T I T L E P A G E

INTEGRATED HEALTH CENTRE KWOI

B Y

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B.Sc. HONS. (ARCHITECTURE).

A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN ACHITECTURE (M.Sc. ARCH).

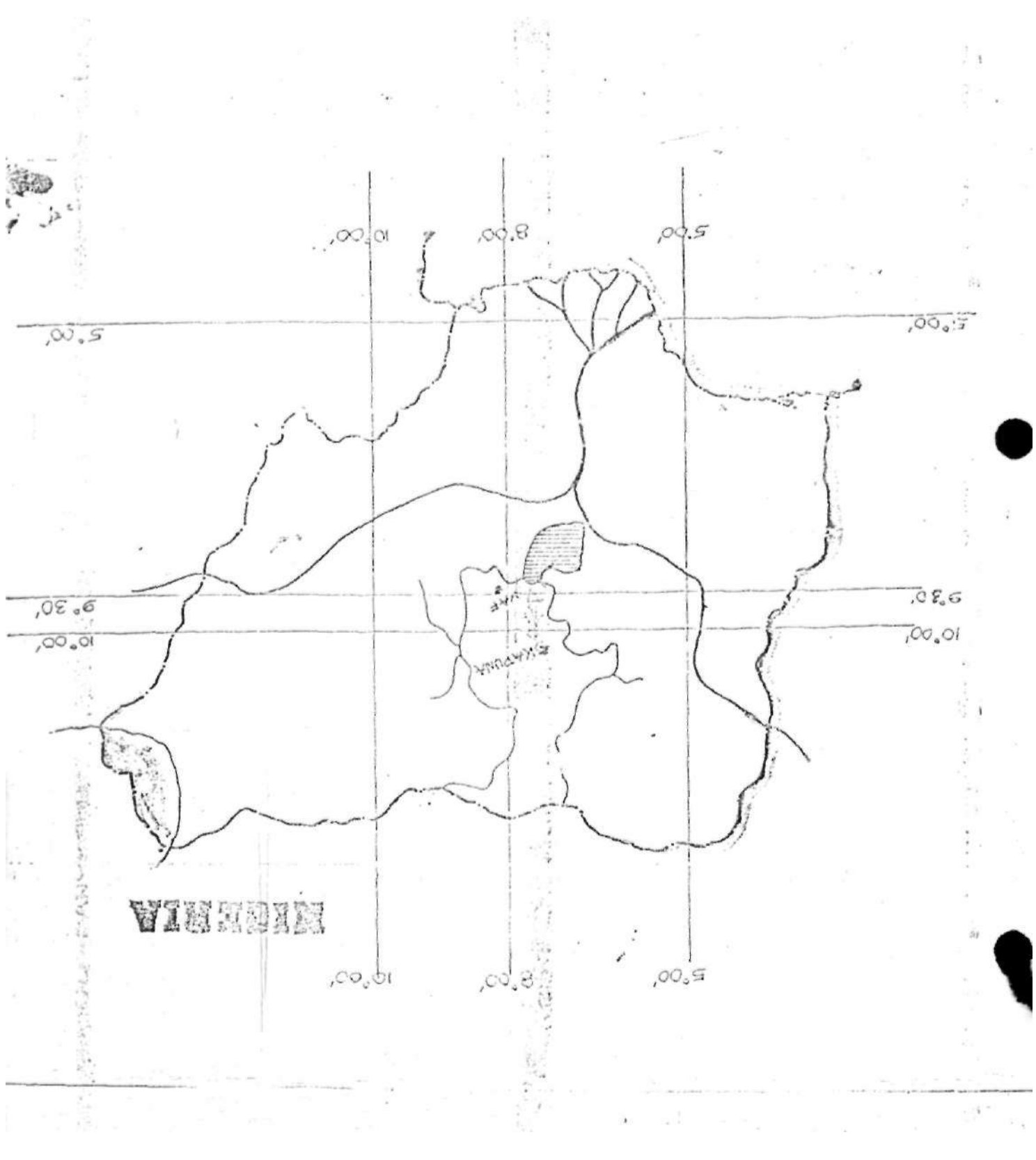
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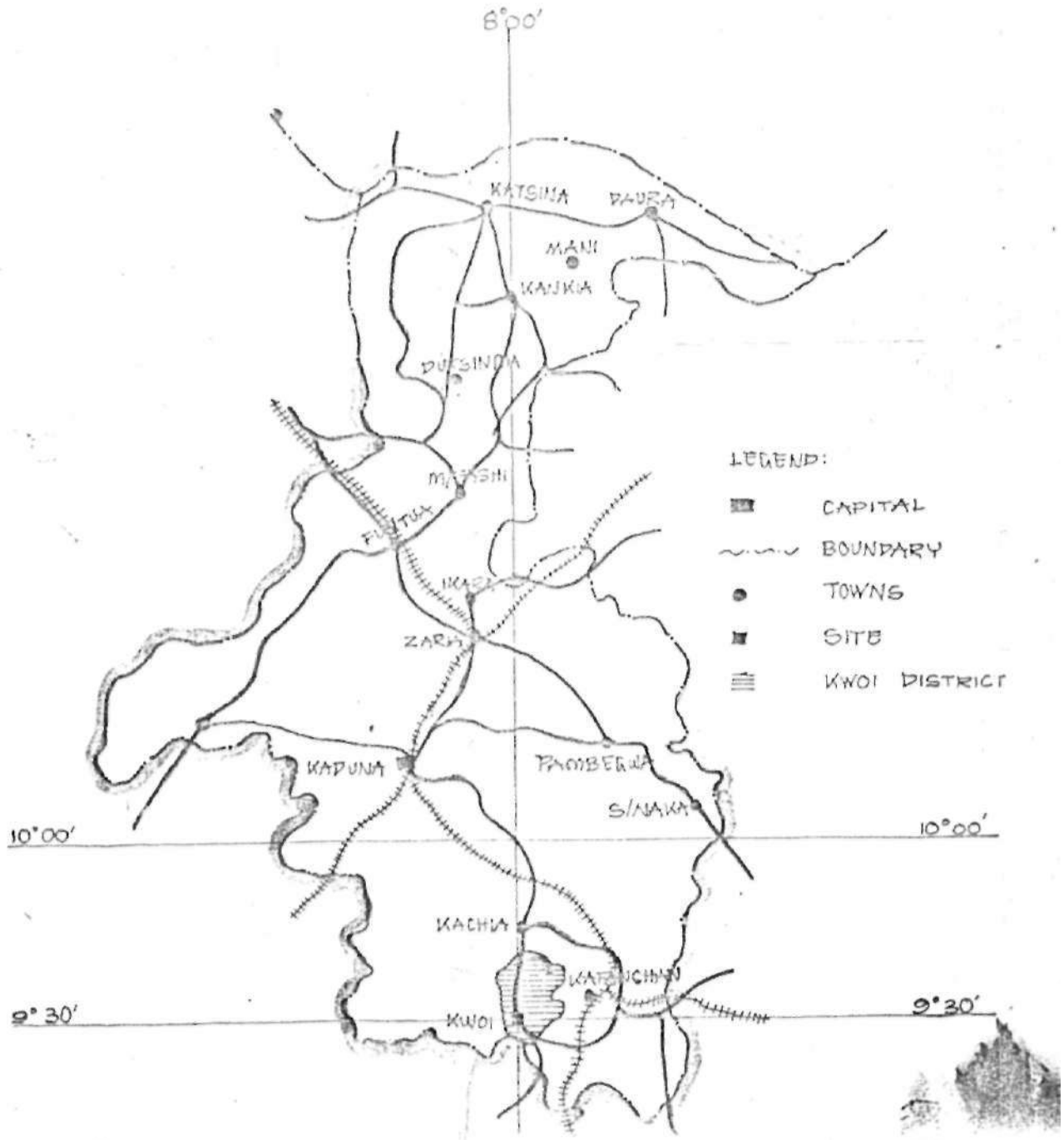
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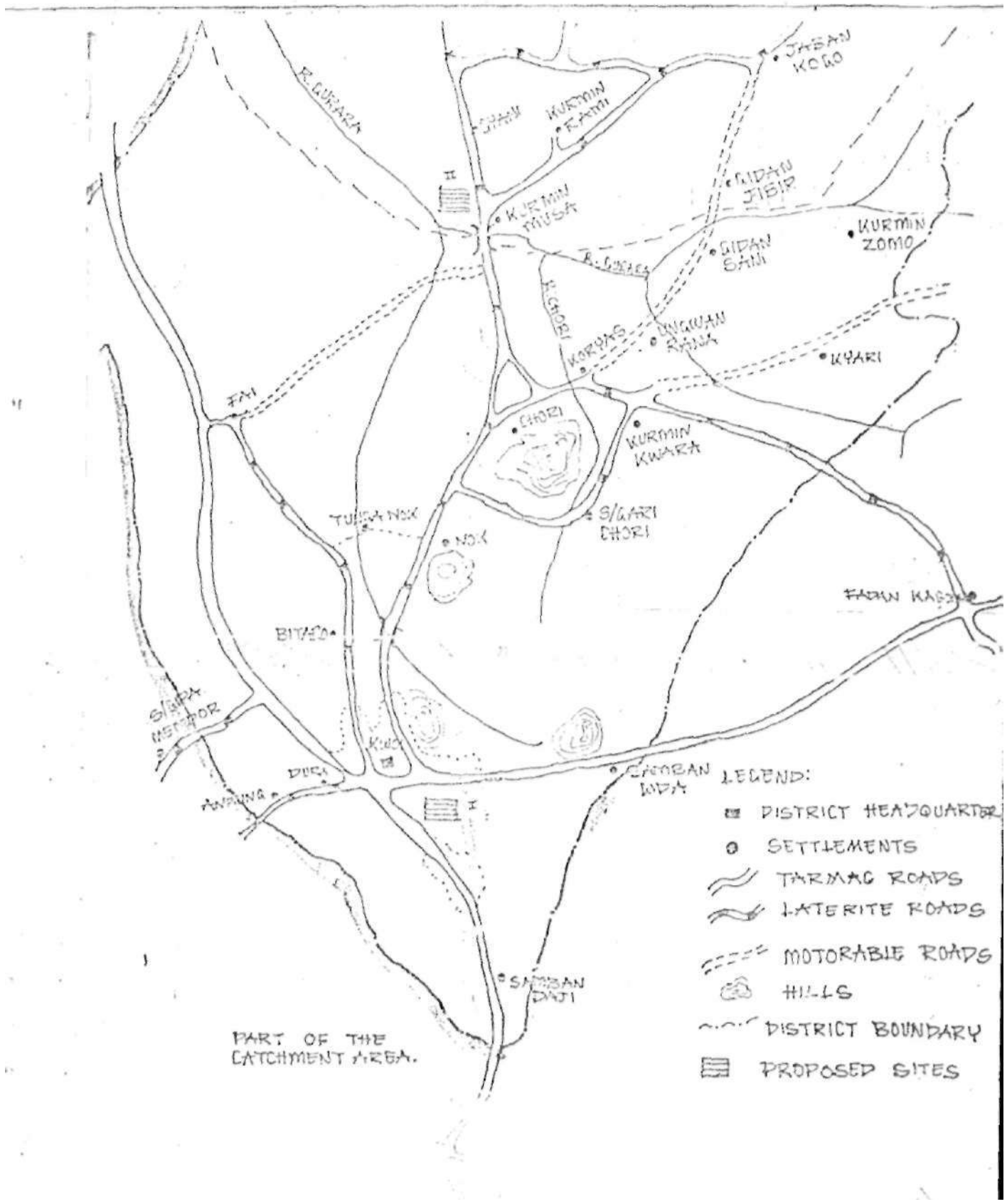
Z A R I A.

J U L Y 1987


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KADUNA STATE




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S/GARI GHORI
BITATO
FADAN KAGO
DEGI
KWOYNA
GAMBAN WIDA
GAMBAN DAJI
PART OF THE CATCHMENT AREA.
LEGEND:
DISTRICT HEADQUARTER
SETTLEMENTS
TARMAC ROADS
LATERITE ROADS
MOTORABLE ROADS
HILLS
DISTRICT BOUNDARY
PROPOSED SITES

D E D I C A T I O N

As a modest token of his devotion the author wishes to dedicate this book to:- his Daddy, Malam Ishaku Maso Myekson, his beloved Mummy, Mallama Rahila Tsokowya Ishaku his immediate senior sister and first living born, Miss. Esther Ishaku Myekson, the rest of his brothers and sisters especially their last born CINDERELLA ISHAKU MYEKSON.

D E C L A R A T I O N

I ARC. ISHAKU ZACHARIAH NGUBEN wish to declare that this thesis report was the true and original results of my research work.

Declaring that no part of the contents has been presented in any scholarly or academic assessment. That, the presentation possesses some contributive ingredients in the field of academy as everything was original.

CERTIFICATION

This thesis entitled 'INTEGRATED HEALTH CENTRE KWOI' by ISHAKU, ZACHARIAH NGUBEN 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.

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A'C K N O W L E D G E M E N T S

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Most of all and above all, my God, the most high, without whom I wouldn't have been born in the first instance. The reasons, if not mysteries of seeing me through, up to this height are yours and are best known by you. I lack words to express my profound gratitudes. I just say, I thank you very much. God, I thank you.

"THE END OF THE BEGINNING".

A B S T R A C T

That health is wealth, and leading a socially and economically productive and satisfying life, improved nutrition, good basic sanitation and safe drinking water, is more than adequate for the Nigerian populace in general and the Kaduna State people in particular to approach our health care delivery system from a primary perspective, and not otherwise.

People die of one ailment to the other every minute, not because of a mystery but because of the indifferent posture of the Kaduna State Ministry of Health to look at health primarily.

Village populations in general and the Kwoi people and her environs in particular suffer from diversified attacks of diseases, epidemics and endemics, not because of the absence of health centres per se, but because of ignorance and partly poverty. The technical know-how for tackling health problems from the grass-roots is not available.

Therefore, the need for an integrated therapeutic milieu for the people will always have a pedestal to stand on, until investigative results as regards the need for turning a new leaf matrialise, and something done.

The diversified intellectual challenges involved in this, pre-supposes a "meaning business" intellectual in-put in the bid to finding a lasting solution.

