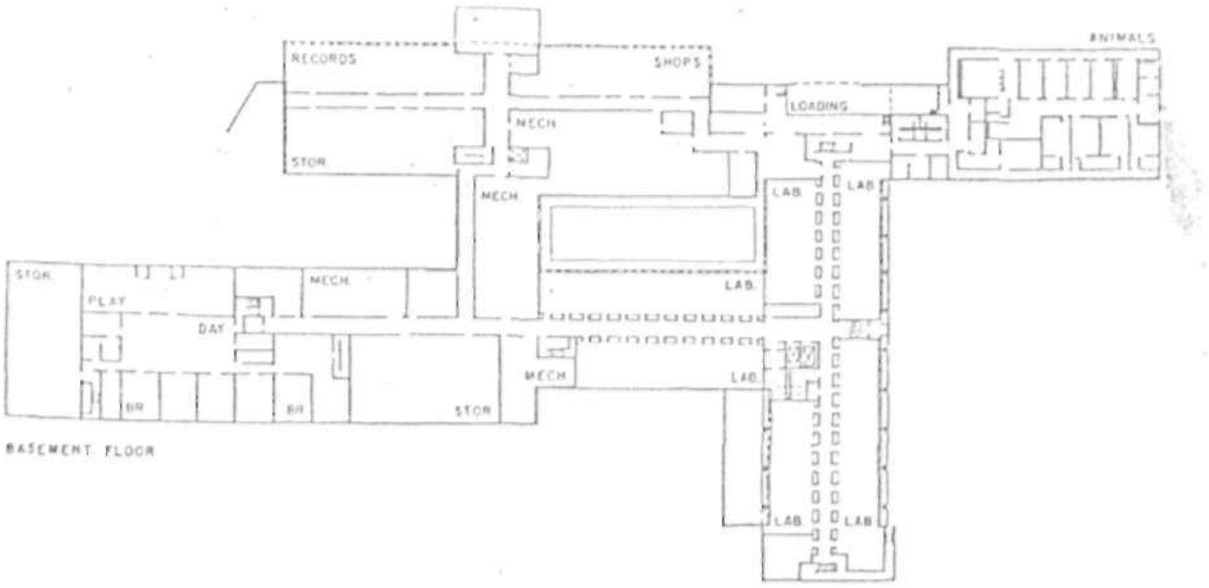
The use of precast concrete on a large scale helps in reduction of cost.



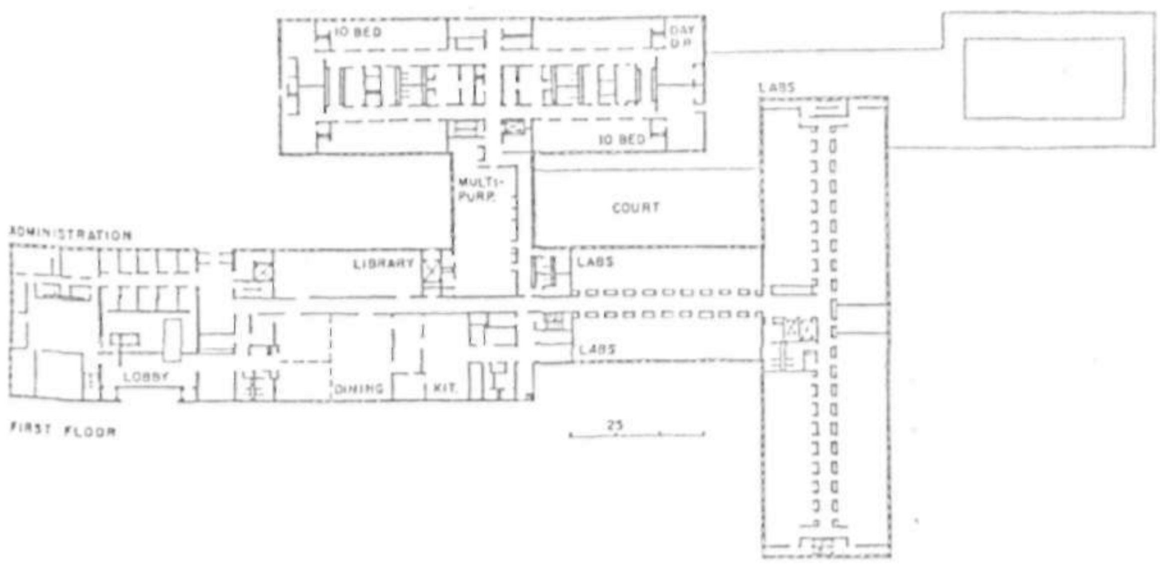
INSTITUTE FOR BASIC RESEARCH IN MENTAL RETARDATION, NEW YORK.



SITE PLAN



BASEMENT FLOOR



FIRST FLOOR

The architectural intention. (flexibility) is reflected in the choice of materials - steel columns, demountable partition walls pre-stressed concrete and stone panells.

3.1.7 Time

The building highly incorporates in-built flexibility and has the facility of expansion on a large scale as future requirement.

Main design goal was flexibility.

3.2 NATIONAL HOSPITAL FOR NERVOUS DISEASES

The hospital forms a part of the first phase of the combined development of the hospital for sick children, Great Ormond Street, and the National Hospital, Queen Square, London.

The ten-storey tower provides approximately 10,000 square metres of laboratory spaces for teaching, medical and research activities.

3.2.1 Planning

The scheme is based on a laboratory bay serviced from the vertical ducts at each of the four corners, offering maximum options for laboratory and environmental services. Each bay can be sub-divided by the user as required. The square module shows dimensions at intervals of 1.2 metres thus each module is 3.6 metres wide and 8 metres long on a typical floor, in the diagram shown overleaf, various partition arrangements are possible and services available to meet changes in configuration. Some of the laboratories are naturally ventilated, the number of this varies from floor to floor.

3.2.2 Flexibility

In the tower, the form of room volumes and circulation shafts is articulated because of the in-changing nature of this spaces.

The modular concept of the laboratory planning and furniture shows a degree of flexibility in the building.

Inside the laboratories, all benches are mobile and can be moved about like tables, the pads on the feet being adjustable to take up any small irregularities.

Under bench cupboards and drawer units can be wheeled about to fit in anywhere.

3.2.3 Utility Distribution

Laboratories are served from vertical ducts at each of the four coners offering maximum options for laboratories and environmental services pipe. Shafts are in opposite corners of each laboratory module so that each wall of the Laboratory can have piped supplies and drainage.

Air supply shafts flank the double access corridors, bringing high-velocity supply air to velocity reducers in the ceilings.

Services are provided through two spines fixed to vertical supports between the benches. The lower one carries all water and gas supplies and has drip cups built in where required.

Drainage which is in glass, runs above the floor to catch pots in the plumbing ducts. Connections in the drainage system can easily be made and unmade.

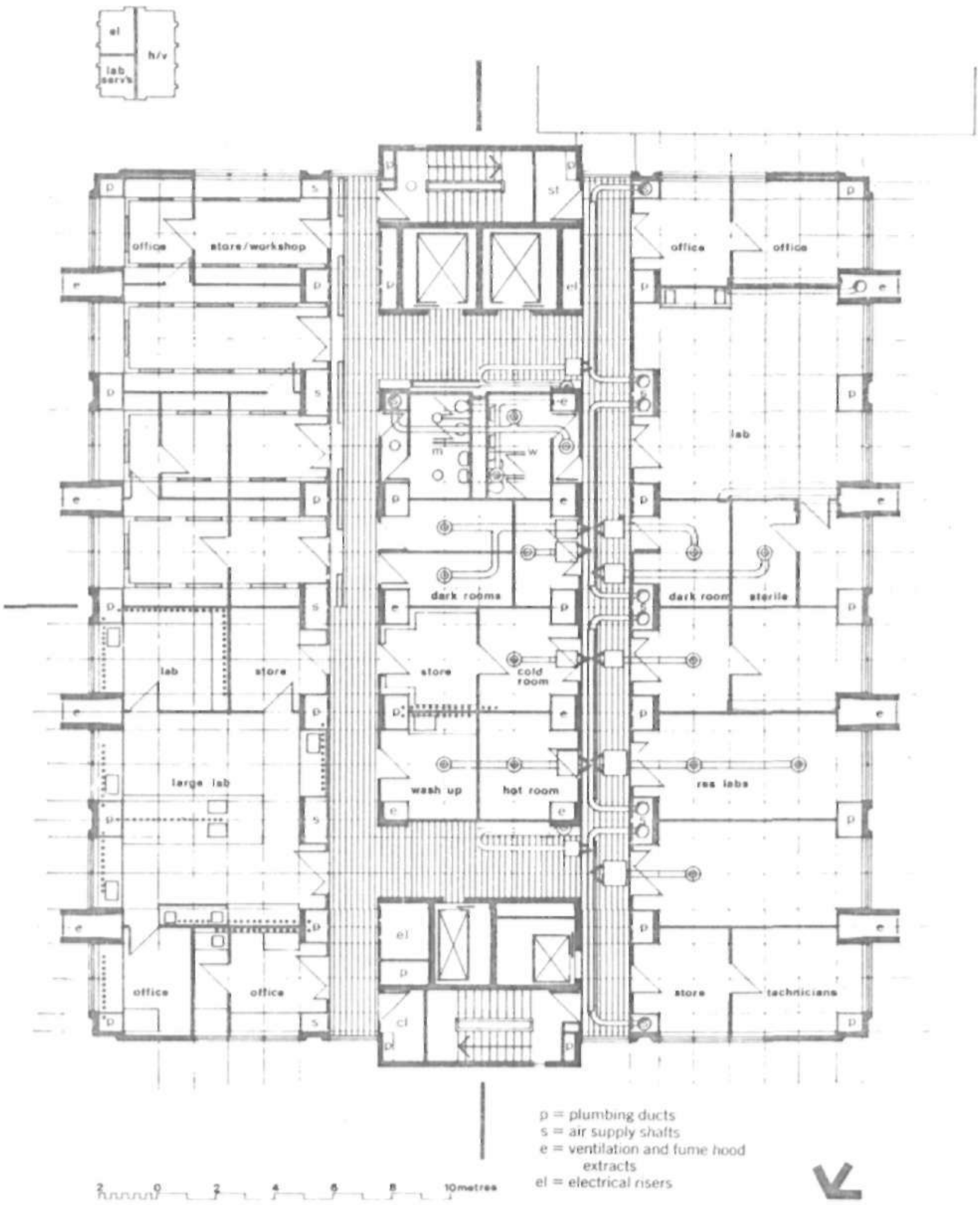
Benches containing sinks can be moved as easily as those without an electrical out-lets are provided in the distribution spine. The spine is about 500mm., above the bench top, so that it is easily accessible even if the bench is cluttered with equipment.

3.2.4 Architecture

This shows alternate extract and plumbing ducts. All ducts incorporate structural members. Ducts are accessible from inside the building and air extract shafts have external removable panels. The ducts gives it a prominent vertical character.