Emphasis therefore will be laid on the preventive services rather than the drug centred curative environment of the present practice.

The curative services will however be approached architecturally so that the two can be housed under one umbrella.

Certain sections where certain essentials deserved attention are out-patient department, diagnostic and therapeutic departments, Nursing Units, Administration, ancillary services and most importantly PUBLIC HEALTH UNIT.

Purposely going through this thesis for the simple fact or need of creating a conducive therapeutic environment for the health needs of the Kwoi people and her environs. Preventive services which are the basics, are wished to reach the people for a grassroot solution of their health attainment. Epidemic and Endemic cases are wished to be stopped with the presence of the centre as it will aid reduce the spread of infection through immunisation, and promote effective nursing care. where Traditional medicine can be incorporated in the centre, that will be done in order to attract the people to the centre. The drive for health for all by the year 2,000 A.D. can only attain fruition via primary care. Lastly, to respect and honour humanity as the only strong "constant" of the living creatures.

Architecturally, problems of fire protection, Noise control, traffic flow identified in health buildings will be attempted to solve. Emphasis would be laid on Noise control as an academic and architectural contribution.

Conclusively, the research work will give birth to the architecture of the centre and this will further reflect the in-put up to the working drawings stage with the economic realities of the people at the back of the mind of the author in order to reconfirm the workability of the thesis for the Kaduna State Ministry of Health, the major sponsor.

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CHAPTER ONE

1.1 INTRODUCTION AND PHILOSOPHY OF TOPIC

The teeming populace of the Jaba community in Kaduna State within the catchment area residing within a radius of 20km from Kwoi (site of the centre) live in the Southern part of the State popularly known as "Southern Zaria".

Kwoi, essentially is a district headquarters (Jaba) and covers a considerable land area. The district population as of 1979/80 was about 120,600 which must have escalated with the present socio-economic realities. To the north, the area is bounded by the Kachia Local Government territory and to the south, it shares boundary with Plateau State. The East and West of the area are bounded by the Kagoma district and Kachia Local Government areasrespectivelly.

Kwoi and its environs found in the northern part of the country Nigeria is within the savanna vegetational belt, with hot humid climates and have considerable rainfall during the months of April to October (the rainy season).

Found at Kwoi and its environs are the so-called E.C.W.A. comprehensive Health Centre, the maternity clinic at Fai, and the maternity clinic at Nok. The nearest health centre or hospital is that at Kafanchan with varying distances of about 50-70 km away from various sections of Kwoi. This might have been the root cause of the unawareness of the village people of the role of modern medicine to their health solutions. Traditional medicine is believed to take precedence as far as health is concerned.

Where health facilities are found, they are haphazardly located with no architectural in-put into the designs in order to reflect the nature or vocabularly of health buildings.

Things are rather unbearable even as most of the villages surrounding Kwoi have no means of accessibility to the urban Kafanchan general hospital, as there are no good feeder roads and thus no vehicles at anytime of need.

The Local Government (Jema'a) in particular and the State in general are entangled in economic squeeze and thus there are no funds for the building of curative environments that are needed for a primary health care delivery system (PREVENTIVE, which is cheaper and accessible).

The irony of the trend of events is that the Federal Government in general and the State Government in particular have just started seeing (theoritically) the ever need for a primary approach to the country's health solutions.

Health presently in generic terms, is unfortunately characterised by social apathy and lack of initiative to increase the pace of change. What is needed right now is the inexpensive, PREVENTIVE methods of health attainment for all populations rather than kind of drug-centred technology beloved of some members of the medical profession located or sited within the urban population at the dear disadvantage of majority of the rural communities. The author is advocating that, our health care delivery system is in dire need of overhaul, partly because of the inadequacies and stresses which exist in it and partly because innovations, improvement and advancement are the hallmark of progress

1.2 BASIC HEALTH SERVICES

There are basically two systems of health services in hierachy of importance, we have the PREVENTIVE and the CURATIVE SYSTEMS.

PREVENTIVE MEDICINE or primary health care takes care of health education, that is directed towards improving environmental sanitation and modifying personal habits, immunization, routine examinations of the ante-natal and under fives clinics, campaigns against specific infections, for example, malaria legislation concerning such things as alcoholism, building standards and accidents e.g. burns.

On the other hand, curative services or secondary health care takes many forms. The cure of illness in a mild enough form to be treated as outpatients e.g. minor trauma and sepsis, upper respiratory infections and malaria. Other patients present themselves so ill as to need admission to a hospital ward under the supervision of a doctor, and at times need also the services, both emergency and elective, of a surgeon as well as the facilities of an operating theatre, a laboratory and x-ray unit.

Though it is useful to make a theoritical distinction between PREVENTION and CURE, they are closely interwoven in almost every part of the medical endeavours.

At the rural level the referal system takes the lead, even as the population after being found with an ailment or disease that needs a more sophisticated approach, are always referred to the district hospitals, or general hospitals within the geographical location. This is in agreement with the medical axiom (WHO) that "patients should be treated as close to their homes as possible in the smallest, cheapest, most simply.

equipped and most humbly staffed unit that will still look after them adequately. Only if a particular unit cannot care for a patient adequately is he/she be referred to a higher unit in the chain", also that "in respect of most common conditions, there is little relationship between the cost and size of a medical unit and its therapeutic efficiency".

As the author earlier echoed, the PREVENTIVE step which should be given high premium in any governmental health approach, forms the core of my further discussion and architectural diagnosis.

The success of the curative services largely depends on the effectiveness of PREVENTIVE services, for the latter prevents the occurance and re-occurance of most out-patient cases in the hospitals. The authors argument from the genesis is then logical that the approach to health should start from the "ground floor and not the first or second".

The basic human biological health demands which are control of communicable diseases, environmental health, nutrition, health education, family planning etc. are what Health Centres do.

1.3. COMMUNITY INVOLVEMENT IN HEALTH CARE:

The general objective here is to organise and encourage community participation in health maintenance, through lectures and visitations. Instructional objective here is that, at the completion of these lectures, the community Health aid should be able to contact the community through the help of the Project Manager, or Secretary to the Local Government or Councillor for health or the Chief Health Officer in his or her area of operation.

There are basically five things to be done by the field nurses, drilling comittee, training Co-Ordinators etc. to the people before getting their co-operation.

1) The Committee or Medical personnels should first of all build a good relationship with the community so that its co-operation could be got.
2) Identify any political, environmental, or social and economic factors which are affecting the health of the community, and may prevent the successful implementation of the programme.
3) Identify the main habits, cultural beliefs, practices and attitudes of the people in the community harmful or helpful to the community.
4) Enlist the support of the community leaders and organise community meetings:-
   a) Explain findings,
   b) Hear their views, aspirations and goals whether are in accordance with what is perceived by you.

5) Organise with the village Health Committee, the Village Health Sub-Committee which will be responsible for assisting in:-

a) Fostering active participation of the community in health related activities.

b) Selection of volunteers as primary health workers and organising in service training. Encourage the community in making contribution towards relevant programme e.g. clinic, digging wells etc.

These are basically the first things to be done before coming up with programmes.

The community should be involved in the process of hundred percent health attainment by the year 2000 A.D. because of:

i) Inadequate number of personnels

ii) Lack of enough staff (paramedical) to meet the health requirements of the populace.

iii) Health needs

iv) Socio-economic reasons and lastly;

v) Because of proper courage and total awareness.

The process is then broken down as could be seen below:-

1.4. PREVENTIVE PROCEDURES:

The organisation should begin right at the tail and with just a person with some medical skill however little in each village. He or she acts as the local representative of the health team right at the periphery of the health services to the heart of the community itself. Such persons need not be full-time employees and can be indigenous midwives or Traditional Birth Attendants.

A mobile team which will comprise of a Training Co-ordinator, Senior Health Nurse, Environmental Sanitation Engineer, non-formal educationist and a member of the drilling staff from the health centre will visit the villages at the aid posts where contacts are also made with the local representatives.

The local representative will inturn deposit their knowledge with the rest of the villagers when they must have received the needed lecture at the centre on routine basis. The drilling committee will teach individual villages how to make bore holes as water problems are numerous in these areas.

Medical personnels too can from time to time travel on established days to provide additional health services to the population, with the aim of providing out patient medical treatment services, family health including family planning, nutrition service, school health service, environmental health inspection and activities and health education, this time directly.

EDUCATION ON WATER USE

COMMUNITY MOBILISATION:

When the need and the potential for change with those in authority are discussed even at village level and at the villagers invitation, exchanging views with them at open meetings or at clan and family gatherings the people could see the ever need of being co-operative. Items like bore-holes, latrines could take precedence in the meetings.

COMMUNITY PLANNING:

After the team must have gone back for about an interval of one or two weeks, the team returns on a scheduled day to the village for talks that will result in Community decisions, e.g. where should the bore-holes and pumps be placed? Is there any agreement on the type of latrines desired and or there distribution?

TRAINING AND EDUCATION:

The community of each village will then select trainees from their village, (ideally respected, functionally literate persons in their 30s and 40s who are expected to remain permanently in the village) are gathered at the health centre to be trained as hygiene water protection and PREVENTIVE health monitors who will go back and transplant there hygiene knowledge to the rest of their people and keep watch on any act of anarchy by any one village member. The community should be ready to pay for the cement used in the construction of the pump platform and drainage apron.

Local masons and others can help in the mixing and laying of the concrete. Latrines can be built after a model has been demonstrated by the training team to the villagers who then build their's individually.

CONTINUITY AND MAINTENANCE:

Some other person could be chosen by each village to be the watchdog over the pumps and the village at large. Then a trainiry or health officer will be visiting a particular village after a period of say six weeks.

People could then be charged with the responsibility of refreshing the lectures hitherto delivered.

EVALUATION:

This is the nagging bugaboo of all projects.

The advantage of a drinking H20 and sanitation project is that the several simpler aims, such as the installation of certain numbers of pumps and latrines, the training of certain numbers of hygiene monitors, and the gross changes in water use patterns can be fairly easily checked on an en-route and project term basis.

It is believed that when all these above are strictly followed successfully, the water-borne diseases such as typhoid, malaria, and diseases due to lack of sanitation will be minimised if not eradicated in totality.

1.5. STATEMENT OF PROBLEM:

This is basically and essentially the identification of the authorities involved in authenticating the proposal.

CLIENT: The clients of the project or the commission looking at it from a realistic view point is intended to be the people and Kaduna State Health Management Board. The two bodies are opting for a conducive healthy environment rather than a community centre so to say, and they are out to donate generously for the execution of the project because they know that it is their normal responsibility.

BUILDING OWNER: The building owner is obviously the Kaduna State Health Management Board, because after the execution of the project, all other things, including the payment of staff, maintenance, drugs supply and any other thing that will see to the efficiency and reliability of the centre is the prior duty of the board.

U S E R S: The users are the people of this country in general, but essentially the users should be the people of Kwoi and its environs (Ham). Anybody from this region is entitled for any type of treatment, provided the treatment is available. For an outsider, that is people from the neighbouring districts, the spirit of health for all by the year 2000 would be employed and treatments discharged accordingly.

1.6 IDENTIFYING THE PROBLEMS

This is guided by four determinants, viz: function form, economy and time.

FUNCTION: This invariably relates the type of activities that are expected to take place in the centre. The relationship of spaces or departments and the type of people to use the centre. It is a known architectural fact that sociology plays a vital role in architectural indept designs. Thus, the relationship of building spaces and the type of users always remain a striking architectural problem deser ving architectural attention.

F O R M: The form of a complex is always connected to the site and its physical environments.

1.7. SITE CONSIDERATIONS:

ENVIRONMENT: Micro-climatic concept influenced by surrounding situations are part of the problem requiring a solution. Environmental Influences which can be natural or artificial are both taken into consideration for harmonious solutions to the problem.

QUALITY: The patients comfort in services or circulation is the result of the quality of construction, planning and the way it harmonises with site conditions and the general environment. This is in essence

saying that concepts should not be such that the final solution becomes something that doesn't fit within the environment in standard and other levels of expectation.

ECONOMY: Essentially, form is what you see and conceive. This concerns the critical budget or the available resources for carrying out the project in relation to the quality of the final complex. It may also include consideration of operating and life cycle costs.

T I M E: This has three categories or classifications: Past, Present and Future which deals with the influences of history, the inevitability of changes from the present and projections into the future.

P A S T: This brings about taking into consideration the influences of the development of health centre designs in the past.

PRESENT: The considerations being taken in by the present day health centre designs are the present technological improvements in design and health centres functions or activities.

FUTURE: Involve projecting into the future for possibilities of changes and improvements in the field of health centre design and changing models of therapeutic processes and nursing functions the centre is expected to house.

SUMMARY OF THE PROBLEM: Summarily, the whole problem is a health centre design with concepts geared towards solving the problems as raised by function, form, economy and time.

1.8. GOALS AND OBJECTIVES:

This project would always have some down-to-earth basis and intended pragmatic goals and objectives.

GOALS: To represent in black and white a health centre that will be functional.- To vocalise my instictive and spontaneous feelings and respect for the health needs of the Users.

- To present an architectural and pleasant therapeutic environment.
- To site a health centre with ancillary services that would work as a homogenous complex.
- To provide or upgrade the level of awareness of the complementary health needs and process of the people.
- To create a conducive environment in which medical,nursing, and auxilliary staff, working as a team could effectively apply their skills and techniques to the service of the populace of Kwoi and its environs fresh from farms without much headache and delay.
- The absence of such a most needed project in the region has been the root cause of uncontrolled epidemic occurances in a large scale. This, however, might promote comfort to the teeming populace and might make life explained in a better direction as it might reduce the spread of infection, and promote effective nursing care; through immunisation.

OBJECTIVE: To produce some architectural designs that are done with the fullest consideration of the present nation-wide economic imbroglio and recession, thereby making their actualisation and workability plausible even as they will be economically viable and adaptable to the climatic conditions of the environment.

Designs that will provide comfort and function with a touch of aesthetics, simple but adoptable structure and some air of expressionism of the cultural heritage.

To relax the problem of the need for standard health buildings for the therapeutic processes in the State.

To create an organic surrouding through land scaping, that will draw the people's attention towards modern processes of therapy.

1.9 SCOPE OF THESIS:

MACRO-SCOPE:- QUALITY: As the project development is within the district headquarter, which invariably means that further developments will be sited at this town, the quality of development is to be of a standard, befitting a modern town in the making. As no one would want a development that will only come just to be outmoded even before it is felt the general quality is intended such that the project can have an aesthetical life projection. This is encouraged by the fact that in the development statements of towns in-the-making, quality comes to be the foremost.

MICRO-SCOPE: To design a health centre that incorporates the out-patient department, the nursing hints, ancillary services, administrative unit and public health section.

ACADEMIC SCOPE: As this is a Master of Science degree thesis, respect is paid to the standard requirements of such programme. Out of the many challenges (academic) in health buildings which include, Noise control, Fire protection, traffic flow etc, Noise control has been picked on, and this would be digested in the standards of academy.

AREA OF RESEARCH CONCENTRATION: An area of research concentration is chosen to allow an indepth study of a specific area of the major research topic. The area chosen is Noise control in health buildings. The aim here is to carry out an indepth research on areas of noise and solutions in the centre.

CHAPTER TWO

HEALTH AND HEALTH CENTRES

2.1 What is Health?

Health, as simple and common as the word sounds, could yet have diverse definitions from one class of individuals to another, depending on its level of enlightenment. The dictionary meaning of health, Longman, dictionary of contemporary English low-priced edition has this to say: that "health is the state of being well without disease or is the condition of the body. But health from a broader and intellectual perspective could be defined as the state of being able to lead a socially, economically productive and satisfying life. It means improved nutrition, availability of adequate and safe drinking water, good basic sanitation, improved agriculture decent but affordable housing, immunization against major communicable diseases and most importantly it means health literacy".

Recapping these above, health means the sufficient possessiveness of needs of oneself and the demand of his/her health.

Total health means that there will be no unnecessary suffering and premature death, it follows that mercy has replaced greed and selfishness. Health in yet another view-point means living well and striving towards the ideal goals that we establish for ourselves. It's never a commodity that can be purchased in super market or chemists shop. It is not just something an individual desires simply to enjoy but a basic need of every society. Health begins in the home, neighbourhood schools and even in the community at large. Health is a dear

and inevitable goal to be achieved and not an end to itself. It is a quality of life empowering one as an individual to achieve a socially useful life. This diagnosis of health means therefore that health is more of a social problem than a medical one. Health is essential if Nigeria as a developing country is to be economically productive and independent. The merits of health however, cannot be over-emphasised.

2.2 ELEMENTS OF HEALTH

Health as a natural phenomenon that is inevitable within a development conscious state can be visible and touched with its basic elements fully identified viz:-

- Mass education campaign concerning prevailing health problems and the method of preventing and controlling them is a step towards achieving total health in a society.
- Promotion of food supply and proper nutrition. This element can be realistic if however people are taught the principles of agricultural practice involving the types of crops needed for particular nutrient in the body and the combination that will help maintain the body chemistry and biology. This cannot be achieved without a thorough acknowledgement of the problems at stake.
- Adequate supply of safe drinking water and basic sanitation. This infact re-emphasises the reason why the thesis is gearing towards preventive medicine as the first step to our health problems: Food and clean drinking pipeborne water, basic sanitary considerations of the surroundings are yet factors that if viewed with understanding, our health problems are bound to diminish.

- Material and child health care including family planning. The relationship between the provision of needs of children and the number of children is essentially a factor that has since needed attention. Family planning does awey with poverty, sickness and many associated problems.
- Immunisation against the major infectious diseases.
- Prevention and control of locally endemic diseases.
- Appropriate treatment of common diseases and injuries.
- Promotion of essential drugs are all elements of total health.

The prime means for practicalising these elements are through political will, community involvement, multi-sectoral action, appropriate technology, an even distribution of health resources and total coverage of all the prpulation. Health, they say is wealth, prevention is better than cure and even cheaper.

Many countries including Nigeria, continue to lavish their financial resources on training new doctors and building new hospitals specialist hospitals which are the secondary and textiary approaches respectively to health problems, in order to cure diseases which can be prevented at the primary level through preventive methods.

These doctors invariably turn out to be unwilling to work in the remote rural areas leaving the rural population in messy situation and the few urban settlements benifitting. Health is against this, it won't compromise with this approach and thus the need and necessity for PREVENTIVE METHODS.

2.3 HEALTH CENTRES

The call for health attainment, the need for economic productivity and the very reason for social satisfaction paved way for health facilities centres christened or called health centres. Functionally, a health centre perform the promotive, preventive and curative functions. Physically it can be viewed as being divided into the NUCLEMS which is supported by the SHELL.

The Nucleus comprises of (a) preventive section, (b) Diagnostic section (c) Treatment Section and lastly (d) In-patients section (the Nursing Units).

PREVENTIVE SECTION: This section checks on ante-natal and post-natal patients, Immunisation and general check-ups on children (under-fives) and others. Family planning is always combined with the post-natal care and thus treatments such as injections, dressings and issueing of pre-packed drugs, should therefore be provided.

Cases that are deemed difficult at this section are immediately referred to the diagnostic section.

Also at this section, information to large groups either on nutrition, sanitation etc given in the waiting areas.

DIAGNOSTIC SECTION: Examination of sick patients by community Nurse or clinical officer takes place here. Most cases are always sent to the Nurse, while serious ones are referred to the clinical officer for further examination and treatment in minor surgery. Prescribtion follows diagnosis of diseases in form of injections, dressing or medicine.

TREATMENT DEPARTMENT: The treatment department or section comprises of the pharmacy or drug store, dressing and injection rooms, usually placed strategically so as not to obstruct flow.

THE SHELL: The shell constitutes the supporting facilities or the ancillary services necessary for the efficient operation of the Nucleus. This constitutes toilets, kitchen, C.S.S.D. Laundry garage and workshop, maintenance Unit, mortuary, general store and others.

C.S.S.D: This is the central sterile supply department which contains or supply all sterile equipments to various sections of the centre for surgery purposes and others.

Laundry: Mainly intended for in-patients but also serves the entire medical Unit. This includes facilities for boiling and an out-door area for washing and drying of linen.

Kitchen: Simple facilities for food preparation, boiling and food storage.

General Store: Self-explanatory even as it stores miscellaneous items.

Workshop: For carpentry work and painting. Even electrical services are found here.

Incinerator: Should be provided for the disposal of dressings etc.

Garage: Supported with or by store, workshop for the public health technician.

Day Space: Especially for in-patients. This is usually an open enclosed countyard with benches, flower beds provision for children playing facilities necessitated.

Demonstration Farm: An open space to be used for gardening purposes will help in the nutrition education by teaching the mothers the planting process of the desired foodstuffs and the right time.

2.4. THE BEGINNING OF CONSCIOUS HEALTH CARE:

Health care present a different problem in every country, for the way it is organised is a response to geography, climate, historical development economic situation and social cultural and political conditions. Found in the advanced or developed world is an established and inherited machinery for medical support and a substantial proportion of national resources devoted to health care. In the developing world on the other hand, there is usually little inherited machinery of a comparable scale and the provision of health care has to be built up on almost entirely fresh foundations. Appreciation of these differences is fundamental to an understanding of the situation which prevails in a country.

The advances in medical knowledge and skill that have taken place, together with the parallel revolution in communications that is bringing these advances within the awareness of a constantly increasing number of people throughout the world have combined in a process which seems irrevocable. The provision of health care is a developing facility and its continuous expansion in one form or another to a widening range of the population, seems inevitable.

A perfect dissection of the above will invariably show that the genesis of health care just as any other aspect of scientific development, found its roots from the pre-colonial developed countries of the world. Health care from a historical view-point existed with

the emergence of science and technology predominant within the civilised countries.

In the U.S.A., there are voluntary hospitals and other establishments owned by philantropic organisations both religious and secular, including many belonging to sickness insurance funds. There are also private establishments run on a commercial basis, and municipal state and federal establishments for those unable to afford other forms of care.

In Central and Southern Europe the pattern is dominated by the social insurance institutions and there is a sharp division between the preventive and curative services.

At the other extreme, in the socialist countries of Eastern Europe, there are no private hospitals. All hospitals are part of the public service for preventive and curative health, they enjoy no autonomy and are virtually state controlled from the centre.

In the U.K there are private hospitals, some of them commercial and many run by insurance organisations and there are opportunities for private health care from independent professionals. But since 1948 the National Health Service has established a comprehensive system of inter-related social and medical services that, apart from some minor charges, are available to everyone without fee irrespective of their age, sex, religion, economic position and or ailment.

In the developing areas of the world (Nigeria inclusive) where there are greater problems and usually slighter resources, the deliberate organisation of health care is expanding rapidly.

It follows almost inevitably from economic and social progress, from the expectations generated by education and from the political pressures of the population. Indeed, it can be said that continuing progress can scarcely take place without it.

Governments are impelled to frame a policy for health care and to assume either an executive or advisory role in implementing it. The pattern is increasingly one of provision by the state, with varying degrees of control, frequent by working alongside existing private or philanthropic institutions such as missionary organisations or relatively small commercial units patronised by patients who can afford them. The extent and sophistication of the service depends not only on the country's attitude to social welfare and its administrative structure, but more fundamentally on the level of its economic development on what it can afford to spend.

2.5 EVOLUTION OF HEALTH CENTRES:

With the introduction of the National Health Service in 1948 in the U.K (Britain) a network of integrated primary health centres was envisaged. It was intended that they should provide accommodation for rent by groups of general medical practitioners, nurses and administrative staff, where they could be housed together or with the staff of the preventive services of the local authority.

This initial proposal failed as dentists chemists and opticians were reluctant to participate in a nationally organised scheme, fearing that their hitherto professional independence might be denied them even as they saw the proposal as a first step towards becoming state employees and preferred to safeguard their independent position.

The wind of change however found its course by the 60s and the professionals were united for the country's health services.

By the end of 1958 only ten new health centres had been completed in England, by 1968 the number rose to one hundred and ten and has subsequently continued to increase, although partly for financial reasons the pace has not been as rapid as might have been hoped.

Health centres as places for primary care may be purely preventive or curative or may integrate both these aspects. Integrated health centres where organised preventive services were combined with the primary care of general medical practitioners first appeared in the USSR as part of national policy in the 1920s when a network of such establishments began to be set up as elements in a regional framework, with polyclinics and hospitals at secondary level.

However, despite the recognition in the British Ministry of Health's Dawson report of 1920 that "Preventive and Curative Medicine cannot be seperated on any sound principle' it was not until 1945 that the concept of organised community care based on the integrated health centre began to gain wide acceptance in the U.K, or indeed in most other countries.

The term health centre can signify different things. Regretably it is generally used to designate something that might more accurately be described as a centre reluctantly visited by people with minor sickness in the hope that they can be restored to health without having to go to a hospital. A Unit that demonstrated a different and more positive approach, better fitted to its title, was

an independent British project that first attracted some notice nearly fifty years ago. It is of interest both for the idea behind it and for the physical form into which the idea was translated.

The pioneer health centre at Peckham in South London was a voluntary experiment, independent of government and the local authority. It began in a small way in 1926 and was finally established, much expanded in purpose built premises in 1935. Intended as a centre for the local community where the emphasis was on the promotion and the monitoring of health, local families were invited to use it as a club and as a condition of membership were offered periodic health overhaul of the whole family. It also provided ancillary services for infants, children and adults.

The function of the pioneer health centre was primarily preventive and did not extend to treatment, and its nature was deliberately that of a community centre. An entirely different type of health centre was built by a local authority in Finsbury, London at about the same time as the Peckham centre. It is perhaps best known because of the attention it attracted architecturally.

The purpose of the Finsbury health centre was to bring together under one roof all the health services for which the local authority was responsible, which had previously been dispersed in different parts of the borough. Thus it housed the offices of the departments of the medical officer of health and the sanitary inspector, the public cleansing and disinfecting station and the mortuary. For public use it provided a lecture hall and suites of rooms for clinics and treatment

for chiropody, dentistry, tuberculosis and for electrical treatment. But unlike the latter, health centres in U.K, it made no provision for the general medical practitioner, whose services were not a function of the local authority.

The nowadays trend with health centres especially in Nigeria is that attempts have been made in Integrating both preventive and Curative services in a more elaborate language. The successes of these attempts have always been the question at stake. A more pragmatic approach to the country's health solutions even as it continues to preach the everyday slogan "health for all by the year 2000 is the most essential tool that could be used in conquering the enemy - ailment. Attention therefore should be directed towards the Preventive methods rather than otherwise as this is the brain behind the choice of this thesis topic as earlier voiced.

CHAPTER THREE

CASE STUDY

COMPREHENSIVE HEALTH CENTRE TUDUN-WADA, KADUNA

3.1 GENERAL APPRAISAL:

This centre was built by the North Central State (now Kaduna State) Ministry of Health with the necessary approval of the State's Health Management Board. It was built to serve the then health needs of the Tudun Wada community from a primary scale. It became more functional at its inception then, but with the proliferation of more functional health buildings its usefulness depreciated over time. This was not actually unconnected to the bare fact that people were always carried away by the mentality of modernization and sophistication. Broadly speaking the centre was not big enough to cater for the health needs of the populace.

3.2 ARCHITECTURE:

Architecture goes with planning,functionality and may be aesthetics. But hospital or health centres' architecture believes in functionality as the number one keypoint. The idea of aesthetics is infact a tertiary one not even a secondary. Moving hand in hand with functionality is simplicity of circulation pattern. As a matter of fact the architect did achieve this in his planning. Circulation routes are simple and clear in that an indisposed peasant would always find his/her way whether approaching the centre for the first time.

The short-coming of the planning or the design concept of the centre was that of compactness. Compactness of units or departments is not always desirable in health buildings. The generally accepted proposal that departments should be clearly defined in health complexes was lacking.

3.3 A CRITICAL LOOK AT THE CENTRE:

Looking at the whole centre with a specialist's eyes and even critically and closely, one can always say that it was designed to serve a lesser population. Many functional spaces were missing and generousity not dramatised in space allocations.

The centre was for curative services as it is evident in the functions. Only little and almost negligible attention was paid on the preventive side which basically was the primary thing to be done.