The structure is poured concrete with precast concrete panels below windows.

Typical floor plan



p = plumbing ducts
s = air supply shafts
e = ventilation and fume hood extracts
el = electrical risers

Figure 6.16 National Hospital for Nervous Diseases. Square module.

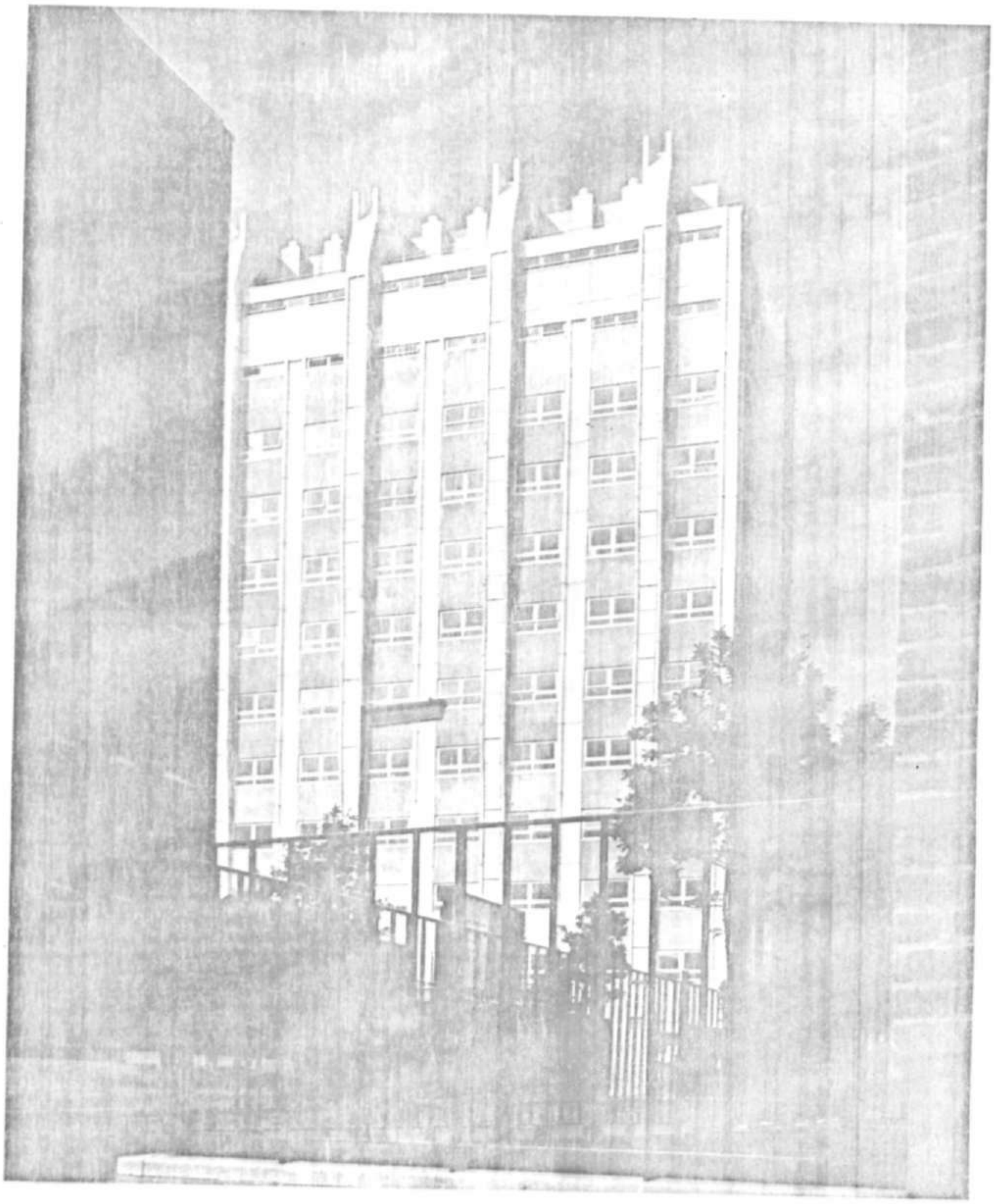


Figure 6.20 Exterior showing alternate extract and plumbing ducts. (Crispin Boyle photo).

CHAPTER FOUR

SITE AND SITE ANALYSIS

4.1 NEURO-PSYCHIATRIC HOSPITAL, ARO, ABEOKUTA APPRAISAL

On the out-skirt of Abeokuta lies the site of Aro Hospital which is a notable land mark in the history of psychiatry in Nigeria. The hospital is autonomous both Clinically and administratively.

4.1.1 Planning of the Existing Structures

Entrance Zone

By the main gate are the gate house, the emergency block, the chapel and the mosque. The places of worship are not properly located because they are close to the emergency block which is a noisy area and the noise made by the patients would distract the attention of the worshipers.

Teaching Zone

The Class-rooms and the two blocks of student's hostel are made of temporary structure. The initial architectural plans for the hospital did not include a school building. One of the structures originally planned as a disturbed ward, has however, been converted into a unit suitable for women which is the female nurses hostel. Also, there is a long temporary building from both male and female nurses' hostel.

This location is due, functionally, to the proximity to the in-patient wards, administrative area, the gate and the proposed medical centre which are linked linearly by the connecting road.

Administration

Both the new and old administrative blocks have been conveniently located near the teaching and proposed medical Centre.

Wards

The wards at Aro are seperated in a "Villa" type of design. Originally planned for are two admission wards, two infirmaries, three general treatment wards and two disturbed wards, only four are being used for this purpose at present.

Two male wards and two female wards. They are all rectilinear in shape.

The remaining wards not used for housing patients are used for facilities like X-ray, patological laboratories, electro-cardiography and Electro-encephalography departments, theatre and dispensary. This is not proper.

Medical records department should be placed near both the medical centre and the teaching and research centre to enable the centres use them in consultation and research purposes.

The maintenance department, Boiler house, Laundry, generating plant and the incenerator are properly grouped and located.

Out-patient Department

Location

One of the buildings originally designed as disturbed wards, i.e., psychogeriatics, is used both for the out-patient clinic and electro-convulsive therapy.

For this reason, it does not serve the purpose of out-patient department with necessary amenities and it has been wrongly located.

Patients are made to pass through the whole length of the hospital premises and may affect a much needed tranquility of quiet zones.

Solution

Since more of the patients do not need other hospital services, they should be restricted around the entrance zone as indicated by the proposed medical centre.

Design

The Out-patient Department has not being properly planned, the patients are mixed together which is improper, sex grouping should be adopted. The out-patient Department should be an integral part of the medical centre of the hospital and it should house all necessary and major medical and clinical facilities.

Structural Systems

- Most of the buildings are of simple load bearing, block work. Examples are the in-patient wards, staff houses, gate house and the temporary administrative block.

- Roof Structure

  The pitched roofing system is designed in close reflection of existing roofs in the community as at the time they were built, that is, in the late fifties.

4.1.2 Proposed Structures

Buildings proposed for future redevelopment of the hospital includes;

1. The medical clinics and laboratories
2. The new hospital administrative block an annex of the existing building.
3. Medical Library
4. Auditorium
5. Students hostels
6. Postgraduate hostels
7. Staff Club
8. Staff Quarters (an addition to the existing buildings)
9. Extension of words
10. Extension of maintenance department
11. The games centre
12. Guest chalets

- The proposed medical centre would house the out-patient clinic, medical records department, X-ray department, pathological laboratories, E. C. G. Department, theater and the dispensery.

- Teaching facilities under construction includes the class rooms and a central medical library.

4.1.3 Conclusion

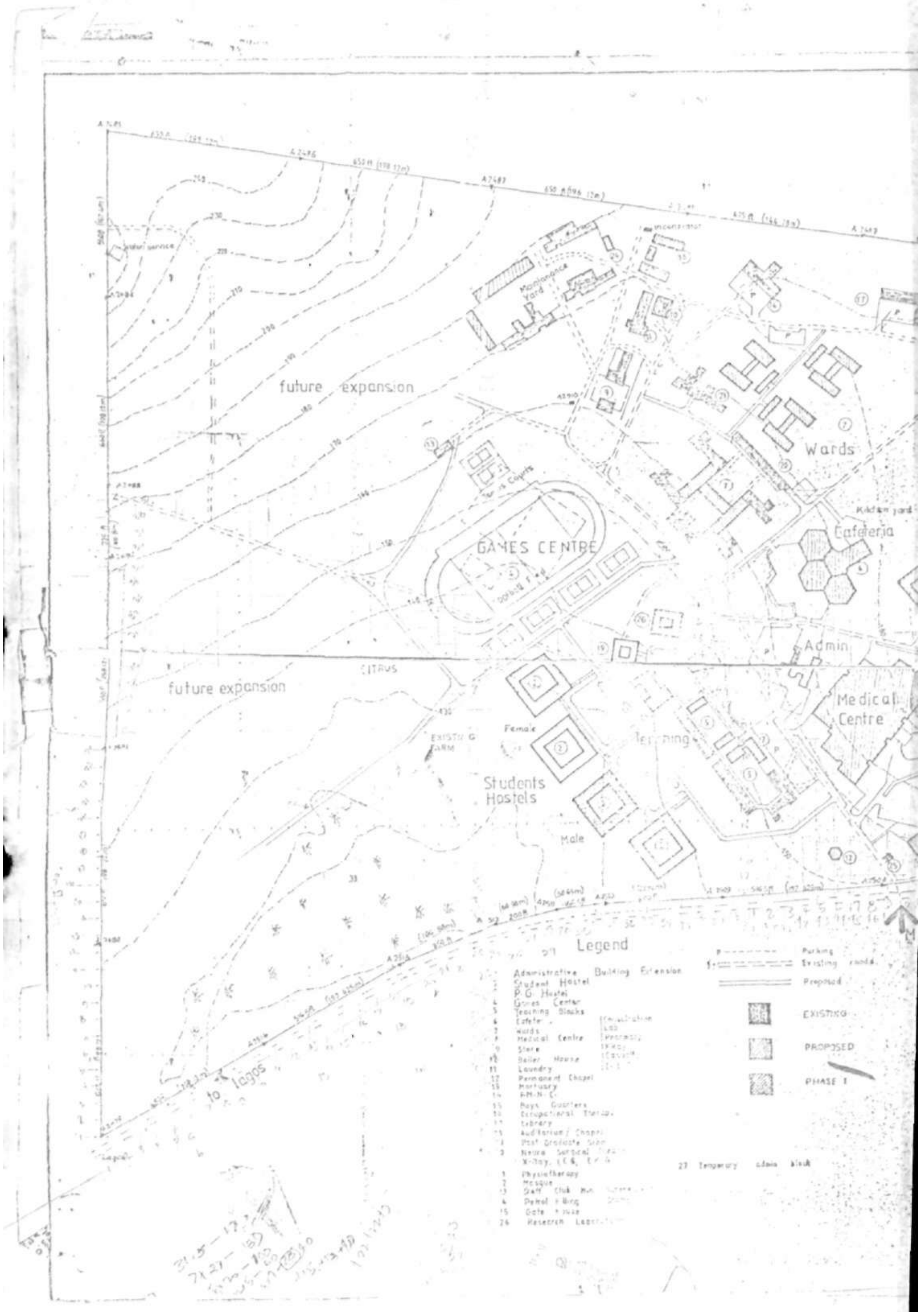
Aro Hospital is a spread-out hospital complex.