3.4 APPRAISAL OF DIFFERENT DEPARTMENTS:

As it might have been known by the reader, the centre supposed to have three distinctive units or departments, the out-patient department, the Nursing Units and the ancillary services. Present in this centre are the first two.

O.P.D.: The Out-patient Department (O.P.D) is not elaborate enough as it looks space deficient. The general waiting is enclosed by the diagnostic and therapeutic facilities leaving it in dire need of cross natural ventilation.

The allocation of functions in the O.P.D looks austere to the specialist eyes and unconforming with basic needs.

The Canteen is so much attached to the O.P.D. without noticing the danger it possesses. The public health section is also close to the canteen and the maternity section.

Administration unit is to the left hand side of the main ingress facade with minimum functions.

One good thing about the O.P.D. is the co-ordination of functions and circulation system.

NURSING UNITS: The theatre is enclosed by the male ward and the maternity Unit. So compacted in that the question of expansion is ruled out at a sight. The good thing about the nursing units is that the children's ward which is always noisy is segregated and taken far away the end of the site in the Y-axis and in the vertical direction of flow. The nurses station or duty room plus some other facilities are centralised which may be was a conscious attempt by the architect to control noise in the wards.

ANCILLARY SERVICES: Ancillary services which include the mortuary, central store, laundry, maintenance unit, kitchen are all absent. Available only is a small canteen which was wrongly sited. Its geography should have been away from the nursing units.

A justification as to the absence of the above functions might be found or created thus, as the centre was meant to serve a handful of the population and which was to obey the referral system of health services it had to be as it is.

3.5 LIGHTING AND VENTILATION:

The designed was to be ventilated and lighted naturally with minimum artificial assistance. The administration unit has both good lighting and ventilation naturally, the O.P.D. is where the problem lies. The general waiting, the cubicles (examination) dental clinic and doctors room obviously do not enjoy these two necessaries.

Apart from the above, almost all the functions with the exception of the first stage room in the ante-natal clinic, the urine testing room and some W.C's enjoy good natural lighting and ventilation.

3.6 FENESTRATION OF WARDS:

Wards which are supposed to house inpatients are supposed to have good fenestration. Openings should not face the west-east direction. This was achieved in the male, female and maternity wards. The children's ward although faces the West-East direction has verandahs that serve shading purposes.

3.7 CONSTRUCTION AND MATERIALS:

Materials included concrete hollow blocks, asbestos cement roof, timber rafters and iron bars. Finishes were concrete screed and granolithic floor finish in wards and theatre.

The double-pitched construction method was adopted in the OPD the wards and public health. Mono-pitched roofs were employed at some places.

3.8 CONCLUSION:

The centre was rural-oriented per se, this is evident in the concept adopted, the services & architectural in-put in terms of aesthetics.

3.9 THE HEALTH CENTRE AND ITS ACTIVITIES:

3.9.1 DOCTORS AND PATIENTS FLOW:

The doctors and patients approach the centre from the same ingress point and go back through the same egress.

Patients have good flow pattern and the doctors same. Although no preference was given the doctors to a minimum degree.

3.9.2 BASIC INGREDIENTS OF PATIENTS:

COMFORT: Good circulation pattern, simplicity in flow, noiseless atmosphere, attention and efficiency of doctors are the basic ingredients. These were achieved in the centre to some degree.

3.9.3 TYPE, FORM AND STYLE OF CENTRES:

The type of the centre was the curative one with little attention paid to preventive services.

Form adopted was the rectangular one, which sort of eases the movement of trolleys, machines and patients flow. Maximum use of spaces can be got with this form, even as it is the form advocated by hospital design pioneers.

The style of the design was the pavillion spread which is the right style for our climate (the Northern climate). Monoblock style is always problematic in terms of services, ventilation, lighting etc.

3.9.4 FINAL NOTE:

That the total design was not in conformity with the right trend of distincting departments still possesses its merit in the style, circulation simplicity, ventilation, lighting and so forth. The courtyard 'system is yet another merit worth commending.

CASE STUDY 2
NORTH CENTRAL STATE RURAL HEALTH CENTRE (STANDARD).

3.10 GENERAL APPRAISAL:

A sight of the planning concept will always pre-suppose a thorough understanding of hospital needs and not wants.

As the name implies, this was a revised version of primary health facilities adopted by the North Central State (Kaduna State) Ministry of Health.

The centre was big enough and elaborate enough to cater for a village community per se. The architectural dramatization and in-put in terms of planning connodes a conscious exhibition of the needs of a therapeutic milleu, and the generic acceptability of distinction of departments in health complexes.

3.11 ARCHITECTURE:

The architectural exposition and language of the centre portrays a handiwork of intellectuals and conscious architects.

Circulation, simplicity which are the governing keypoints in hospital design are demonstrated with some air of understanding. The facades are not too elaborate, nonetheless the primary thingwere the above former considerations.

3.12 A CRITICAL LOOK AT THE CENTRE:

A critical and architectural look at the centre's planning concept instills some air of satisfaction and acceptability. Deficiencies can always be identified even as the wards are passable through the middle-long travel distances and too much isolation of departments.

3.13 APPRAISAL OF DIFFERENT UNITS

3.13.1 O.P.D.

The general waiting space is enclosed by the diagnostic facilities and has the main entrance into the complex widely open. Planning concept was that the O.P.D. encouraged horizontal spread in the X-axis. Laboratory and the pharmacy sited at the same place which is the accepted system. Ventilation and lighting naturally were maximumly achieved in the design.

3.13.2 NURSING UNITS:

Nursing wards are scattered away from each other with theatre centrally located. The maternity unit shares the same geography with the female ward which is the best. Ventilation and lighting naturally were achieved in the design.

3.13.3 ANCILLARY SERVICES:

The total absence of a kitchen laundry, CSSD, mortuary, central store and maintenance unit portrays a failure in the design brief. The centre would not function in isolation without the supportive advantages of the ancillary services.

3.14 LIGHTING AND VENTILATION:

As a matter of fact maximum natural ventilation and lighting is achievable with the planning concept adopted. I commend this architectural in-put.

3.15 FENESTRATION OF WARDS:

The male ward and the female ward all of 12 beds each were fenestrated with their long sides facing the North-South direction. The maternity ward was treated differently and fenestrated in opposite direction. The effect of sun rays was taken care of as eaves overhangs were extended to trap this effect.

The total absence of children's ward is yet another discrepancy of the design brief.

3.16 CONSTRUCTION AND MATERIALS:

Materials were hollow blocks, for walls, asbestos cement for roofs, timber rafters, casement and louvre windows for openings and so forth.

Mono-pitched, lean-to, and double-pitched roofing systems were adopted and at appropriate positions.

CONCLUSION: In generic terms, the merits of the planning concept in any way overshadowed the demerits. Apart from its allowance for horizontal expansion, it provides almost maximum ventilation for all functions, provides fresh air and it compromises the patient psychology to be part of the natural environment-the earth.

The materials employed need some overhaul since we are going by time. Mention must be made regarding the finishes of the health centre since they are of paramount importance more especially in wards and operating theatres.

Although the centre occupies a big amount of land, its no problem since its rural-oriented with available land, welcoming such spread.

ACTIVITIES OF THE CENTRE: DOCTORS AND PATIENTS FLOW

This was architecturally and therapeutically taken care of. No amount of complication but clearity and simplicity in their highest.

PATIENTS INGREDIENTS OF COMFORT: Circulation, attention, simplicity in flow, efficiency are basically the ingredients of patients comfort, these were/are optimumly if not maximumly demonstrated in the centre.

TYPE, FORM AND STYLE OF CENTRE: The monoblock concept which preaches contiguity of departments was found unnecessary in the evolution of the design concept by the architect (ARC A. Bilewu). The pavillion spread took precedence even there was enough land.

The type was aimed at curative services. There was no plan for any preventive services at the centre. This was too unrealistic of the brief.

Design form was rectangular may be for easy movement of trolleys, machines and patients.

The author must confess at this juncture that many difficulties were faced in his bid to getting / the plans of these centres. That was why enough information was not got as it is seemingly so in the presentation. Governmental projects were not to be released to unknown bodies or individuals, that was why.

CHAPTER FOUR

THE PEOPLE

As has been earlier pointed out in the first chapter of this report, the people of Kwoi and its environs (Jaba) live in the Southern part of Kaduna State in the guinea savannah.

RELIGION: Predominantly, the Jaba people are practising christianity as their line of doctrine or religion. Not until recently, the population of the muslim sect has gained some recognisable degree unevenly found in the villages of the district. Mention must be made in order to cap this information that traditional religionists are still found in remote villages of these people. However, with the swinging wave of the christian faith, this hitherto embraced dogma is declining to its utter demise.

TOPOGRAPHY: Jaba land lies on the regional plains of heights ranging 550-700m above sea level reflecting a general regional slope to the south and local relative relief. The local slopes are generally low between ½ and 4°, although in isolated areas they are quite steep. Above the general plains major features can be identified:- Chori, hills, Nok hills, Kwoi hills ranging from 30-50metres high are very much conspicuous and spectatcular among the gentle plains of the area.

VEGETATION: As earlier pointed out, Ham land lies in the natural vegetational zone known as Northern Guinea Savannah. Usually, matured trees are between the heights of 10-15 metres with broad leaves and crowns almost touching. The tall hard elephants grass is intermittently found in most areas as there are marshy areas.

Even as there are no industrial activities since there are no basic ingredients (as the government is yet to see that) that will warrant the establishment of any, and consequently since there are no administrative centres within the locality almost every Jaba man within Kwoi district and its surrounding is a farmer. Farming is the predominant v occupation supposed to be embraced by every grown up male child. This is necessary for an adult who is married in any case.

That agriculture is the predominant practice within the set-up, any act that could result in health disaster will not come in any other form but agriculturally. It is believed that whatever one does, wherever he/she does it, be it in close contact with the environment or not, if it is not done hygienically, his/her health equilibrium will be shaken and unwanted corollaries cropped up. The activities of the people more especially as regards farming and what they eat from morning to evening if actually analysed, their health problems could be minimalised sort of.

4.1.1. ACTIVITIES

The Jaba or Kwoi people and its environs farm in the bush manually with no gloves and rubber long shoes.

They farm in marshy land barefoot. They eat at times at the farm with unwashed hands and spoons. (Primitive ones). They bath with inpure stream water and even drink it since there is no pipeborne water. They wash with this dirty water, wash their dishes and pots. (This is a typical village life and situation of whatever set-up).

A typical Jaba village organises traditional dances in the village from time to time which used to take place in the open air with

dust or loose earth. Since no water is normally poured on the ground before the practice, it is very obvious that the dust will have some bad side effects on the populace.

People are sometimes seen sitting on the loose ground especially small kids, some use to swim in stagnant water. One cannot erase the fact that molecules of this water could be swalloed and thus the resultant disaster. People are seen playing 'dara', fishing, hunting, enjoying themselves in sports such as football, volleyball for the youth, people carry loads on their heads, since there are no vehicles at the time of need, some are blacksmiths, some tailors, some are Burkutu makers and some many diverse activities and petty jobs.

As mentioned earlier, all these activities if their practice or execution is not done according to health standards, and until the people are enlightened on the dangers of these activities their health problems may have no marked difference from the present.

4.1.2. F O O D: When we talk of food, we are always referring to what one can take-in and become strong even as the substance will aid either the rate of metabolism in the individual's body or will help balance up the needed nutritients, vitamins and minerals needed by the body for the activation of cells.

As agriculturalists, the people engage themselves in varieties of crops, both cash and food crops.

In the cereal group, they grow 'acha', hungry rice, sorghum, guinea-corn, millet, rice and others. Coming to the legumes, they grow beans (soyabeans) groundnuts. Among the tubers, they grow yams, cocoyams, cassava, sweet potato etc. When looking at the different fruits within this set-up, they have mangoes, oranges, banana, cashew, 'mama' etc.

Nuts constitute Bambaranuts, groundnuts, fluted punpkin, they grow the 'gourd' calabash and the okro plants, onion and many others as their vegetables. The only recognised cash crop is the ginger which has since lost its value as market prices are going down year in, year out.

Jaba people are sedentary tillers, and they adopt the shifting cultivation system with their primitive techniques.

Relevance needs to be drawn even at this point as to why all these above were mentioned. Whatever you grow, whatever you eat be it raw, fresh or cooked, if the sanitary considerations are neglected, the outcome will always be disasterous but only for the love of God. The people's health problems may not be fully solved without the basic knowledge of some of the intricacies of what they take as food and fruits. No wonder a nutrition garden is always inevitable if this problem is to be fully looked into and solutions got.

The taking of too much alcohol in this case 'Burkutu', the embraced smoking habit of a large population of youths, the using of grindstones without knowing their geological composition (even as it is clear that some grindstones contain some toxic chemicals which when used for grinding foodstuffs might be having catastrophic, subtle and unacknowledged effects which might result into total death of individuals) and many acts that could be diabolic and homicidal to health of the populace are the things the centre is intended to draw its attention towards.

EXISTING HEALTH FACILITIES: Present in the district are only a so-called E.C.W.A. Comprehensive Health Centre at Kwoi a maternity clinic at Nok and Bitard which was jointly built by the Women Wing. This is nobody's fault as a matter of fact. All blames in this respect should be dedicated to the State and local governments for their non-challance and inhuman posture as regards the health of these people.

Because of this condition above, one will then begin to wonder as to where and how the teeming populace have their health problems solved since the governments are yet to reason alongside with them.

For a population of about 120,000 people, the statistical data of attendance in the Comprehensive Health Centre, Kwoi shows how yet the centre is to answer its name in wholistic terms. (See data below:-

1986 MONTHLY ATTENDANCE STATISTICAL DATA AT THE ECWA COMPREHENSIVE HEALTH CENTRE, KWOI

MONTH	NEW ANTE-NATAL CLINIC	OLD ANTE-NATAL CLINIC	UNDER FIVES CLINIC	DELIVERY	MALES	FEMALES	NEW PTS.	OLD PTS.	TOTAL
JAN.	51	94	63	22	3467	4724	532	5086	5618
FEB.	40	91	52	17	3730	5002	425	4681	5106
MARCH	43	70	63	30	3950	4231	422	4789	5211
APRIL	47	65	99	50	4001	5188	531	5321	5852
MAY	21	82	50	27	4107	5292	429	5093	5522
JUNE	55	75	45	60	3945	5223	420	4909	5329
JULY	45	87	80	45	4117	4053	397	4867	5264
AUGUST	53	109	74	23	3000	4898	524	5761	6285
SEPT.	37	101	65	55	2992	4667	505	5021	5526
OCT.	30	93	70	33	4134	5105	476	4374	4850
NOV.	50	90	85	51	3943	4988	443	4123	4566
DEC.	29	78	66	40	4320	5222	503	5432	5935

SOURCE; The Head Medical Personnel, E.C.W.A. Comprehensive Health Centre Kwoi Mr. Aniya Hyai.