Planning

Generally, the planning of the buildings is of rectilinear concept and form which forms a complex of linear blocks with their main axis on the East-west orientation.

In the first phase of the hospital, that is in the late fifties, the building systems were aimed at providing a therapeutic atmosphere in close liason with the building systems of the surrounding community. If the hospital structural system is far from that observed in the immediate community, the patients may think it is an attempt to deceive them and therefore, institutionalize or confine them.

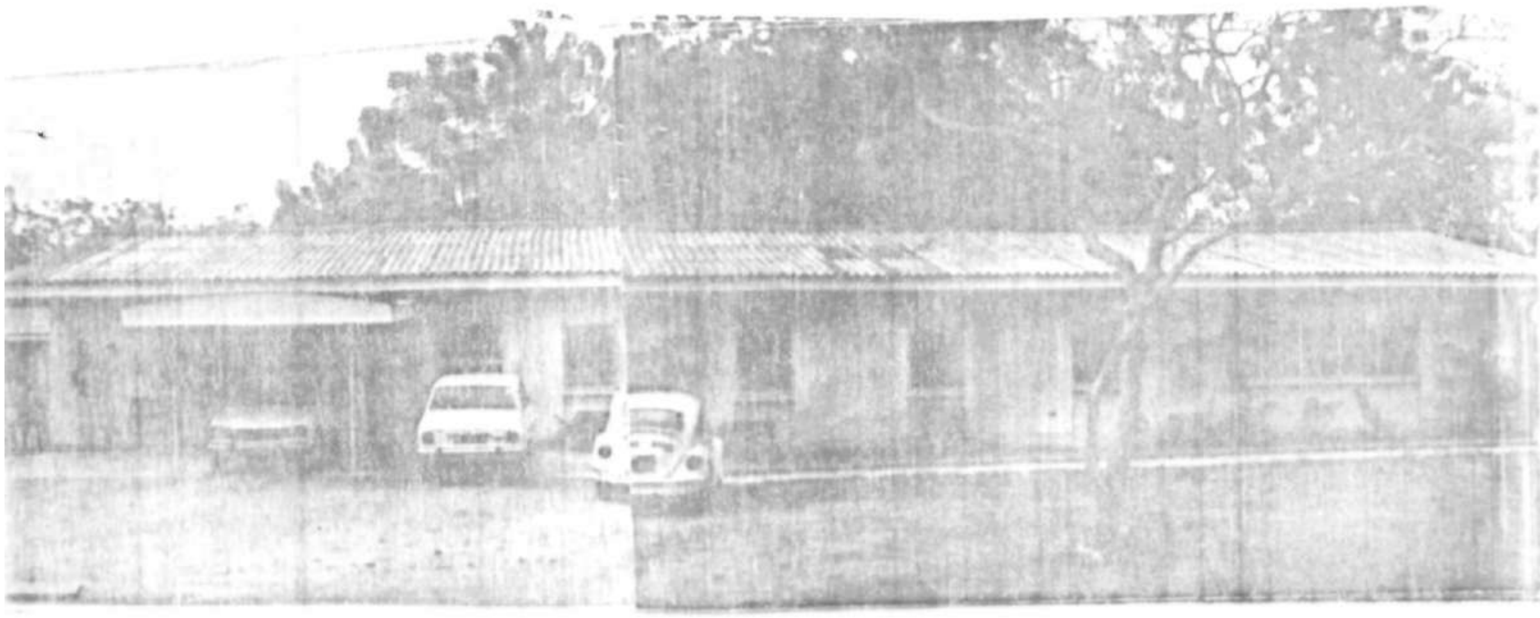
In the second phase, which is the modern times, has allowed the planning of buildings under construction at present and the proposed ones are multi-floor in nature and the structural systems are



future expansion
Maintenance Yard
Wards
Kitchen yard
Cafeteria
GAMES CENTRE
Admin
Medical Centre
CITRUS
future expansion
Female
Teaching
Students Hostels
Male
to Lagos
Legend
Administrative Building Extension
Student Hostel
P.G. Hostel
Games Center
Teaching Blocks
Wards
Medical Centre
Store
Boiler House
Laundry
Permanent Chapel
Mortuary
Boys Quarters
Library
Auditorium / Chapel
Physiotherapy
Mosque
Gate House
Parking
Existing roads
Proposed
EXISTING
PROPOSED
PHASE I
27 Temporary Admin block

THE GATE HOUSE

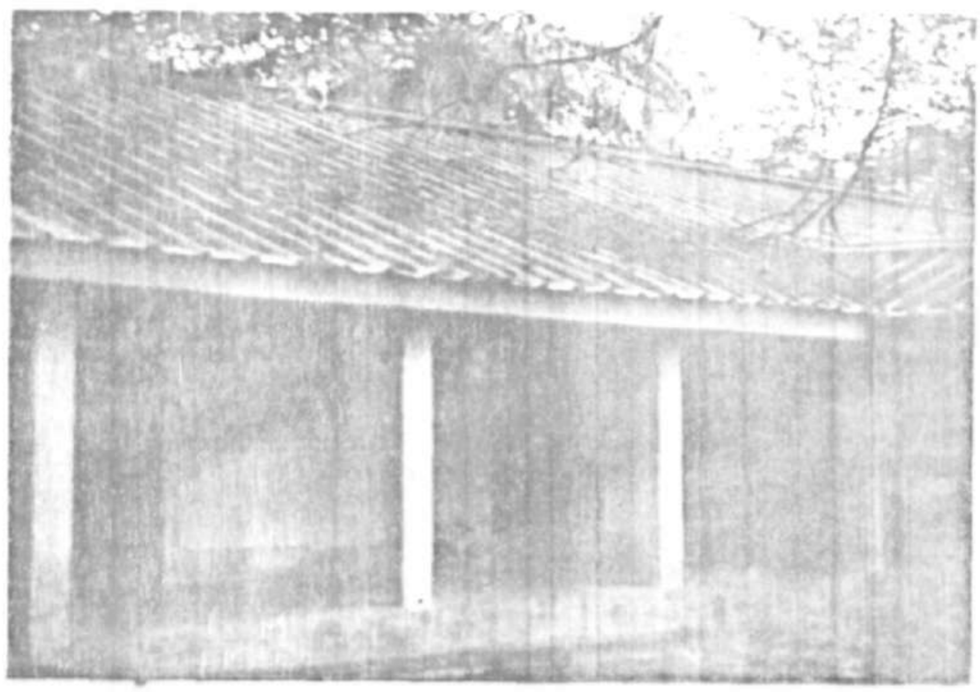
THE TEACHING BLOCK



THE ADMINISTRATION DIVISION

TEACHING BLOCK

OUT-PATIENT'S DIVISION



E.E.G. AND X-RAY DEPARTMENT

modern. This gives a marriage of the old and new structural systems as it is now in the community and this provides a therapeutic atmosphere in close liason with the buildings in the surrounding community which makes the patients more comfortable and will enhance the therapeutic process a great deal.

The situation in the hospital will definitly affect the design of the centre for research since it's site would be within the site.

The centre should be designed to fit into the environment, the architecture, structural systems, and other characters must blend with those of the surrounding structures.

4.2 SITE AND SITE ANALYSIS

4.2.1 Choice of Site

The major criteria for site selection for a mental retardation research centre lies in its proximity to a well established mental hospital and Aro hospital has been chosen.

4.2.2 Location Criteria

The research centre has to be within the medical core of the hospital which gives it a direct link with the medical clinics and the teaching hospital.

The centre should be located on the edge of the hospital site rather than within it because of its affinity for growth. This centre is a satellite in the hospital but has a degree of autonomy. It is important that the students and staff in the centre have easy access to the main hospital area., i.e., the wards and other facilities.

(a) Size

The site should be large enough to accomodate growth of programmes and concurrent parking. Buildings should be placed on the site so that additions can be made as programmes develop and as enrollment increases.

(b) Relationship

In view of the growth of research and services responsibilities, the site should permit location of these facilities in relation to the major hospital so that staff and students can be within a few minute's walk. The teaching hospital and clinical facilities should be placed near the site so that the educational facilities relates to and connect with the basic science facilities.

4.2.3 <u>Site Selection Criteria</u>

<u>Site - 1</u>

<u>Merits</u>

- <u>Availability of Land</u>

  Adequate land to accomodate growth of programmes and parking.

  <u>Accessibility to Site</u>

  Good access to the main hospital area.

<u>Demerits</u>

Site is too inward with regards to accessibility of out-patients to the medical centre which is supposed to house the out-patients' clinic.

<u>Relationship</u>

Site is too far from the educational facilities.

Circulation

Site makes circulation difficult such that pedestrians would have to ply the same route as the vehicles this would also result in heavy traffic within the hospital environ.

Site - 2

Merits

Adequate land to accomodate growth of programmes and parking.

Good and easy access to the main hospital area.

Good access to the main traffic route which makes it easy for out-patients to get to the medical centre.

Site is not far from the hospital in-patients' wards and the educational facilities.

Circulation routes tapped from the main road and the existing route in the hospital makes a good circulation system possible.

Site - 3

Merits

Good access to the main traffic routes. Ease for out-patients to reach the clinic.

Good access to the hospital area.

Demerits

In adequate land to accomodate the medical core.

Site founded by roads which makes flexibility and growth, which is very important, impossible.

4.2.4 Location of Site

The centre is located in the future expansion, area of the hospital site which is the South-end of the hospital.

The site is just by the proposed medical centre where the clinics and laboratories for the in and out-patients are.

Also close to the site are the medical library which is presently under construction, the existing teaching blocks for Nursing Students and the proposed Auditorium.

SITE (EXISTING SITUATION

SITE (EXISTING SITUATION)

VIEW FROM LAGOS-ABEOKUTA ROAD

VIEW FROM THE TEACHING CENTRE

The site is 21,600 metres square in size and there is a large provision of land for for the purpose of expansion around it.

4.3 GEOGRAPHIC AND CLIMATIC DATA OF ABEOKUTA

4.3.1 Topography and Vegetation

The topography of the site is a gently sloping terrain. The predominant vegetation type is the savannah forest which provides a pleasant open but sca ttered shaded environment.

4.3.2 Geology

There is an absence of rock out-crop and minerals on the site but it has an adequate strength to withstand any engineering, structure.

4.3.3 Soil

Soil is predominantly loamy soil, basically moist clay and sand. These gives a characteristic of a good workable site and good drainage.

4.3.4 Rainfall

The rainy season in Abeokuta starts around March and till the end of October, with reference to the rainfall Chart, it is realised that the bulk of the rain is experienced in May, June, September and October. Abeokuta and its environ is well watered with a total annual rainfall of 1,625 mm. This necessitates a proper drainage system that can withstand large volumes of water very rapidly. The roof structural system should be carefully chosen.

4.3.5 Wind Direction

The major air mass which dominates the climate is the tropical maritime air mass formed over the atlantic ocean to the south of the country. It is moisture laden and it moves South-westerly from March to October. Being moisture laden, it brings lots of rain (heavy rainfall) around this time.

The tropical continental air mass is developed over the Sahara desert and it is dry and warm. it blows in the North-east and South-west direction.

This air mass is associated with the North-east trade winds. It intensifies between November and February bringing dry, dust laden conditions associated with harmattan.

4.3.6 Temperature

The response to net radiation which in human terms is felt as air temperature is generally influenced by humidity. Abeokuta records its highest temperatures during the dry season where there are few Clouds.

The town being a rocky town records relatively high temperature with a maximum of 27.7% occuring in March due to the reflection and radiation of Solar Energy by the rocks.

The average annual temperature is 26.2 C. Proper Proper ventilation would be of importance to buildings on site and most of the trees on site would be retained to improve the micro-climate.

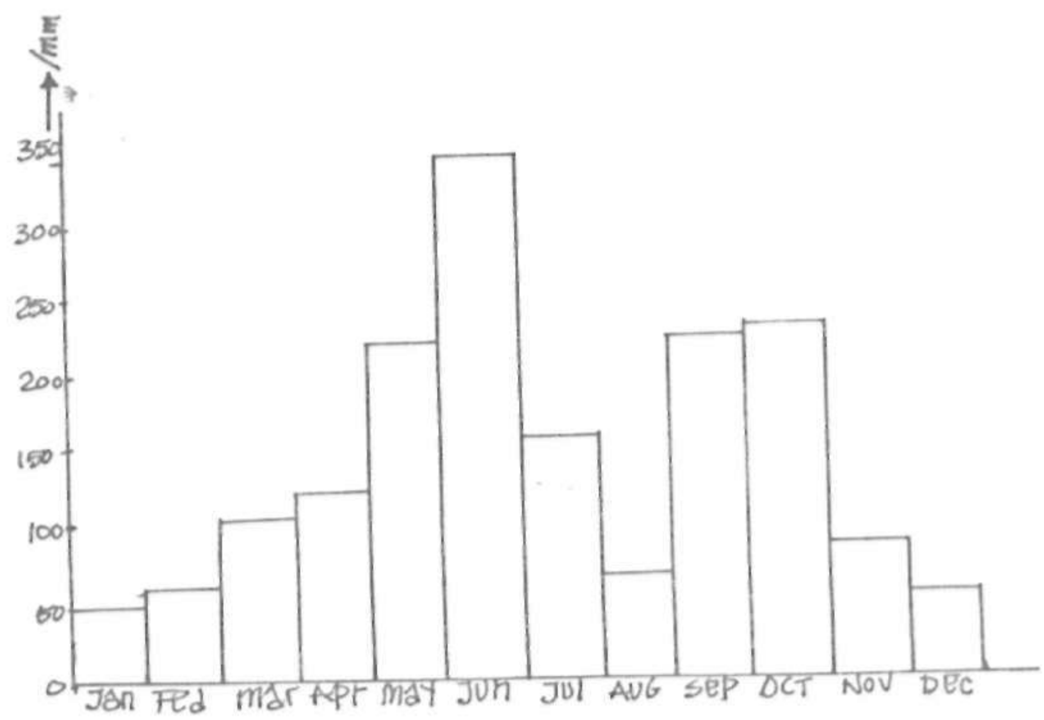
4.3.7 Humidity

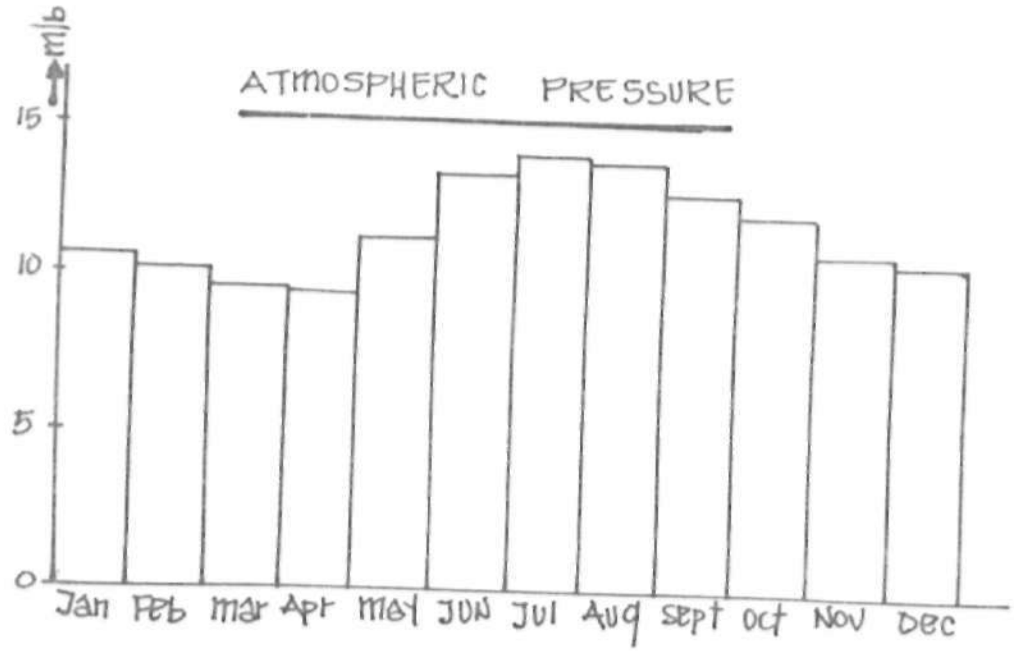
Relative humidities are relatively high with an average annual figure of 85%. Materials to be used on site should be capable of retaining a lot of moisture.

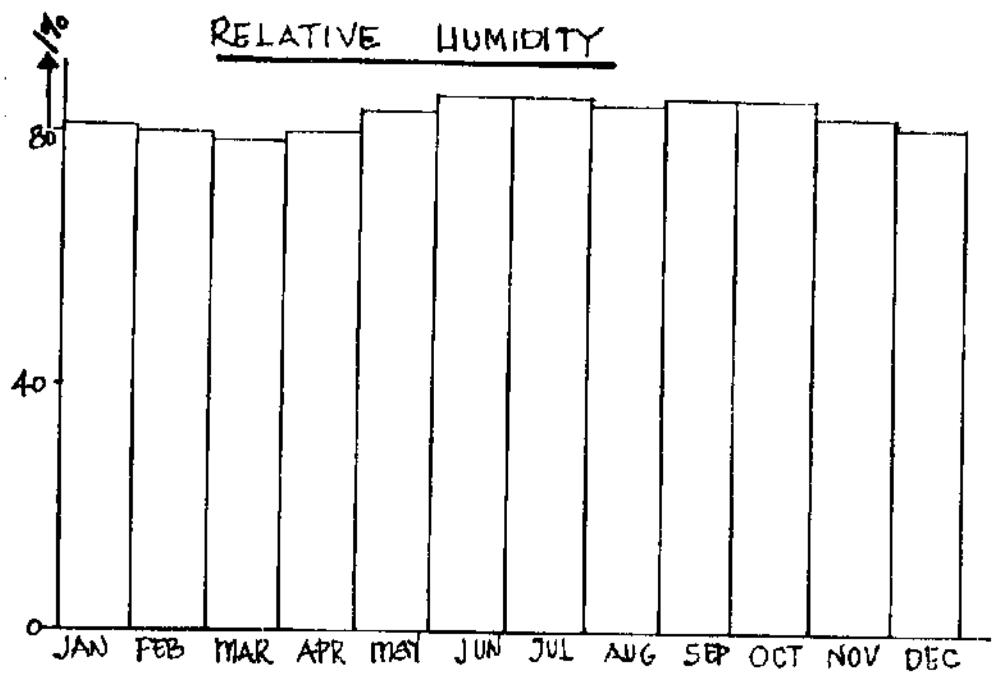
4.3.8 Relative Atmospheric Pressure

The average annual atmospheric pressure is 11.7 mm., proper care should be taken in the roof design and in the structures of the buildings.

AVERAGE RAINFALL






RELATIVE HUMIDITY
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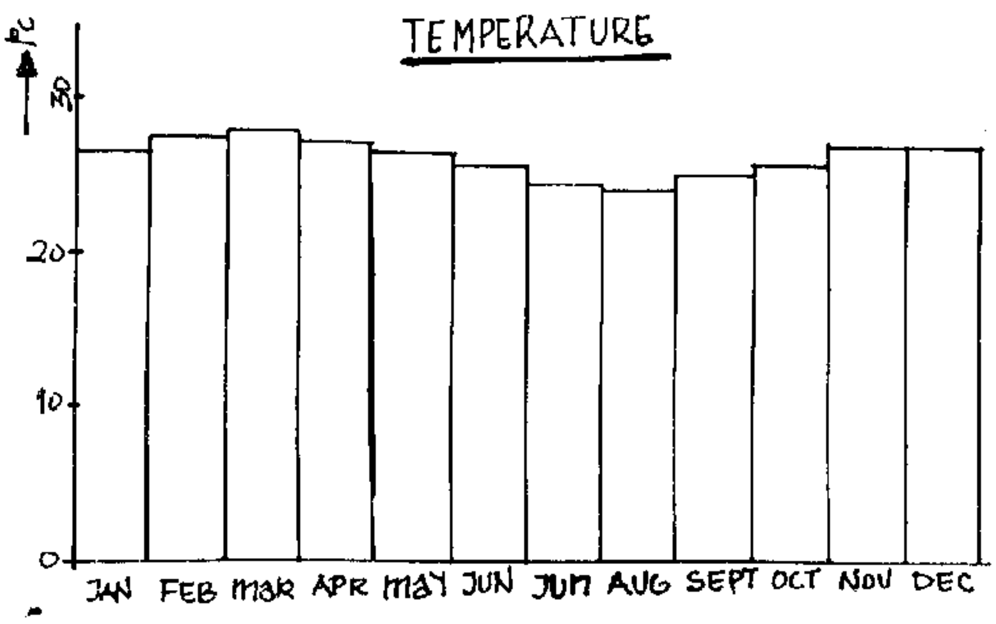
TEMPERATURE
°C
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CHAPTER FIVE

THE RESEARCH LABORATORY

5.1 TYPES OF RESEARCH

Research is basically referred to as a venture into the unknown. Research is also an intensive study for advancement in very many areas of knowledge.

The path into research is divided into two main categories; viz;

1. Basic Research
2. Applied Research

Basic Research

This attempts to uncover new scientific knowledge and understanding with little regards as to when or how the new facts will be used.