PROJECTED POPULATION OF JABA IN KAGI DISTRICT: 1963-2000

YEAR	NORMAL GROWTH 2.5%	MEDIUM GROWTH 3.5%	HIGH GROWTH 5%
1963	33,750	33,750	33,750
1965	35,450	36,120	37,200
1970	40,330	42,800	47,200
1975	45,400	50,700	60,000
1980	51,400	60,100	76,500
1985	58,000	71,300	97,500
1990	65,600	84,700	124,400
1995	74,200	100,700	158,800
2000	83,800	119,300	202,500

SOURCE: Kaduna State of Nigeria Statistical year Book 1978. Ministry of Economic Development Statistics Division, Kaduna State, Nigeria.

PROJECTED POPULATION OF JABA IN KACHIA DISTRICT: 1963-2000

Year	NORMAL GROWTH 2.5%	MEDIUM GROWTH 3.5%	HIGH GROWTH 5%
1963	33,500	33,500	33,500
1965	35,300	35,900	36,900
1970	40,000	42,500	46,900
1975	45,100	50,400	59,900
1980	51,100	57,800	76,400
1985	57,800	68,600	97,400
1990	65,300	81,500	124,300
1995	73,800	96,500	158,500
2000	83,400	114,600	202,200

SOURCE: National Archives Kaduna File No.2984. Kachia District Assessment Report on Jaba Tribe By W.T. Barnicot.

Because of this problem and many others, a questionnaire was produced and circulated within four strategically positioned, or located villages, namely, Memdor, Nok, Kwoi and Fai' with the view of knowing their health problems and possible solutions as they deem it fit,

The questionnaire reads as follows:-

- What do you have to say as to the general health care system of your village in particular and your district in general?
- What are the different ailments (diseases) prevalent in your locality?
- Standing as a paramedical staff or from common knowledge, what do you think are the possible causes of these ailments?
- Speculate (suggest) possible methods of eradicating or minimising these ailments from an empirical perspective or otherwise.
- We have two basic approaches to eradicating disease attack, orthodox or modern method and traditional (ancestral) method in the world at your village or locality?
- From a generic viewpoint, what have you to say about traditional medicine practice whether or not the practice is available within your set-up or village?
- What are the diseases you perceive as only curable by Traditional medicine men if any, as it is typical of primitive societes?
- Are orthodox Medicine men necessary for your maximum health attainment?
- It is obvious that within the Jaba populace or community, the only health care 'primitive' inadequate facilities are at the ECWA dispensary Kwoi. What do you think is/are the cause (s) as to the reluctance, indifference or non-challant attitudes of your people towards this dispensary?
- What do you have to suggest in order to encourage or draw people closer

to this health environment?

- Educate the author with your abundant knowledge on your perceived methods of tackling the hazards of health at your village.
- The fundamental goal of this thesis is in line with the general saying 'prevention is better than cure' criticise your village for not being preventive as far as your health is concerned.

Apart from the question are discussions were made in a tete-a-tete of myself and the chief Nurse of the Kwoi ECWA Comprehensive health centre, Mr. Aniya Hyai on lines that must have been responsible for the various diseases in the area, their possible causes and solutions or remedies, plus the poor response.

My knowledge from the questionnaire and the discussion with health personalities in the area enumerates the prevalent diseases of the area as seen below: Malaria, malnutrition, measles, pnewmonia, Hookworm infestation, Bilhazia, peptic ulcer, hypertension, child abuse and Neglect and so forth. Apart from this predominant diseases any tropical disease could be found or identified in this area since it (area) is a sub-set of the tropics. Such tropical diseases include: heat exhaustion heat stroke, sunburn, prickly heat, fungal infections. These are all common skin diseases. Other tropical diseases which are classified as those of insanitation are: typhoid fevers, worms infections, dysenteries, cholera, diarrhoea, Schistosomiasis. Others consist of infectious hepatitis, poliomyelitis etc.

Direct contact diseases of the tropics are: Smallpox, measles, tuberculosis, veneral diseases, leprosy, yaws etc.

Insect borne diseases are malaria, fevers filariasis, trypanosomiasis, leishmaniasis, plague etc.

Diseases got from injuries and animals are rabies, tapeworm and snakebites. Any of these diseases could be tackled from the grassroot by attaching grassroots preventive methodologies which are nothing but mere sanitation and cautiousness.

My research paved way for me to define the prevalent diseases in Kwoi area and this is seemingly necessary that they are communicated to the populace for understanding and cautiousness.

DISEASES

PEPTIC ULCER: This is a diseases that is concerned with the body action of changing food in the stomach caused by pepsin liquid for some reasons such as High ingestion of alcohol, burkutu, High indiscriminate ingestion of drugs such as APC, aspirin, 'E'-Tablets' etc.

MALNUTRITION: This is simply the corollary of low intake of high protein diets or the dependence on diets that are difficient in protein, calorie minerals etc. Major causes of this are: Ignorance - The people are ill-informed as such their level of understanding of the basics of life is still very meagre and low. Although there are proteinous crops such as guinea-corn, beans and poultry which are present within the community, the knowledge or enlightenment as to how necessary these are to the body composition is not there that is why you find individuals more interested in selling their fowls in return of Burkutu or so. People sell their eggs which is a good source of protein in exchange of money for burkutu. This is very much alarming and appalling. .

POVERTY: This is a forgiveable pre-condition as nobody can help solve this problem. Majority of the people are poor even as they are found in the territorial disadvantaged section or region of the State. No alternative means of income apart from the only source ginger - whose price invariably goes down everyday.

MALARIA: This is a hot countries disease in the tropics caused by a small living thing called plasmodium - malarial parasite which enters the body when one is bitten by an anopheless mosquito. This is encouraged when people have uncleared surroundings, when people plant right into the house, potholes and dirty gutters due to overcrowding of houses units, are some factors encouraging mosquitoes.

GASTROENTERITIS: This concerns the diseases got from contaminated, stagnant dirty water fromstreams, rivers, shallow wells etc. The diseases here include diarrhoea, bilhazia, cholera, typhoid fever, worms infections etc. Eating uncooked foods, eating with unwashed hands, ignorance of the type of food combination are other causes of the diseases.

PNEWMONIA: This is a serious disease of the lungs with inflammation and difficulty in breathing. This is an airborne disease prevalent in hot dry areas and caused by lack of architectural planning of houses and ventilation, which results in inhalation of impure air or oxygen which attacks the lungs. The thorough education or knowledge of architectural planning of villages (a model village) with their sewage and drainage systems will in a way help eradicate or minimise the panicious posture of this disease.

HOOKWORM INFESTATION: This is a disease caused by hookworm which lives in the intestines of animals and human beings caused by the environment and the entire house such as uncontrolled movement of animals, the barefoot habit of some individuals, indiscriminate defeacating attitudes, and ignorance.

MEASLES: This is a severe disease in under nourished children. It is also an infections disease in which the sufferer has a fever and small red spots on the face and the entire body. This is understood to have been caused by insufficient feeding system of most mothers due to ignorance or poverty and lack of constraint immunisation exercise.

HYPERTENSION: Essentially got from internal or psyche-unsatisfaction of the mind or from continuous over-use of the intellect with negative results. Hypertension could also be got from unknown causes i.e. essential hypertension.

Kidney diseases such as pyleonephritis could generate another form of hypertension. Kidney sores and high ingestion of unsaturated fats into the body system could create hypertension.

CHILD ABUSE AND NEGLECT: This 'disease' means physical or mental injury, sexual abuse, neglected treatment or mal-treatment of a child under 18 years by a parent or guardian. Child abuse and neglect occur in all groups of the society. They are not limited to any particular tribe, cultural or educational background or socio-economic status. However, they are detected and reported for more often in families who are economically and socially under priviledged. The great majority of abusive and neglectful parents have themselves been abused or neglected as the children. Situational high risk factors for child abuse are: poverty - ethnic and social isolation, single parent homes, broken marriag and disintegration of families.

4.3. PATRONAGE OF THE PEOPLE:

The tete-a-tete with Mr. Aniya and the questionnaire, produced the whys as to the lack of patronage of the people to the centre at Kwoi as evidently exhibited in the statistical data.

IGNORANCE: This factor tends to play a great role. The typical ruralistic Jaba person is never enlightened as such he/she may seem not to know the efficiencies of modern medicine even as this complement his/her health needs. Until this is explained to him or her, the situation may not change, for he/she might have ignorantly chosen to be conservative and remain a diehard.

POVERTY: The Jaba community is an unfortunate one, majority of the people are handicaped economically. No sources of income, apart from farm crops or produce.

TRANSPORT: Not all villages or roads are accessible or motorable. This in itself is a strong handicap. Regretably, there is no single settlement with a tared road apart from Kwoi and some few linear settlements.

ATTITUDES: The attitudes of medical personnels towards patients have been playing a vital role in reducing the number of attendants of patients. Until this group of individuals relent their wicked and inhuman ways of hospitality, this may remain as ever.

F E E S: Even as the centre is a private one, fees are always high, invariably they tend to embrace traditional medicine even as this is cheaper, comparatively.

SERVICES: Medical or therapeutic services at the centre are deemed inadequate as they don't go together with the high fees always charged. The centre is considered under staffed, and meant for minor cases of sicknesses as such it's better to go to Kafanchan or Zonkwa directly or the nearest cheaper traditional medicine houses than wasting time in the

centre, deemed and concluded by some people.

BELIEFT: There is that general belief of the Jaba populace as regards the efficacies of traditional medicine. The rationale behind the sought patronage of the centre is not there as there are traditional medicine men who can do the job better and cheaper. Some diseases are deemed only curable by the traditional methods, such as 'Lamuka', yellow fever and cases of bewitched persons.

PROPOSALS IN RESPONSE TO THE ABOVE:- GOVERNMENT:

Government with the communal response of the Jaba people should join hands and build for the Jaba populace a bigger Comprehensive and Integrated health centre. The Architectural input in this respect, should be projectional as need may arise and thus the up-grading of the centre to a district hospital.

TRANSPORT: Government should provide the villages around and within Kwoi with the inevitable feeder roads which will ease the transport of patients to the centre and goods to the market.

POVERTY: Government can come in, in this respect by rationalising the prices or costs of the only recognised cash crop in the area - ginger. The price of one sack falls down by 200% every year. Restoration of this is the only solution.

FREE MEDICINE: Even as government owned health centres are known to be on free of charge basis, when this is introduced at Kwoi, obviously people are bound to patronise the centre.

PERSONNELS: Skilled medical personnels who are humane and dedicated to their work or profession if introduced into this health centre by the Kaduna State Government will make every sick person patronise the centre.

IGNORANCE: The problem of ignorance can be erased by organising preventive lectures on nutrition, sanitation, water, social existence etc.

4.4. TRADITIONAL MEDICINE:

Traditional medicine in Kwoi district just as it is everywhere is as old as our great grandfathers. Not until in recent times (far back as earlier 70s) traditional medicine was taking precedence just as it is in some many nooks and corners of the people now. The Jaba men look at ortholox medicine with some sneer in the time immemorial not until now that wave of extreme traditionalism has began to pave way for the assimilation of modernistic preachings with the perpetual dying away of the strongest traditionalists - our fore-fathers.

This thesis was hitherto geared towards looking into the diverse efficacies of traditional medicine men in Kwoi district, identify areas where they could be jointly integrated to form a joint venture and seperate areas they can't come together since the practice is still in full swing and any attempt to discard or eradicate it totally could be a day dream and an unarchitectural approach. Architecture up-grades, it doesn't discard, it doesnt demolish nor condemns or changes cultural beliefs and traditions, rather it accommodates.

The end product of my attempt shows that there was alot to be done for a successful integration, since the marked and clear-cut difference between the two practices are administrative and procedural conditions. Many people look at traditional medicine as to be more secretive, but scientific objectivity which teaches us

us that no phenomenon is wonder, if our prior evaluation of traditional medicine is not prejudicial. However, the catholic, Universal and cosmic generic posture of the world to traditional medicine but for China and India who have embraced traditional medicine as a complementary part of their health solutions is too naive. Nigeria has to be systematic and scientific in her attempt to integrating the two seemingly enemies or antagonists who prefer to have parallel directions.

Obviously, there is a mystical side to traditional medicine that may not be easily amenable to classroom teaching as is always the case with orthodox or COSMO-politan medicine. Examples of these are those medical powers that are exclusive knowledge of certain families which they treasure and would not divulge at any price as well as witchcraft.

The irony of what is happening in the villages is that, may be out of ignorance, upon the general unacceptable nature of traditional medicine as it is seen as containing some unhygienic and unscientific procedures which invariably have some detrimental side effects on the user, the people are never moved by this, for a typical villager, and infact everywhere, every occassion of sickness/injury is a crisis for the individual and for his or her immediate community, a time of uncertainty and insecurity, so he/she wouldn't mind any side effects that may be long term, what he/she sees at this crucial time is to get well whatever the means. To some extent this could be logical and sensible.

From a broader angle, traditional medicine is a harmonious blend of science and magic. Outside this only situation science and magic are supposed to be antagonists. The scientific aspect reveals its crude use of observation and tests while the magical aspect uses incantations or abstract interpretations. Actually the profession was dominated by illitrates and this was probably why it has not gained social visibility from a larger perspective. The length of training is often very long as apprenticeship begins at childhood, candidacy at adulthood and expertise usually at old age.

Meritocracy eludes traditional medicine because its intellectualism is not institutionalised, so no accredited degree is officially awarded. Moreso, the indifference of the orthodox medical scientists to it increased its status problematics. Yet charlatans cannot claim to be traditional doctors without creating social sensations.