Applied Research

This is conducted with a specific purpose in mind. It is directed towards a specific problem, or towards a series of problems that stand in the way of progress in a particular area.

Applied research is concerned with the discovery and application of scientific knowledge to particular problems with the aim of up lifting the ways and means of prevention and reduction of the problems, e.g., psychosocial disorders and neurological disorders, in medical terms.

Nevertheless, basic and applied research are not isolated fields as they are highly dependent on each other. Applied research has being in most cases based on the findings of basic research likewise development is based upon solutions that applied research has worked out for problems relating to specific cases and methods.

Considering mental research, the basic unit in a research centre is the project, usually a small team, headed by a particular psychiatrist or scientist or more, with the social workers are the ones who would collect or fish out data for the psychiatrist.

If the research is laboratory based, the laboratory worker or assistants would be part of the team. Mostly medical research are generally of long term value and the duration is of long term value and the duration is relatively long.

- Epidimiology research provides better estimates of prevalence and distribution of mental and neurological disorders and of psychosocial problems such as those related to alchohol and drug dependence.

  This type of research also gives information about the types, courses and out come of the psychosocial problems and it produce the base line data for planning and for evaluation of the success of interventions.

- Research on effective treatment methods with particular emphasis on psychopharmacology and and action of anti-convulsive drugs. Such research could produce vitally important information about the optimal dosage of essential psychotropic drugs and the side effects and therapeutic efficacy in conditions prevailing in Nigeria. Clinical and pharmacodynamic approaches could be used in these studies.

- Research on the operation of health services dealing with mental and neurological disorders and psychosocial problems such as alchohol and drug abuse. Data from such investigations could serve to evaluate innovative approaches to health, care delivery.

  These are just some of the types of research which could be executed on any mental research centre.

5.2 A DESIGN APPROACH

The history of the laboratory as a specialized building type begins with the alchemist's cell. The first laboratories were built as conversions of rooms in existing buildings, like is happening in Nigeria now, and purpose - built laboratories began to be designed much later. Even early laboratories began to exhibit the kind of planning geometry current today.

In Liebig's teaching laboratory at Giessen, around 1842, there are fixed benches along two walls, with cupboards and drawers under them as well as shelves over them and in the center, two rows of heavy tables, also with drawers.

- The space between the benches and tables is about six feet:
  - Benches are two feet deep; and
  - Tables are about three feet deep.
  - the bench layout, all the long sides parallel and about six feet apart. The scene is very familiar to this day and it responds to clear ergonomic necessity. Scientists can work at the benches, back to back, and someone can work between them.

So long as most laboratory work was bench based, the gradual evolution of the bench itself as a piece of fixed equipment was logical, but today new equipment and methods of work have made this principle obsolate. The development of electronic devices of all kinds and the continually increasing use of small computers and visual display units requires much more flexibility than is provided by fixed benches.

5.2.1 Design Requirements

The major area for design decisions is in the services and the means whereby these can be made available flexibly, usefully and with the minimum of obstruction to the free use of the whole floor space available.

The interior environment of a laboratory is not, in fact, controllable by architectural means. The essential requirement of the users is that since their requirements inevitably will change, everything in sight should be movable.

The designer is to design and put into the hands of the users the means of transforming the environment himself.

The success is judged in direct proportion to the ease with which the users can alter the building.

The designer cannot be in full control of the form.

Research is always changing the patterns of laboratory work, as techniques, once experimental, became routine. There is no universal pattern. The building should not get in the way of research developments, yet do not demand development in order to justify their existence.

Laboratories must be designed for known requirements but be capable of expansion.

5.3 LABORATORY DESIGN CRITERIA

5.3.1 Planning

A health research laboratory building must have the capacity to satisfy research operational needs, allowing for variation both in research projects and in occupancy for at least 10 years.

5.3.2 Building Shapes

Circles, hexagons and tall slim towers may have esthetic appeal, none of them are as efficient as, or have the capability of rectangular designs.

Rectilinear laboratory equipment, office furniture and the anticipated continual interplay between rooms call for utilitarian solutions.

Buildings with simple rectangular configurations commensurate with standard laboratory equipment and furniture with unrestricted accessibility to mechanical utility systems are the easiest to adapt to the changing needs of research.

5.3.3 Planning for Flexibility and Growth

Laboratories are planned basically, for flexibility and growth, on regular grid for considerations of space, lighting and integrated system for structures and services. This is planned in such a way that Ducts and services can be introduced at any point within these strips. Special laboratories for heavy equipments are placed at the lowest level, teaching laboratories and research laboratories are placed above. Such grids lend themselves to growth of almost any shape and in almost any direction.

5.3.4 Research Areas

The research portion of the laboratory is itself divided into several basic elements. Most research areas require desk space as well as bench space; and equipments require some sort of controlled environment installations and other ancillary facilities frequently cannot be accomodated within the ordinary research areas. In addition scientists frequently wish to have conference rooms directly associated with research and there are usually some fairly extensive storage requirements.

Most scientists prefer desk space to be near their research and special installations need to be associated with research as well.

5.3.5 Teaching Laboratories

The design of teaching laboratories provides an analogous situation, with less need for desk space but a requirement for preparation rooms.

Possible solution of arranging the teaching laboratory range from placing all desk spaces in a seperate building to incorporating all offices within the laboratories.

5.3.6 Module

The module is dependent on the width of the benches and the space between them. The most convenient type is the 3 metres module.

5.3.7 Space Between Benches

The distance should be determined by considerations of convenience and safety, that is, one person should be able to pass another working at the bench confortably and without risk of collision.

The use of mobile equipment justifies the adoption of 2 metres space.

In student and routine laboratories where there is less bench space per person and often two people will be working back to back immediately opposite each other the space between the benches should be greater than 1.5 metres so that there is room for others to walk down the center.

5.3.8 Lay-out of Laboratory

Having established the module, it is now necessary to settle the size and position of laboratory offices, the depth of laboratories and the position of service laboratories, fume cupboards and service ducts.

5.3.9 Service Laboratories

These laboratories are either planned to be integral with the laboratory and laboratory office unit or they are provided on the opposite side of the corridor.

Much of the equipment housed in these rooms is expensive and therefore, it must be shared; it follows that this equipment must be located so that it is convenient to the maximum number of staff.

5.3.10 Fume Cupboards

The risk of accident is greater in a fume cupboards or fume hood than else where in the laboratory. So for the reasons of safety one should not be located where it will block an exit. If there is an alternative exit from the laboratory, this difficulty does not arise.

Fume hoods require an exhaust duct with a diametre of 20 - 30 cm.

5.3.11 Service Ducts

The mechanical services are a major feature of any laboratory and, in order to achieve good design, location and accessibility must be given a lot of thought. For benches serviced from the External wall, there should be horizontal and vertical ducts with removable covers. For benches serviced from the corridor wall, it is necessary to have a vertical duct accessible from the corridor.

5.3.12 Type of Bench

These are three types of bench -

The Penninsular, the island, and wall: As the names imply, the Penninsular bench projects from the wall and the island bench is free standing.

Penninsular benches are preferable to island benches because the installation of services is easier and less costly.

Wall benches under Windows should be avoided facing the sun in front of windows on the east and west elevations makes working condition quite intolerable. Whether it be one, two or three module laboratory, the combination of Penninsular and wall bench at right angles to the external wall produces the simplest lay out.

5.3.13 <u>Prototype Laboratory or Bench</u>

In large projects, it is a very good idea to have a prototype laboratory and for small schemes at least a prototype laboratory bench.

Adoption of a Basic laboratory lay out:

Every effort should be made to develop a basic lay out which is standard throughout the building. This may be changed by the user due to the users requirements.

5.3.14 <u>Corridor:</u>

There are four types of corridor:

- Off-Center Corridor
- Central Corridor
- Double Corridor
- Service Coriidor

The choice of corridor depends on the number of laboratories in the complex.

CHAPTER SIX

6.1 THE BRIEF DEVELOPMENT

The proposal, being a pioneer project in Nigeria, need the use of existing facilities in the developed countries like the United States of America and Britain as an experimental study model and discussions with Psychiatric experts to draw up the requirements for the centre. These has enabled the author to draw up the requirements for the proposal.

A study of the Institute of Basic Research for the Mentally Retarded, New York, formed the base for the laboratories and the wards coupled with discussions from psychiatric experts.

The design brief is made of five divisions namely;

1. The Administrative Division
2. The Co-ordination Division
3. The Research Division
4. The Training Division
5. The Ancillary Division

6.1.1 Administrative Division

It consists of:

1. Entrance hall with reception and waiting. This serves for Exhibition purpose too.
2. Office spaces for the Director, Secretary and Clerk.
3. Offices for the Deputy Director and Secretary.
4. Office for the Registrar
5. General Office for Administrative Personnels and Clerks.
6. Postgraduate Office
7. Accounts Office
8. Accountant's Office and Secretary.
9. Records Office
10. Switch Board Room

6.1.2 Co-ordination Division

This houses the Electronic Data Processing Unit which consist of:

1. Reception and Secretary Office
2. Director of Programmes' Office
3. Service Engineer's Office
4. Cubicles for Two Programmers
5. Cubicles for Two Analysts
6. Data Entry Room
7. Computer Room
8. Data Delivery Room
9. Photographic and Printing Section
10. Typing Pool
11. Museum and Supervisors' Office
12. Conference Hall
13. Lounge
14. Research Library and General Information Section.
15. Librarian's Office

6.1.3 <u>Research Division</u>

This division is made up of two parts:

1. Research Laboratories
2. Observation Wards and Sleep Research Rooms.

<u>Training Division</u>

- Seminar Rooms
- Demonstration Room

- Audio-visual Room
- Faculty Room
- Office Spaces for Teaching Staff
- Model Rooms
- Model Storage

6.1.4 Ancillary Division

It consists of:

- The Animal quarters which is very important in the course of research since human beings can not be used for experiments.
- The Central Stores
- Workshops
- Catering services which link the centre with the clinics.

In order to increase and share the pool of knowledge, of the skilled psychiatrists and scientists, the author incorporated the training division in the centre.

This would admit graduate students, i.e., Fresh Doctors that wants to specialise in any part of Neuro-psychiatry. Also, it would admit and train social workers and Research Assistants.

As a proposal, the centre would train 50 students, this is subject to increase based on man-power requirements.

6.2 PROJECT SUMMARY

6.2.1 The Administrative Division

This would see to the smooth running of the whole centre. It would consist of offices for executives, general offices for administrative staff and the entrance hall which also serves the purpose of exhibition. Space where exhibition could take place for people to be informed and to appreciate models in display.

- The co-ordination centre comprises the electronic data processing unit for easy computation of data, records, informations and research finding. This would make research process much easier and interesting. Also, here are the conference hall, library, offices and the lounge for relaxation.

- The teaching area has audio-visual room, seminar rooms, demonstration rooms and offices for teaching staff.

- The research laboratories, offices and support facilities to undertake elaborate research programmes.

- Ancillary facilities like Central Storage, maintenance section and catering which also serves the adjoining medical clinics and laboratories.

- Animal quarters - this assists in carringout of research, since scientists would not like to use human beings tests.

- Wards, these are observation rooms especially for patients for specific research programmes and also in my proposal are the sleep research rooms which serves the research programmes.

6.2.2 Research Division

Observation Wards

This has both male and female parts. The wards are mainly for patients from the hospital and the community needed during some phases of research. There are also sleep research rooms which are special rooms for controlled atmospheres and pressure to aid patient research.

Research Laboratories

The main research is to be carried out here and the section is made up research laboratories, offices and support laboratories.

Animal Quarters

This provides facilities in which live animals are housed. This section is very important in some phases of research since human beings a cannot be used for experiments.

6.3 SITE PLANNING CONCEPT

In planning the site of such a centre, it is required to have close relationship with the clinics the teaching area and the medical laboratory. Also is the provision for effective growth without disruption. Design excellence should make expansion feasible without disruption to overture proposal.

I have taken care of this by selecting a site where there is provision for land to accommodate growth equal to the initial provision.

6.3.1 General Site Planning Principle

- Optimum expansion possibilities with little or no disruption to initial proposal.
- Relationship to the major hospital, the clinical facilities and the teaching hospital
- Provision of peripherial distribution road to feed the parking lots and the loading bay.
- Circulation - to minimise the total length of circulation as well as to reduce friction.
- Harmonious flow of space without abrupt changes and having a sufficiency of connecting elements.
- Zoning of like facilities together, section that are pron to growth are grouped together and those that are not are grouped together.
- Optimum orientation of buildings in order to reduce solar control problems.

- Long sides of buildings have been Northernly or Southernly oriented where design permits.

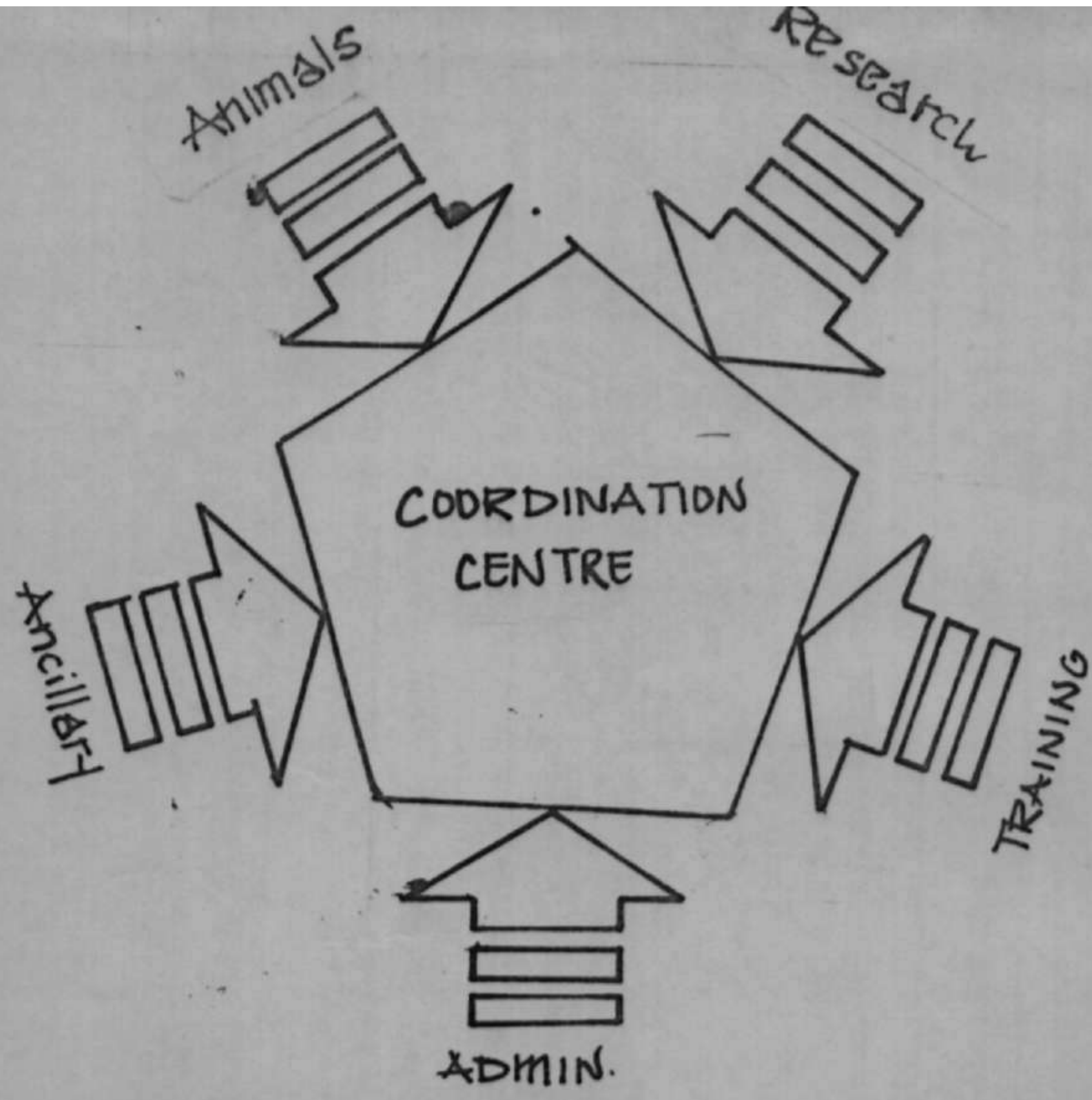
- Also, orientation of building to increase the interior wind velocity. Buildings are 45^{o} to the wind direction. this also helps in reducing the humidity and temperature level of the interior spaces.

6.4 DESIGN CONCEPT AND DESIGN CHARACTER

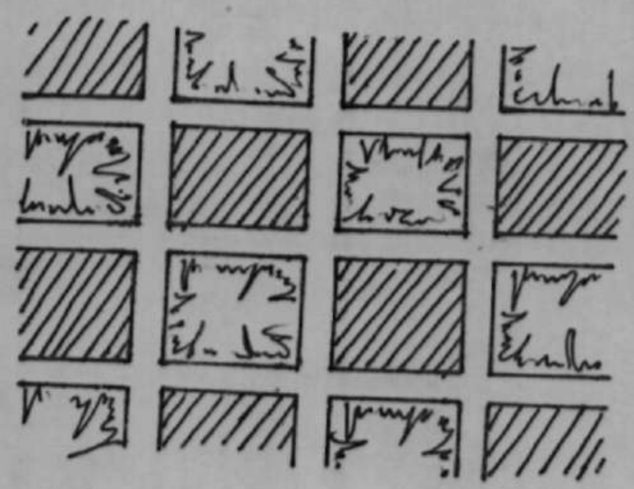
The adopted concept was developed with the initial consideration of the nature of the proposal which has its site within a hospital environ and it was basedon a series of interrelated courtyards.

The courtyards were oriented at 45^{o} to the direction of wind and the building layout was then developed around the courtyards with walk ways linking the buildings together.

My proposal been a Research Centre needs provision for flexibility and growth, this was achieved by the grid concept which offered the greatest flexibility of all other patterns.



Organizational concept



Combination of Grid and Courtyard concepts

Design concept.

The layout principle helps in increasing interior wind velocity since they are at 45^o to the wind direction.

The concept was with the notion of providing contact with visually and physically stimulating environment during circulation. This also helps the therapeutic process since it's within hospital area.

The basic form adopted was that of a rectangular, i.e., rectilinear form. This form is keeping in character with the surrounding building forms.in the hospital. It was chosen so that the centre could flush in easily to the existing situation in the hospital.

6.5 STRUCTURAL SYSTEMS

The structural systems adopted are simple ones. The design was made from a grid, i.e., the modular approach, of 6 metres by 6 metres in the laboratory area and 6 metres by 4 metres in other parts of the centre.

Columns are located 6 metres apart and some 4 metres apart with beams connecting them. In buildings which have more than one floor, these is a Waffle grid floor. The rectangular grid flooring is a development of the two way spanning slab in which the two sets of reinforcement are concentrated in ribs. The walls are curtain wall, non load bearing, since the load is being carried by the beams and transmitted to the columns.

The roof adopted is the steel truss in order to achieve a good roof drainage system, since Abeokuta experiences heavy rainfall, therefore, demanding efficient drainage system.

If there is need for vertical expansion, all that is needed to be done is the construction of floor on top of the columns and beam which as been provided already.

The walk ways are covered with concrete slab all over in the entrance hall, the roof is of skylight which gives natural lighting effect. Since the entrance is in the East, openings on this side are not desirable.

6.6 S E R V I C E S

INTRODUCTION

Services from an essential part in the planning and design of laboratories. The technical divisions proposed in the center consist basically of research laboratories , in this respect, the whole of this chapter has been entirely devoted to the subject because services within a research laboratory requires more emphasis than in any other building type.

The method of distribution of services from the submains to funiture and equipment strongly influences th e design configuration, design, cost and flexibility of possible layouts.
in view of this, routes for the distribution of services called DUCTS must be co_ordinated within the structural design of the laboratory building shell.

6.6.1 DUCTS

In the laboratory building, it is usual for the runs of the various services to be grouped together for convenience and conformity in design. Special passages though the building called SERVICE DUCTS areplanned and constructed to accommodate the service runs amd to allow for easy installation, maintenance and replacement. The outcome being:

1, Concealment of services i.e . appearance, heat, noise, condensation, etc.

2, alterations and additions are facilitated.

3, various services are protected from damage.

Inthis centre, three main types of ducts are utilized,

1. Main Ducts or Horizontal submains

These gave basic horizontal distribution of services, they occur below the ground floor slab level , air ducts dominate on upper floors.

2. Vertical Ducts or vertical sub-mains

These distribute services to a particular area on each floor. They appear as recesses in a corridor wall covered by ply-wood facing. Access to the service run is very easy. On upper floor, interference to circulation is not envisaged.

3. Lateral Ducts

They give local horizontal distribution of services, electrical runs , treated below and others are concealed in suspended ceilings which are often used as lateral ducts.

VERTICAL DIMENSIONS AND SPACES FOR SERVICES (DUCTS)

Vertical Dimensions

The clear height in bench scale laboratories should not be less than 2.7 metres. If a height approaching is 4.0metres is required as , mezzanines floor can be introducedfor work work which does not requiredthe double height thereby achieving a more effective use of space.

Vertical space for services

If vertical submains ducting is used, horizontal space requirements will be minimal. Minimum size to accommodate fume ducting plus pipe work would be 600 by 1200mm.