4.4.1. TOWARDS SUCCESSFUL INTEGRATION:

The calling for an integration of traditional medicine and western medicine is gathering force in a rising tide which demands to be heard. Differences of opinion on whether traditional medicine should be used or not, leave many people and patients confused and uncertain.

Integration does not mean in anyway mean subordination of tradition or submission to western practitioners, it is a solution where all relevant primary medical resources are equally accessible to the different groups of practitioners with specialisation occuring on the same basis as it occurs in western medicine.

Co-operation in drugs, healing technique, counselling, psychotherapy personnel and concepts between the two bodies will help aid the integration process. Sentiments apart, the efficacy of traditional medicine is hardly controvertible, moreso when there have been proven cases where ailments declared incurable by reputable hospitals have been successfully treated in herbal homes.

Traditional medicine practice as earlier pointed out has been going on since the emergence of man on the continent of Africa, this age old medical practice which most of us have found useful at one time or the other was nevertheless given less attention than it deserved. This unfortunate situation of the relative neglect of Traditional medicine arose as a result of the penetration of the modern medical knowledge along with its accompanying paraphernalias.

The integration exercise will only be successful if the below procedures are intellectually and intelligently executed.

- Federal Government making a legislation recognising the art and prescribing modes and procedures for operation of traditional medicine.
- Nigerian medical and para-medical schools curricula should include the basic principles of traditional medicine because the role of traditional medicine had been relegated to a state of unawareness.
- Colleges of herbal medicine should be established to conduct research and analyse health care delivery system.

- All Nigerian medical practitioners in the country should be officially trained in modern sanitary principles and techniques to avoid contermination in the process of administering their herbs.
- All councils for arts and cultural research centres and universities should organise seminars and workshops on traditional and modern medicines.
- Staffing of traditional clinics by both traditional healers and modern health workers to ensure good sanitation and hygiene.
- Establishment of traditional clinics in the rural areas so that traditional practitioners stay where they are for sometime.
- Allocation of government aid to traditional healers in accordance with their experiences and expertise.

There are many proposals to be made which can help effect a successful integration programme, however, all might not be mentioned here. Mention must be made that if the integration is successful, it will not only offer the society freedom of choice between two medical systems, it will ensure the preservation of knowledge of both systems. It will make both health system more accessible to all. It will enable each system to specialise in the ailments it is best equipped to treat. It would attract more educated people to study and practise traditional medicine which in turn would contribute much to health care delivery. Even as by this time a successful systematic study of traditional medicine pharmacopocia must have been achieved and all groups of people including the hitherto conservative religionist and the conservative diehard orthodox medical scientist who have since been staunch opponents of traditional medicine will cease to be dogmatic and will with reflective alacrity embrace the realities of the efficacious

complementary not supplementary half of our health delivery system. Traditional medicine -

TRADITIONAL BIRTH ATTENDANTS: Traditional birth attendants (TBAS) by definition are considered as persons who mostly have no training at all in midwifery, but who are usually well versed in the beliefs and customs relating to maternal and infant care (WHO Tech. Report Series 331.1966).

Midwifery has an archaic sound, and is indeed an ancient profession as old as the art of healing. This is the only part or aspect of traditional medicine that is at this material time deemed okay to be brought together with the orthodox men, may be because of the absence of comlications such as mysticism and the open nature of their activities. That is why the centre is intended to house this group of traditional medicine people who will be on routine instructional lectures with laboratories to teach them on how best the act of cutting the umblical cord and the implications if not complications of post-operative tetanus resulting from their unclean traditional methods.

The truth is that whether or not this group of medicine persons are taught how to use the surgical equipments, the story in the villages may still be not different from the past. What is more likely the solution is the individual understanding of the complications of the 'Yanken gishiri' or 'gishiri' (salt) cut system or attempt of trying to relieve obstructed labour of mothers (a local episiotomy) which is vesico vaginal Fistulae, the post-operative tetanus resulting from the use of cow feaces in cutting the umbilical cord and many others.

The ever need to maintain some aseptic techniques such as cleanliness, non-interferrence of normal deliveries, recognition of abnormalities and referral to the nearest health institution when a case is becoming complicated is always there, for safety sake. Unseen germs from the touch of a finger, breath or placing objects together could be elliminated by boiling or dry heat only to return when touched.

The needs of the whole system are that it(system)should include information on their (TBAS) role and functions, numbers and distribution within the community, any training including apprenticeship to established trade midwives, approximate age years of practice etc. should be 'on the job'.

A supply of surgical blades and tapes for the cord and simple instruction on the TBAS proper application could prevent tetanus and other complications.

4.5. GENERAL DESIGN PRINCIPLES: COMMUNITY NEEDS:

4.5.1. DEMORGRAPHIC SURVEY:

A health centre design may be incomplete and a failure if the demorgraphic survey of the catchment area is not done. The population of the users or that of the area expected to be the patrons of the health centre technically called the catchment area from a given radius will determine the size of the hospital or health centre. The size of the hospital or health centre is always known by the number of beds.

The standard number of beds for a health building varies from geographical location of the site. The World Health Organisation (WHO) advocated about 3 beds per 1000 of head of population times the

population of the catchment area for urban centres. For rural centres about 2 beds per 1000 of head of population times the population of the catchment area.

From common knowledge and pragmatic results these standards don't normally follow well with the situations of these distinct areas. Therefore the need to rationalise architectural standards with empirical realities is always there.

As a matter of fact, beds needs vary as a result of community differences, population growth, age distribution, marital status, religious belief or doctrine, sex distribution, degree of urbanisation and so many others.

Peoples attitudes towards health will in many forms affect the number of beds or the size of a hospital or health centre. Until when the people's civilization has reached a compromising height as to their expected response to modern health facilities, the standards given will have to be overhauled intelligently and architecturally.

Other factors that are guiding principles towards effecting a design of health buildings that could be maximumly patronised in the strictest meaning of the word are the condition of the existing health facilities and the presence of some other social facilities.

A hospital cannot be irrationally sited in an area that has not experienced anything like a clinic or so just for the sake of siting it there. Peoples attitudes towards adaptability of new modes of life always register some negative results, as such the health building architect will have to always rationalise proposals with some social human realities and socio-economic status.

The presence of some other social facilities could be enough to some extent in upgrading the size and quality of a health building in an environment.

DESIGN PRINCIPLES

In the words of Grooves (1981), "By principles we do not have in mind anything abstruse or remote from daily practice. We propose simply to discuss how to put the hospital together so that it will be more than a mere collection of functions and departments needed in the practice of medicine - how to put it together so that as whole and in itself the hospital plant is a tool that serves the therapeutic process".

CIRCULATION

Cox (1981) says: "Separate all departments, yet keep them all close together, separate all types of traffic, yet save steps for everybody, that is all there is hospital planning".

OUT-PATIENT DEPARTMENT

The out-patient department houses the clinics the adjunct facilities and may be some administrative functions. However, the administrative unit can be separated but yet be made closed to the out-patient department, viz:-

- The reception department, the general public toilets are located here.
- The casualty department where emergency treatment is rendered is sited h
- The examination rooms, treatment rooms, all clinics, the adjunct facilities as earlier mentioned are found here. Infact majority of the therapeutic facilities are within the O.P.D.

Within the O.P.D. it has been identified from pragmatic evidences that the administrative and record functions are always centralised while medical organisation is always decentralised may be for privacy and social differences. This could be tackled when the community's needs are known. That is the population's common characteristics vital statistic and deficiency in health needs, people's attitudes towards medical care etc. Hospital resources of the community if known could help solve the problem. This include pattern of medical practice, quantity and quality of staff, programmes and services.

Where applicable, government policies and programmes along with social and psychological factors should also be considered.

EYE, EAR, NOSE AND THROAT (E.N.N.T) CLINIC: This require a measure of built in equipment or special accommodation. It requires an audiometry room, darkroom for diagnosis of certain cases of the eye etc.

EMERGENCY UNIT

This plays some vital functions as below:-

- Reception of patients and attendants and provision for waiting.
- Casualty theatre for simple or minor operations.
- Housing of patients during post-treatment observation.

The reception room should be accessible directly from the ambulance entrance and opens immediately into the treatment room. Emergency Services Unit are often provided with post--treatment observation beds. This is primary because patients could be observed better than in the general ward.

LABORATORY

The laboratory room suppose to perform three basic functions:-

- It is a place where investigations are carried out in a routine manner to assist in the establishment of a diagnosis or to assess progress control therapy.
- Its a place where test can be performed to detect the spread of epidemic disease.
- It provides an area where investigations of a research nature can be carried out.

Laboratory tests are generally divided into four main sections viz:- Haematology, Biochemistry, histology and Bacteriology.

HAEMATOLOGY: Where one conducts a special study of blood.

BACTERIOLOGY: The identification of organisms causing diseases.

HISTOLOGY: Process tissues removed from dead of living body (autopsy or post-mortem).

BIOCHEMISTRY: Carries out the chemical analysis of blood and other body fluids.

For a health centre all these might not be too elaborate in their functions, although they may be present. The provision of a single block will sort of house all these functions with little partitioning done.

Toilets for taking specimen should be very close to this unit with privacy duely emphasised.

LAB DESIGN

Laboratory design principles should be in conformity with these below:-

- Design should be capable of easy expansion.
- Design should face away from direct sunlight.
- Should be as flexible as possible.
- Floor finish should be non-slip, easy to clean and free from cracks when treated with disinfectants.
- Services should be located where they will be easily accessible for service and repairs with a minimum distribution of normal laboratory services.

Laboratory in the health centre is always best located in the ground floor if its a storey building; adjacent to the OPD and should always have easy access to the main entrance and roadway. This is because, certain tests requires the withdrawal of specimen at certain interval of time, and disposal of specimen after investigation may be done with ease.

X-RAY UNIT

The Unit where the taking shadow of abnormalities of bodies internally and treatment of skins take place.

Size of x-ray unit must be related to demand and design layout should be determined by the organisation of function so that economy in both patient and film travel can be achieved.

Operational areas include x-ray room, dressing or changing accommodation, darkroom, film files and film viewing.

There is usually diagnostic and therapy x-ray. The former is the taking of shadow of abnormalities of the bodies internally while the latter is the treatment of patients by means of x-rays. Elements of this include superficial therapy - treatment of skin lessions, Radium therapy, cancer etc.

PHYSIOTHERAPY (PHYSICAL MEDICINE)

This section is meant to assist the restoration of function after sickness and injury. It however, has three main components:-

- Manipulation of various parts of the body by massage and movement of joints.
- Remedial exercise by means of gymnastic apparatus, free movement and games.
- Hydrotherapy bath. In my centre only the first two are advocated since the third function entails some advancement and sophistication. In situations where a case requires a Hydrotherapy bath, it has to be referred to the general hospital at Kafanchan if there is or St. Louis hospital Zonkwa.

Occupational therapy is not included here because of obvious reasons. This is simply the adaptation of craftwork to assist in the restoration of function after sickness and injury by mobilising stiff joints, strengthing weak muscles and restoring the power of mental concentration.

DENTAL CLINIC

This is the clinic where all dental cases (cases dealing with the mouth, the gums of the teeth and the teeth themselves) are treated.

Dental Clinic for 2-man practice consists of 2 surgeries (1 large enough for principal surgery), a recovery room with couch and basin for post anaesthesia patients, dental workshop and waiting area.

Planning principles are that the surgeries should have a North-East orientation if daylight is needed but trend towards theatre-type operating lamps and more mobile equipment. There should be obscured glazing for the windows. If some accommodation has to be less easily accessible, it is preferable to separate functions like the dentistry or chiropody rather than a part of the general medical practice.

Again, there is much to be said in the interests of flexibility for planning the dental clinic to a standard useful size where this is possible. People visiting the clinic will usually arrive at the centre's reception point in the first instance and will be directed to subsidiary waiting spaces if appropriate. In large centres, dental patients although coming in through the main entrance might be expected to go through a different exit from their recovery room for privacy.

ADMINISTRATIVE UNIT

This unit contains offices for the hospital administrator, medical secretary, records and reception, business and admitting offices and other facilities.

PUBLIC HEALTH

A health centre re-emphasises its difference from a hospital even by the allocation of functional spaces. The centre is intended to take care of all public health cases such as immunisation, public lectures and others.

Its location should be in close proximity with the OPD but should be distinctive to maintain the general accepted hypothesis that all units in a hospital design should be distinct and easily identifiable.

All the field Nurses, Sanitary Engineers, drilling committee members, health officers, non-formal educationists are found in this unit.

The waiting area and the immunisation room should be directly accessible from the entrance and the reception Unit.

6.2. NURSING UNITS:

The nursing unit is where a patient is put to bed, fed, kept comfortably and provided with necessary nursing attention from the time he/she is admitted to the time she/he is discharged.
This has been earlier voiced.

MEDICAL NURSING UNITS: Patients with medical nature are accommodated here. They are always admitted without proper knowledge of the disease.

Patients here require the diagnostic aids of laboratory and x-ray and the therapeutic aid of physical therapy more often than patients in other units. Thus, the medical Nurse Units should be located in close proximity with these facilities.

SURGICAL NURSING UNITS: Places where patients with cases of surgical nature are accommodated. Patients here require surgical suite, emergency suite and x-ray, thus there is every need for their closeness.

MATERNITY NURSING UNITS: Consist of both ante-natal and post-natal accommodation. Beds of these two places should be separated and maximum flexibility should be obtained in the development of same.

The rooming in system of nursery is chosen here rather than the central Nursery, since the former has the baby by the side of her mother, which requires individual facility for washing the baby by each bedside.

DESIGN CONSIDERATIONS:

- Size of Nursing Unit.
- Control of cross infection.
- Psychology.
- Control of climate.
- Gain in privacy.
- Control of noise.

Number of beds here should be a maximum of thirty two and the design of this unit should be pre-aimed at elliminating cross-infection and not just mere reducing it. Adequate isolation and sub-division of Nursing Unit are of great and paramount importance.

Some isolation wards of about 2-3 beds within the unit could be employed for the sake of a health centre.

Both cross natural ventilation and lighting are very much important in this unit. Designs should be done in such a way that actual provision is made for these necessities.

While privacy is also important, it should be compromised with the economic realities of the sponsors plus the social interaction height of the users.

LABOUR ROOM AND DELIVERY: The labour and delivery rooms should be in close contact and flexibility of interaction highly achieved. The labour room should have toilets, showers and may be dressing cubicles. Single occupancy labour rooms might not be the solution in this context although it has been viewed as the most comfortable in terms of privacy and satisfaction. Prevention of sound transmission to the labour room should actually be achieved while floors free from cracks or any opening that may labour bacteria paid good attention.

Delivery room should have adequate space for obstetrician perhaps anaesthetist and midwives working around the delivery bed. The delivery room should be easily observed by nursing staff and required to be sound proof.

OPERATING THEATRE: The function of the department is to receive patients after diagnosis, to anaesthetise them either before or after transfer to the operating table, to operate and to supervise their post-operative condition before returning them to the words.

For reasons of staffing, engineering services, flexibility of programming and the sharing of ancillaries, operating suites are usually located together in one department if possible.

Sufficient floor space is needed for this team of a surgeon or surgeons, an anaesthetist and surgical nurses for them to carry out proper surgical techniques.

It is recommended that minimum sterile circle diameter should be 3m and the space between the wall and sterile circle should be 3-5 feet minimum or 0.9m-1.5m.

The operating department could be sub-divided into four basic zones:-

Protection Zone: All administrative elements and reception facilities are located in this zone. Changing facilities are located here also. Infact people in this zone should not penetrate to inner zones until after changing their shoes and clothing.

Clean Zone: In this zone, found are storage facilities for those items to be used in surgery, scrup-up facilities and anaesthetic rooms. This zone should be clean and it should not be accessible directly from outside and should be very clean in the accepted sense of the word.

Sterile Zone: This is where the actual operating theatres are situated. It is absolutely essential to maintain the highest level of cleanliness and aseptic conditions in this zone.

Disposal Zone: This zone houses the facilities for handling waste, used instruments drapes, gowns and dressing. In some cases Janitorial equipments are also handled here.

DESIGN OF OPERATING SUITE: This should always be aimed at preventing theatre infection. It should therefore be situated or sited where there can be no risk of sucking in contaminated ward air.

Floors and walls should be such a nature that they don't collect dust and it should be possible to wash them with disinfectant solutions.

Changing and scrub-up rooms should be sited outside the theatre as the process of changing and scrubing may let loose large numbers of hospital staphylococci.

Theatre must be properly ventilated so that patients tissues are opened and exposed to clean bacteria free air. The location of the operating suite should be close to the x-ray unit the laboratory if possible and the central sterile supply department (CSSD).

6.3. ANCILLARY SERVICES:

CATERING DEPARTMENT (KITCHEN): This functional space should have good access for both goods deliveries and to the nursing units. The fundamental requirement here is short direct and rapid connecting link between the kitchen and the nursing units. The fact that the former is a 'High Fire Risk' area with 'High Fire load' and the latter a 'High Life Risk' area deserves an instinctive intelligent compromise in their geography.

Drinks, beverages and emergency foods are prepared and the food brought from the main kitchen is received and distributed to the in-patients in the Nursing Unit.

There should also be access for staff to the dinning room from all parts of the hospital or health centre.

As earlier emphasised,the geography of the kitchen should be in a way such that there is avoidance of noise and obnoxious odours to the other centre's departments.

There should be as usual maximum natural lighting and cross ventilation in the kitchen which is always determined by the fenestration.

CENTRAL STERILE SUPPLY DEPARTMENT (CSSD): This is where sterile equipments, prepacked and ready for immediate use in the treatment of patients for all procedures. Size is determined by the daily requirement of the centre, layout must reflect workflow and should be close to the laundry, pharmacy and central stores.

Receiving, processing, sorting and issuing functions could lend themselves to a single administrative control.

LAUNDRY: This is for processing soiled linen for re-use. Smooth flow of work is always desired, e.g. press work doesn't cross with flat work and clean linens have no contact with dirty linens.

The basic flow of work is from collecting, sorting, washing, extracting, drying pressing, folding, storage and distributing.

The room should be well lighted and ventilated. It's ceiling should be higher than those in other departments of the centre so that heat will rise above the employees heads. Exhaust fans should be provided to remove this heat and maintain good air-circulation.

A sewing machine could be auxilliary in the laundry.

MORTUARY: This is usually in a small scale in the health centres. Functions present are the washing body room, the autopsy and finally the storage room. The ambulance parking space could be provided which should always be in close contact with the storage room. The mortuary should have a clear-cut circulation route that will pass through the service gate.

4.6. PLANNING PRINCIPLES ON A GENERAL NOTE:

Probably the most important factors to be born in mind or taken into account in the overall plan form of a health centre, whatever its size, are simplicity and clarity in the circulation flow of patients, and the need to avoid this circulation becoming confused with that of the staff. It is also desirable to combine clarity with an atmosphere which is comfortable and human is scale. No wonder, health centre designers advocate organic architecture. Some patients will be arriving at the centre for the first time, some will be visiting a doctor for diagnosis, treatment or follow-up others merely for a renewed prescription or the signature of a certificate. Some may be disabled or infirm, old or confused or may be in wheelchairs, some will have children or will come with relatives.

The movement of patients may be considerable and as far as is practicable must be separated from the movement of staff and the transfer of records from central storage to consulting rooms. Each doctor may be seeing a considerable number of patients an hour, and a group of two to three doctors may generate a patient flow, in and out, of big number an hour or a big number of journeys in one direction or another. It is important that these journeys should be short and simple

and should not conflict with other journeys that staff are making about the buildings. The patient should arrive at the consulting room in as relaxed a mood as possible.

In a strong note, circulation and clearity are architectural ingredients that deserved consideration at all moments.

4.7. FINAL NOTE AND CALCULATIONS:

PLANNING: The architect is thus in his planning procedures setting a problem of balancing three principal elements in the acute general hospital. The ward accommodation, the diagnostic and treatment departments and the out-patient accommodation. The second of these must be linked for easy communication to the first and third, and it should not be forgotten that the out-patient department may make little demand upon the main-in-patient theatres, but it is a large, if not the principal user of the diagnostic departments.

In my view, the major problems of future planning are first ease of communication between diagnostic and treatment areas on the one hand and patient areas in our out-patient on the other and second, the preservation of opportunity to expand or vary the use of the diagnostic and treatment areas.

> As Cumberlege (1955) put it, "Health is a state of complete physical mental and social well being and not merely the absence of disease or infirmity".
>
> "The hospital is housed in physically scattered facilities. As a result, it takes extra-ordinary efforts on the part of the bewildered patient or client-or special concern on the part of a public servant to focus all this fragmented but necessary services on an individual case. It is therefore the primary assignment of planners on all levels to explore institutional physical relationships that will actively co-ordinat the various diverse services and make them work together purposefully and cohesively and not as a patchwork.

> It follows that one of the needs - as much real one as beds and facilities is the need for planning itself and for dynamic concept of relationships that will ,ull the system of facilities together into an integral organism".

The hospitals earliest purpose was the protection of the community from the contagiousness of the accursed few - a kind of care which was provided for a suferer, from a slow crippling and repulsive killer of unknown and uncontrollable origin.

Trying to present some final notes on some departments or functions, each surgeon and some nurses must scrub their hands and forearms for a stipulated time in advance of the operation. A deep and spacious sink or a continous trough, with a mixing faucet having a spray spout controlled by a knee operated valve is used. The antiseptic soap is dispensed from a foot pedal operated bottle and spout on a separate stand.

The preparation and anaesthesia spaces are where the patient is first brought for pre-operative preparation and anaesthesia induction in terms of the former. There is a danger of explosion while anaesthesia equipment is being used due to the fusion of some anaesthetic gases.

Emergency or consulty unit in a health centre is one big first-aid department. It is part of the out-patient department and gives life saving services needed immediately upon admission of accident patients or those that fell ill suddenly.

Emergency patients as earlier said, may require, laboratory tests, x-rays and surgery. Due to this need the department should be located close to the surgical suite, x-ray (radiology), pathology (laboratory) and the admission office, because the patient after emergency treatment is in most cases than not admitted. The department consists of: ambulance parking, reception of patients and waiting, preparation room, minor operating room, etc.

USEFUL CALCULATIONS: NUMBER OF BEDS:

WHO or NARD advocated about 3 beds per one thousand of the population of the catchment area in urban areas and a maximum of 2 beds per one thousand of the population of the catchment area in rural ones. These were for hospitals, not clinics, sub-health centres and comprehensive health centres.

For my health centre, that of the rural areas is taken and calculations are as below: with rationalisations:-

- 1 bed per 1000
- population of catchment area equals to 120,000.

Number of beds equal 1/1000x120,000 = 120 beds.

This is too much to carry the weight of a health centre which suppose to obey the referral system of therapy. Thus this was divided into parts and half (½) taken.

½x120 = 60 beds.

This number was to be shared as seen in the breakdown below

- Medical ward 24%
- Surgical ward 33%
- Obstetric ward 19%

The breakdown above was given by WHO.

Calculating these, the author finally came up with the following results:-

Medical ward		15 beds
Surgical ward		20 beds
Obstetric ward	Maternity	10 beds
Paediatric ward		9 beds
Others (isolation)		6 beds
	Total:	60 beds

But because of inevitable expansion in the near or far future, about ninety beds are provided.

The nomenclature adopted in the naming of the wards was different from the above. Instead, male, female, children and maternity wards were used. The medical, surgical and isolation wards shared rationally.

CONSULTATION ROOMS: The formula to be adopted for the calculation of the number of consultation rooms is $Y=\frac{mxt}{S}$ where,

Y = critical number of sessions required.

M = Average consulting time in minutes.

S = Total length of each session in minutes.

If r = number of sessions held weekly

c = critical number of consultation rooms required.

Therefore, let M = 2184 for the whole centre.

T = 5 mins

S = 7 hours - 420 mins.

$Y = \frac{2184x5}{420} = 26$

Let r = 6

then c = $\frac{Y}{r} = \frac{26}{6} = 4.3$
4

= 4 Consultation Rooms.

Todd Wheeler suggested 2 examination and treatment rooms per consultation room.

OPERATING ROOMS: FACTORS: Total number and kinds of surgical operations to be performed.

- Schedule of operations by days and hours.

Assuming a 5 day average stay and 100% maximum occupancy of a 60 bed health centre. The number of operation rooms of which 20 beds are surgical will be equal to:

$$\frac{20\text{beds} \times 100\%\ \text{occupancy} \times 365\text{days}}{5\ \text{days average stay}}$$

= 1460 operations per year.

A full day's schedule 8.a.m to 3.p.m. 5½ days per week.

The number of operating rooms required by the health centre is now equals to: $\frac{1460\ \text{(operations per year)}}{287\ \text{days} \times 3.5\ \text{per room per day}}$

= 1.45 rooms, approximately equals to 2 rooms.

Recovery beds if present in the operating suite should be 1½ to 2 beds per operating room.

OBSERVATION BEDS IN THE CASUALTY DEPARTMENT:

General rule is that there should be four in two rooms (minimum) for separation of males and females, plus an additional two for each 100 hospital beds over.

Example, a 500-bed hospital will have four observational beds in two rooms in the emergency unit plus 2x4=8 beds, summing up to 12 beds.

Observational beds are not inevitable in my centre and they are not employed.

CAR PARK: Neufert advocated five parking bays per one consulting room and 1.5 of it should be for staff in each consulting room.

There are four consulting rooms therefore, number of parking bays equals to 5x4 = 20.

Staff parking bays = 1.5 x 4 = 6

= 6 parking bays.

WALKING DISTANCES: Maximum walking distance from bed to WC=12m. Maximum distance from Nurses' station or duty room to furthest bed = 20m.

OBSERVATION: 50% of beds should be visible from Nurses station.

CONTROL: Day room must not be too separated or isolated from the rest ward.

NOISE: About 40-45 db by day and 35-40db by night in multi-bed wards such as the Florence Nightingale.

One-bed wards should be 35-40 db at all times. Busy courtyard can create problems of noise from adjacent windows.

CHAPTER FIVE

INTEGRATED HEALTH CENTRE KWOI: REGIONAL, ENVIRONMENTAL INFLUENCES AND SITE ANALYSIS (CLIMATIC AND MICRO-CLIMATE INFLUENCES)

PROJECTION LOCATION IN STATE, AND LOCAL OR DISTRICT CONTEXT:

Kwoi, a district headquarters of the Jaba from time immemorial has been influencial in the social economical and political upbringing of the Jaba populace. Apart from being an educational centre it has from the roots being a trade confluence point. The political potentialities of the village and its accompanying administrative capabilities have made the village not only a reference point in southern Zaria but a place desired always to be visited by people.

Although the entire local governments of Kachia and Jema'a of the State (Kaduna) have been from the past been a neglected part of the state, Kwoi and its environs have been showing some considerable and remarkable manifestations in their dear struggle to survive.

Because of the presence of access routes to the site which are coming from the heart of the town to Koffi, the road that runs from Kafanchan to the site (Trunk B) and the one that passes the site from Kaduna, the trunk B road since accessibility is one of the strongest keypoints in the sitting of such projects, this makes the site the most suitable one above all.

The site which is at some 1½ km away from the garage is relatively flat when moving to the east. Towards the northern part, it is a bit slopy with a slope difference being considerable. Along side this slopy side is a stream that runs from far west having its

source from 'Gidan Lolo'. It is evident therefore that drainage system will be directed towards this slopy side as this will be more economical.

Planning of buildings will take the course of the flat land with openings generally facing the North-South direction running away from glare from the West-East orientation.

Descriptions, explanations, analytical facts are presented in such a sequence that starts from the regional environment to the city location and ending with a critical look at the site with all its micro-climatic influences may be a means gearing towards a better orientation of the site.

To also have a good understanding of the site location as choosen certain geo-physical, socio-economic and political factors are to be discussed to get a good view of the mechanisms that influenced the site development and the final design solution. By and large the essence of the whole involvement is to explain the consideration in project location and site selection and discover facts for evolving a design concept acceptable to the situational acchitectural intellectualism and input.