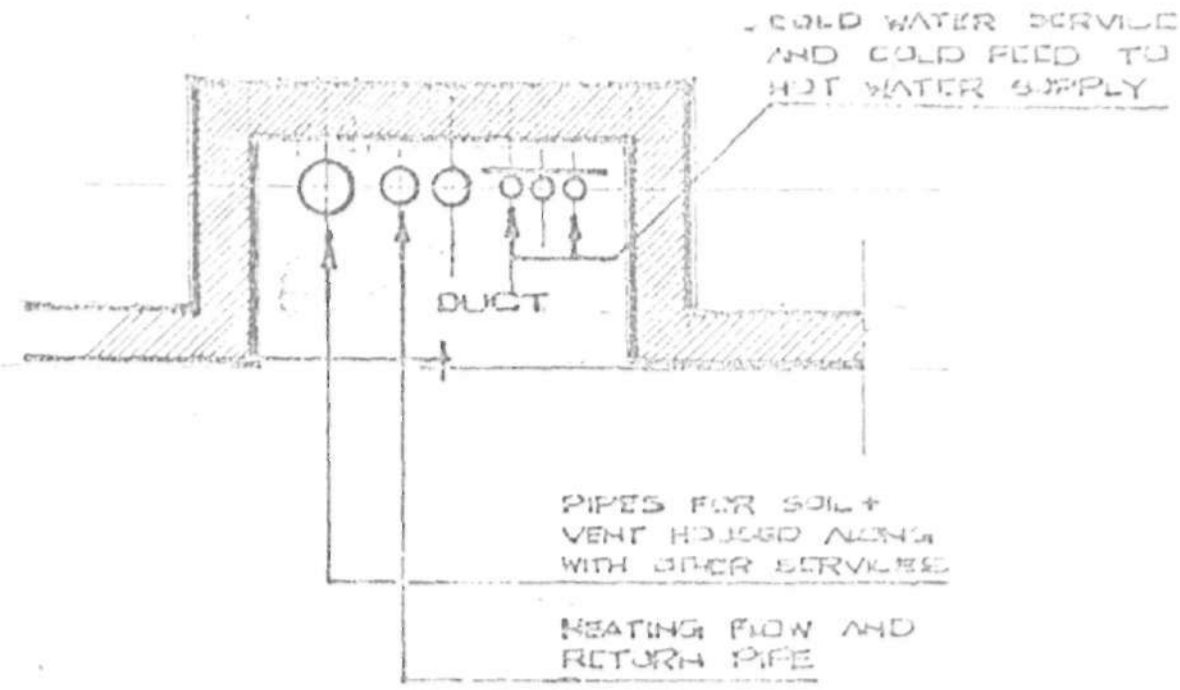
HorizontalSSpace for services

These re quirements are represented graphically in the next page.

6.6.2 ELECTRICAL SERVICES AND LIGHTING

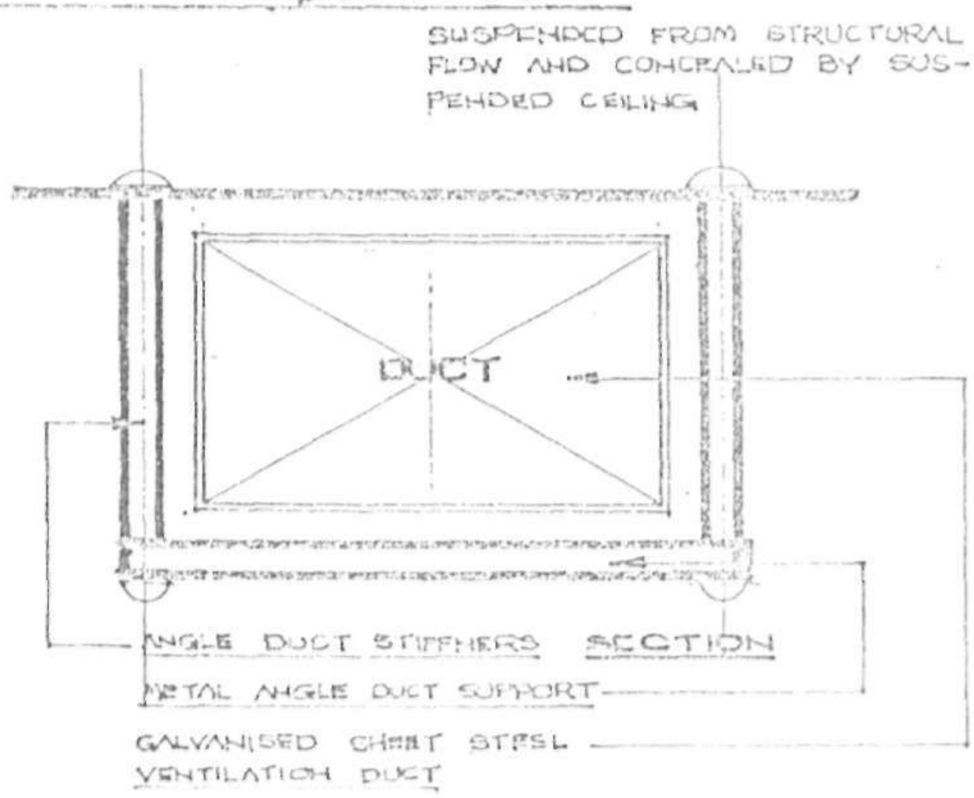
THE demandefor electrical services outlets depends depends upon the nature and level of work to be performed.

VERTICAL DUCT

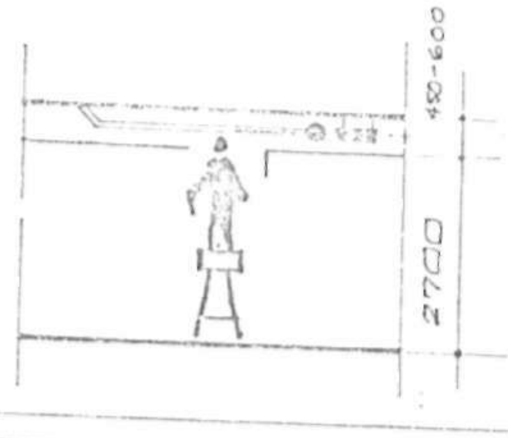


SCALE 1 : 20

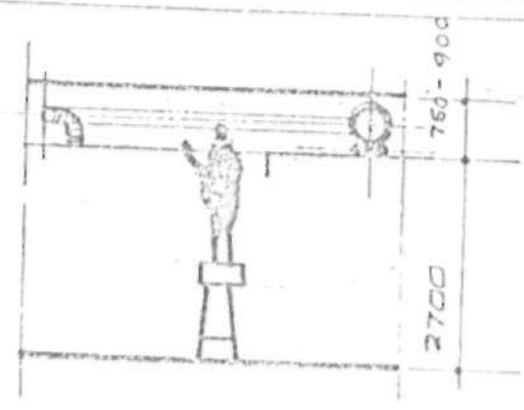
VENTILATION DUCT



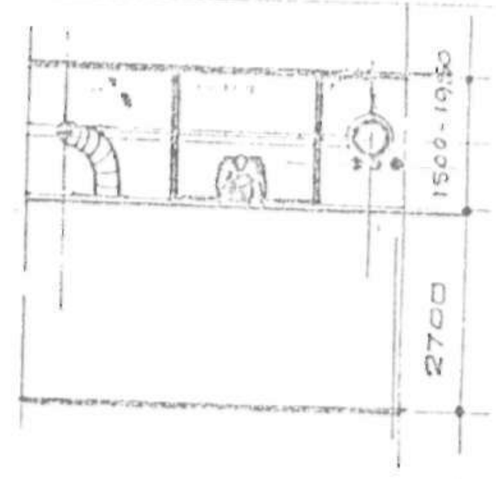
VERTICAL DIMENSIONS AND HORIZONTAL SPACE FOR SERVICES



SUSPENDED CEILING ARE EFFECTIVE MEANS OF HOUSING LATERAL DUCTS. THE INSTANCE OPPOSITE SHOWS min. SPACE for: pipework
electrics
drainage.



SHOWS SPACE AND min dim. for HOUSING pipework,
electrics,
drainage,
ventilation ductwork



SPACE FOR:
all SERVICES
plus space for a crawlway or walkway

USE OF SPECIAL EQUIPMENTS NECESSITATES INTRODUCTION of a mezzanine.

For about 25% of the useable floor area in the laboratories and offices, it is envisaged that the natural day lighting would have to be supplemented by artificial electrical lighting would have observation and accuracy in results of experiments.

Criteria for the desigh of electrical lighting inclde"Quality" . THis is normally defined in terms of the amount of light falling on a horizontal plane at working lewel known as the working plane.
Quantities are giving in terms of lux. General laboratories require 350 to 400 lux. Reading of equipments in other types may require 600 lux.

QUALITY

Several factors can exercise a critical influence on the success of lighting installations. Apart from the proper level of illumination on the working plane.

Glare is an important consideration. Methodshhave been developed to evaluate glare index and it is now possible to calculate a glare index(GI) for proposed installations.

Estimation of Lighting Levels

In the estimation of artificial lighting levels to supplement the natural, the Lumen method have been employed. THis is asimple way of estimating the number and size of lighting fillings needed to give light on a particular working plane.

Basic formula:

$$N = \frac{A \times E}{F \times UF \times MF}$$

or

$$E = \frac{N \times F \times UF \times MF}{A}$$

F could also be made subject of the formula depending on the nature of the supplied data and required information.

N = number of lighting fittings.

E = Illumination level required in lux.

F = Average through life lamp in flux, Lumens.

UF = Utilisation factor .

This is an experimentally determined factor taking into considration the shape of surfaces and performance of lighting fittings.

MF = Maintenance factor ; an allowance for reduced light emission due to dirt usually 0.8 .

Day-lighting

Acute discomfort due to glare or over heating has been avoided by careful design consideration to the the penetration of the sun's rays.

6.6.3 FIRE

Due to the nature of laboratory equipments, th there has been provision of fire fighting means and escape routes in case of accidental fire outbrake.

In the site planning stage , a peripherial service road has been integrated into the network to provide uninterrupted access to fire brigade vehicles.

6.6.4 OTHER SERVICES

<u>Water supply</u>

A provision has been made for water to be supplied from the water station in the hospital.

<u>Hot Water and steam</u>

A central boiler house for the hospital will provide overall requirmments.

<u>Telephone</u>

An efficient and sophisticated telecommunications network is proposed for easy collation of information. This will consist of both 'intercom' as well as external communication which has been planned as an integral part of the development plan for the whole hospital,

<u>Air conditioning</u>

These will be used where desirable. Provision has not been made however for a central air-conditioning system .Each building will have it's own seperate plant where the system can be controlled independently.

CHAPTER SEVEN

DESIGN REPORT

7.1 LABORATORY PLANNING

The design of the laboratory building was essentially based on three major factors:

7.1.1 Flexibility

The nature of research can change in impredictable ways. Research itself may uncover new approaches or points of emphasis.

Because laboratories are such heavily serviced buildings, the question of flexibility is a more technically demaining one than in many other building types.

The laboratories must be designed to cope with grow and change irrespective of the scale of work or the scientific discipline involved.

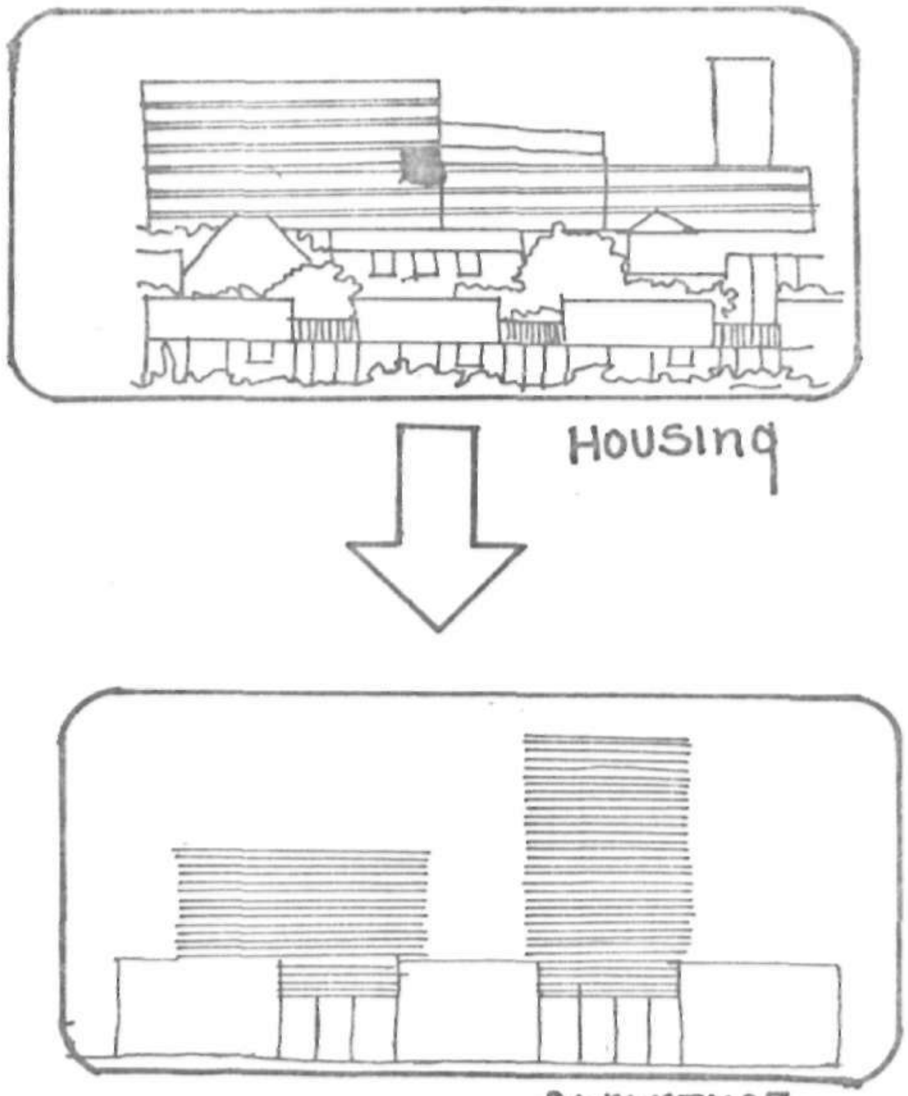
Flexibility can either be of a general type or it can be specific. In the general type of flexibility, a facility is designed in such a way that it can be converted from one use to an entirely different use such as from Housing to Commerce or from educational use to recreation.

In the specific type of flexibility, which my design is concerned with, provision should be made within a defined category of functions, e.g., from research to offices or from research into schizophenia to research into Bacteria effect. Diagram below illustrates this.

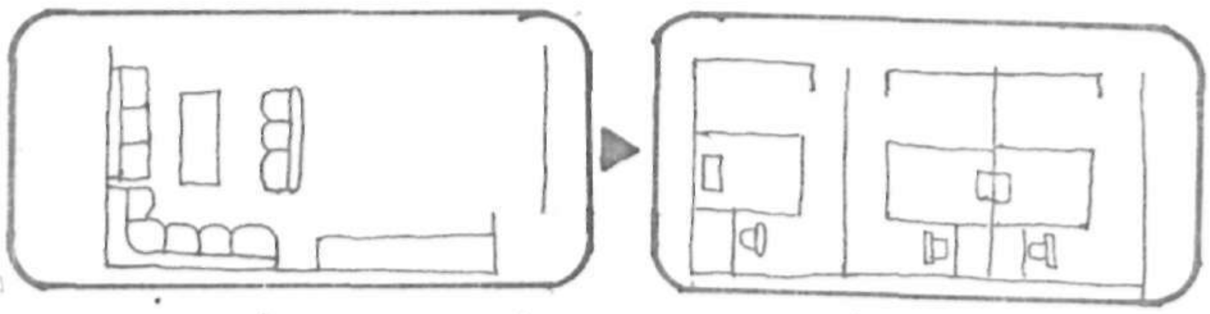
In order to achieve flexibility in the design, the student defined a basic module of 3 metres by 7 metres on a grid patter of 6 metres by 7 metres which makes 2 modules.

The large space provided in the research laboratory building has given an unlimited options in placing partitions according to discipline requirements.

Proposal was made for the use of movable walls, i.e., demountable partition walls which allows the rearrangement of spaces



GENERAL OR UNDEFINED FLEXIBILITY



SPECIFIC OR DEFINED FLEXIBILITY

within the module system as research presses in new directions.

To further support flexibility, the vertical distribution system for utilities in the flexible layout are located at module intervals. The ducts are made in such a way that knockout panels for access are provided so that utility lines can be serviced without disturbing laboratory work and these accesses are from the corridor. This has contributed to the wide space in the corridor so that while repairs are being done, movement would not be disturbed along the corridor. The furniture proposed are all moveable for flexibility purpose.

7.1.2 Safety

The risk factor in laboratories is greater than in most other building types. People may be working with toxic chemicals, There may be danger of spills and so on. There is danger of fire or explosion, the laboratories have been planned in such a way that the positioning of the fume hood has eliminated the possibility of trapping the worker within its confines.

For fire or explosion danger, the escape routes are clearly placed at the two ends of the laboratory building. The designer used the choice of materials of construction in solving this problem.

7.1.3 Quality of Environment

Within the stringent functional and safety standards to which laboratories must be designed, the quality of the working environment becomes a major factor. This has made for the use of courtyards to provide pleaseant views and the walkways are by the courtyards which gives a close contact with the natural effect of the scenery.

7.2 GENERAL PLANNING

The general planning of the whole centre has been based on a modular grid system developed in response to the planning criteria and incorporating a lot of flexibility expansion order and economy upon which an efficient structural grid is developed.

Reinforced concrete columns, waffle grid floors and steel framed roofs makes up the basic structural component. The external walls are made from the normal 23 cm., hollow concrete bricks and 100mm partition walls as internal walls, however, different types of cement, sand finishes are applied.

In the laboratory building, services are concealed within ducts and the inter floors. Fire alarm systems are provided within the complex and there are escape routes at both ends of the laboratory building.

The suspended ceilings used in the complex are of acoustic values and gypsum sound insulators are applied on walls because of the hard surface character of the complex.

All buildings are linked by covered walkways to effect easy contact and flow of routes, though the departments are autonomous. On the whole, this centre has been oriented on the East-west axis to increase the velocity of air flow and to reduce the thermal effect in the buildings. This makes the centre to flush into the hopital environment easily.

In terms of adaptability, the activities within the structure are likely to grow and change during the life span of the building, the organizational patterns are evaluated in terms of their potential for future development.

Growth and reorganization is possible without interrupting the projects major function. Circulation has been reduced to the minimum as well as friction. This has been enhanced by the flow of space and sufficient connecting elements.

On the whole, this is a successful building, a useful addition to educational buildings in response to serve the therapeutic process.

SCHEDULE OF ACCOMMODATION

1. ADMINISTRATION

	Description	Number of Rooms	Area of Each Room (m^2)	Total Area (m^2)
i.	Entrance Hall/Reception	1	144	144
ii.	Switch Board Room	1	32	32
iii.	Enquiry	1	32	32
	- Postgraduate Office	1	24	24
	- Records Office	1	24	24
	- Store	1	18	18
	- General Office	1	36	36
	- Accountant Office	1	20	20
	- Offices	3	12	36

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
- Secretary Office	3	12	36
- Director	1	24	24
- Deputy Director	1	24	24
- Administrative Office	1	24	24
- Registrar	1	24	24
- Board Room	1	36	36
- Toilet	2	18	36
Total			570m^2

2. CO-ORDINATION CENTRE

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Reception/Secretary	1	20	20
Director	1	20	20
Store	3	24	72
Typing/Photo Service	1	48	48
Museum	1	36	36
Supervisor	1	24	24
Switch Room	1	24	24
Operators/Cleaners	1	24	24
Computer Room	1	30	30
Data Entry	1	24	24
Data Delivery	1	16	16
Programmer	2	8	16

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Analyst	2	8	16
Co-ordinator	1	16	16
Service Engineer	1	12	12
Conference Hall	1	110	110
Library	1	110	110
Libarian	1	12	12
Coffee/Snack Lounge	1	72	72
Bar	1	24	24
Office	3	24	72
Toilet	2	8	16
Total			$814m^2$

3. TRAINING DIVISION

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
- Seminar Room	2	80	160
- Demonstration Room	1	60	60
- Instrument Room	1	24	24
- Store	1	16	16
- Audio-Visual Room	1	72	72
- Faculty Room	1	32	32
- Class-room	2	36	72
- Office	7	24	168
- Toilets	4	18	72
Total			$676 m^2$

4. CANTEEN

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Food Preparation	1	54	54
Dry Store	1	24	24
Cold Store	1	24	24
Furniture Store	1	24	24
Dinning	1	108	108
Servery/Wash up	1	36	36
Changing Room	2	12	24
Total			294m^2

5. ANCILLARY FACILITIES

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Central Store	1	100	100
Workshops	2	70	140
Total			$240m^2$

6. ANIMAL QUARTERS

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Animal Reception	1	24	24
Cage Storage	1	36	36
Veterinary Officer	1	18	18
Service	1	12	12
Laboratory	2	18	36
Autopsy	1	18	18
Instrument Room	1	24	24
Operation/Recovery	1	30	30
Sterile Isolation	1	24	24
Cage	5	18	90

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Food Preparation	1	18	18
Food Storage	1	12	12
Toilets	2	18	36
Total			$378m^2$

7. WARDS

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Ward	2	132	264
Locker Room	2	30	60
Solid and Clean Linen Room	2	24	48
Interview Room	8	12	96
Social Workers' Room	2	16	32
Duty Room	2	20	40
Dressing Room	2	12	24
Toilet	2	12	24
Bathroom	2	12	24
Sleep Research Room	10	12	120
Total			$632m^2$

8. LABORATORY BUILDING (Research)

Description	Number of Rooms	Area of Each Room(m^2)	Total Area (m^2)
Research Laboratory Module	40	21	840
Total			840m^2

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