5.2. PROJECT LOCATION:

The isolation in which Kwoi is stated as the centre of gravity or focal point of the Jaba community was may be for reasons of strategy, administrative control, political base and communication. LOCATION: It has been said many times in this write-up that Kwoi district is bounded by Plateau State to the South, Kagoma district to the East and Kagarko district of Kachia Local Government Area to the West. To the North, Kwoi district is bounded by Kachia, the Kachia Local Government headquarters.

The Trunk A road from Kaduna through Kachia to Kwoi, the trunk B road from Kachia through Kafanchan to Kwoi and the Trunk C road from Kafanchan to Kwoi are the major roads that encircle the district coming very closely to the site, the road connecting Sabon Gari and Kwoi is the only one passing through it and thus the possibility of having one directional ingress. The Kafanchan road is about some 100 metres away from the site and the stream that demarcates or bifurcates the two would make it uneconomical for any possible ingress from this direction..

5.3. PHYSICAL SETTING:

TOPOGRAPHY AND GEOLOGY: The area lies on gentle undulating plains of about 550-700 metres above sea level with some average flat plains intermittently found after some walking distances. The igneous rocks to the metamorphic rocks superficial deposits include older and younger alluvium grey-brown sands, clay-red sands and gravels of 15-40ft. thick are also present, Younger alluvium consists of grey-brown sands, silts and clays of up to 30ft. thick. Kaolinitic gneisses and granites are suitable for pothery and possible block manufacture. Granite rocks are usually employed in foundation laying of houses.

CLIMATE: TEMPERATURE: Highest temperature is recorded in the dry season.

Effect of temperature is due to close cover during the rainy season. In January, the highest temperature difference between the maximum and minimum is always recorded.

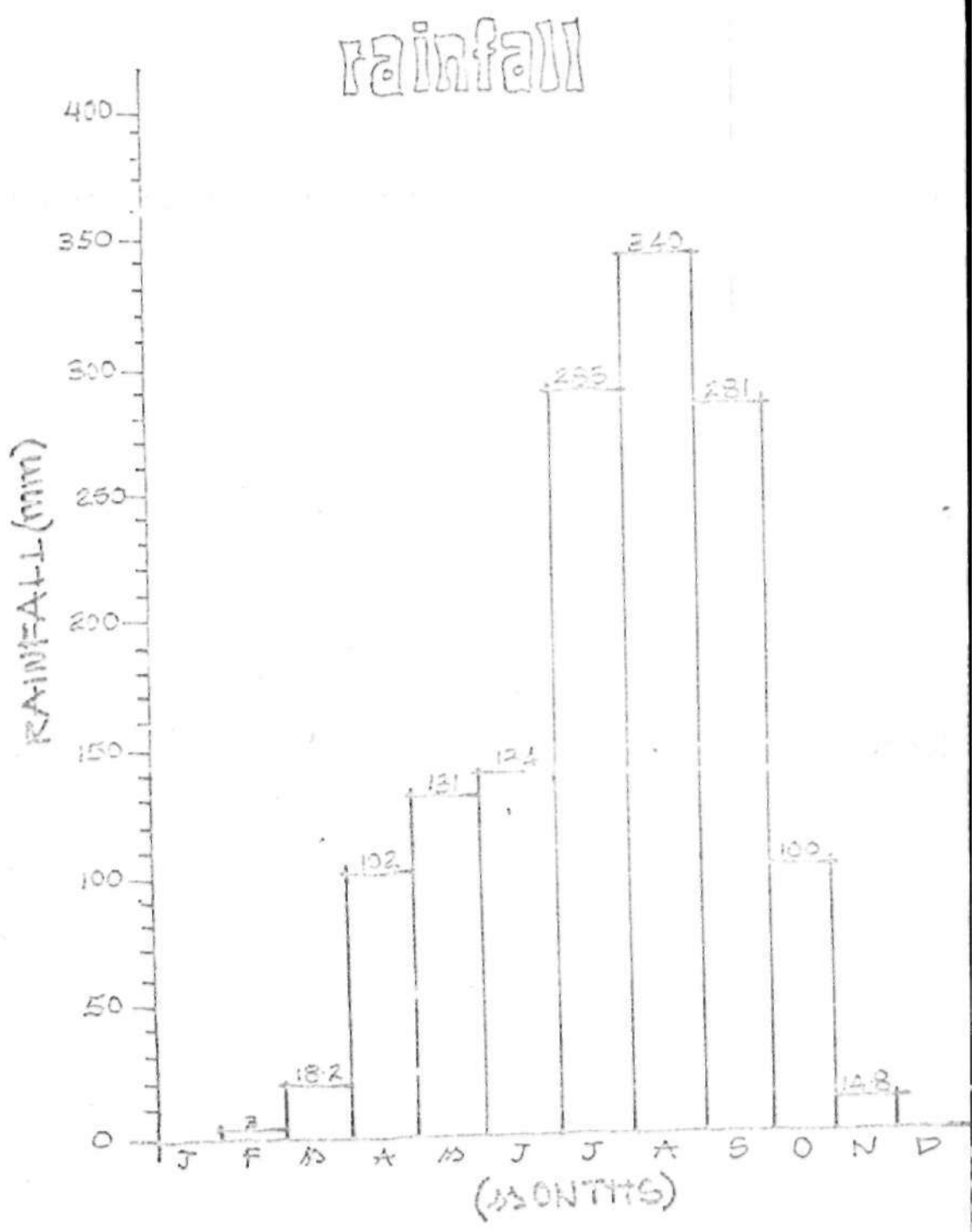
RAINFALL: In the months of October to March there is usually little or no amount of rainfall recorded. Rainfall reaches its peak in August with about 340mm. The months of November at times do record a maximum rainfall of 15mm.

EVAPORATION: In the months of may be March to October evaporation is always in the increase, may be because of the high temperatures and may be because of the absence of cloud cover. Being highest in March and lowest in the month of September, evaporation is not aided by rainfall, that is why its not severe in the area. Architecturally, evaporation has little or no role to play yet it is important to know its characteristics, may be for psychological reasons.

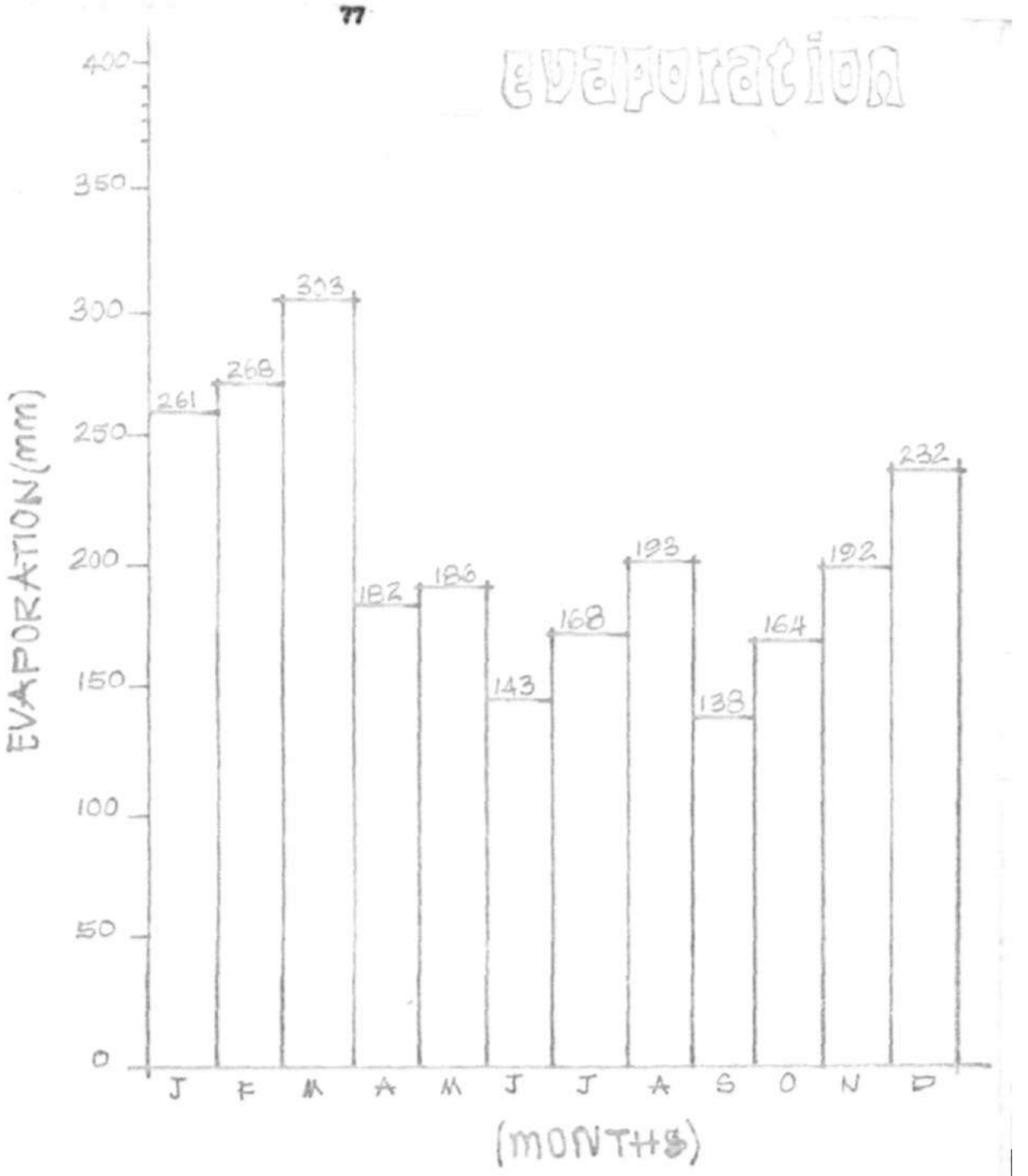
RELATIVE HUMIDITY: Humidity is highest in the month of July with the highest lowest difference recorded in August which is invariably the highest concentration. Relative humidity is advocated in this area since the tropics need it. This is the amount of water contained in the air.

WIND RUN: Because the south-west trade wind is more effective in April, the wind run is highest during this time, and because it is less in October, the wind run is lowest. Fenestration of buildings is affected by wind direction. A conscious design always take care of this problem, since natural ventilation is necessary.

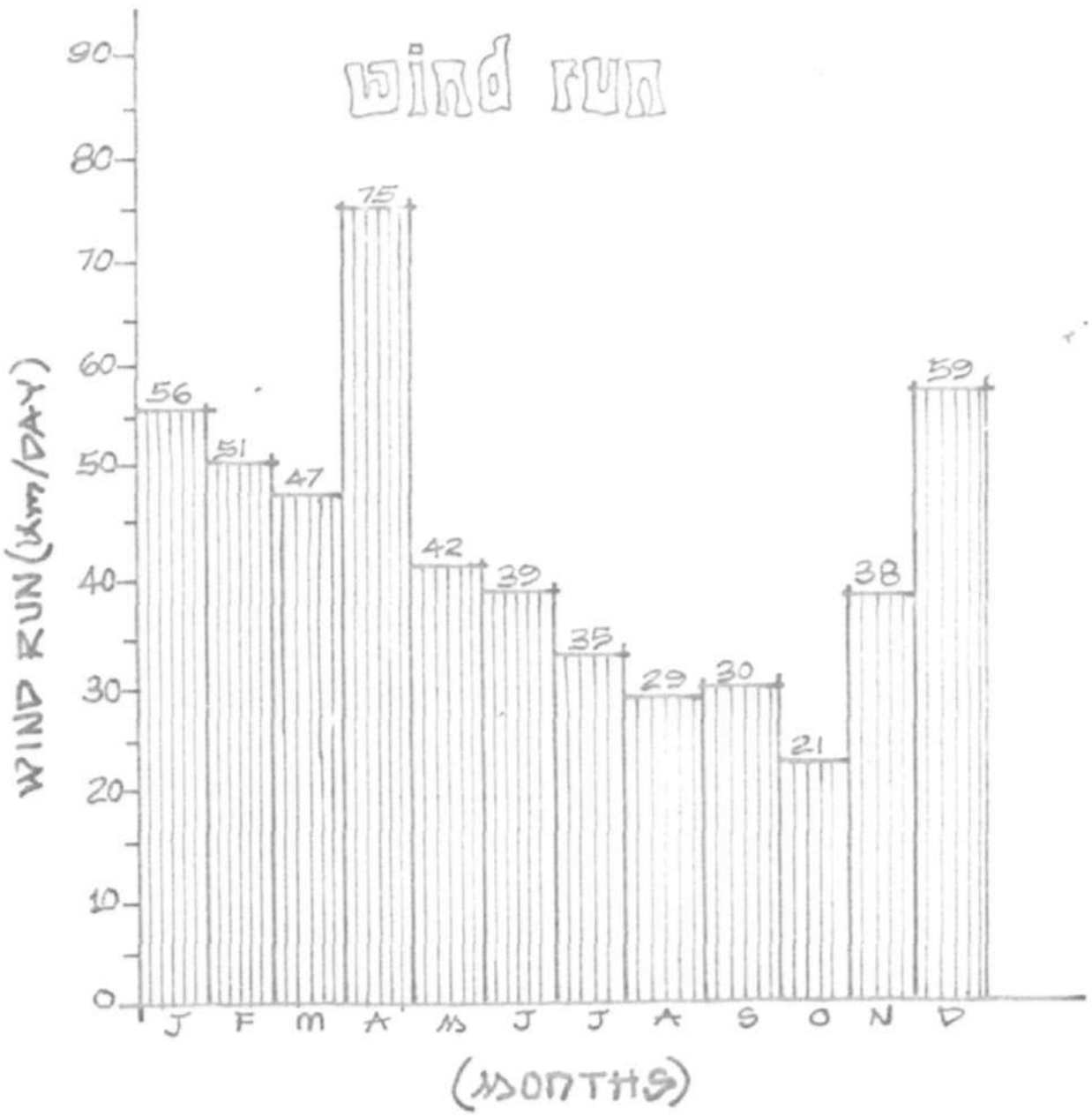
Architectural designs in this area and the country at large have to take care of the effect of temperature, openings have to be provided with the right fenestration, shading devices have to be provided where they (openings) appear on the East-West direction.



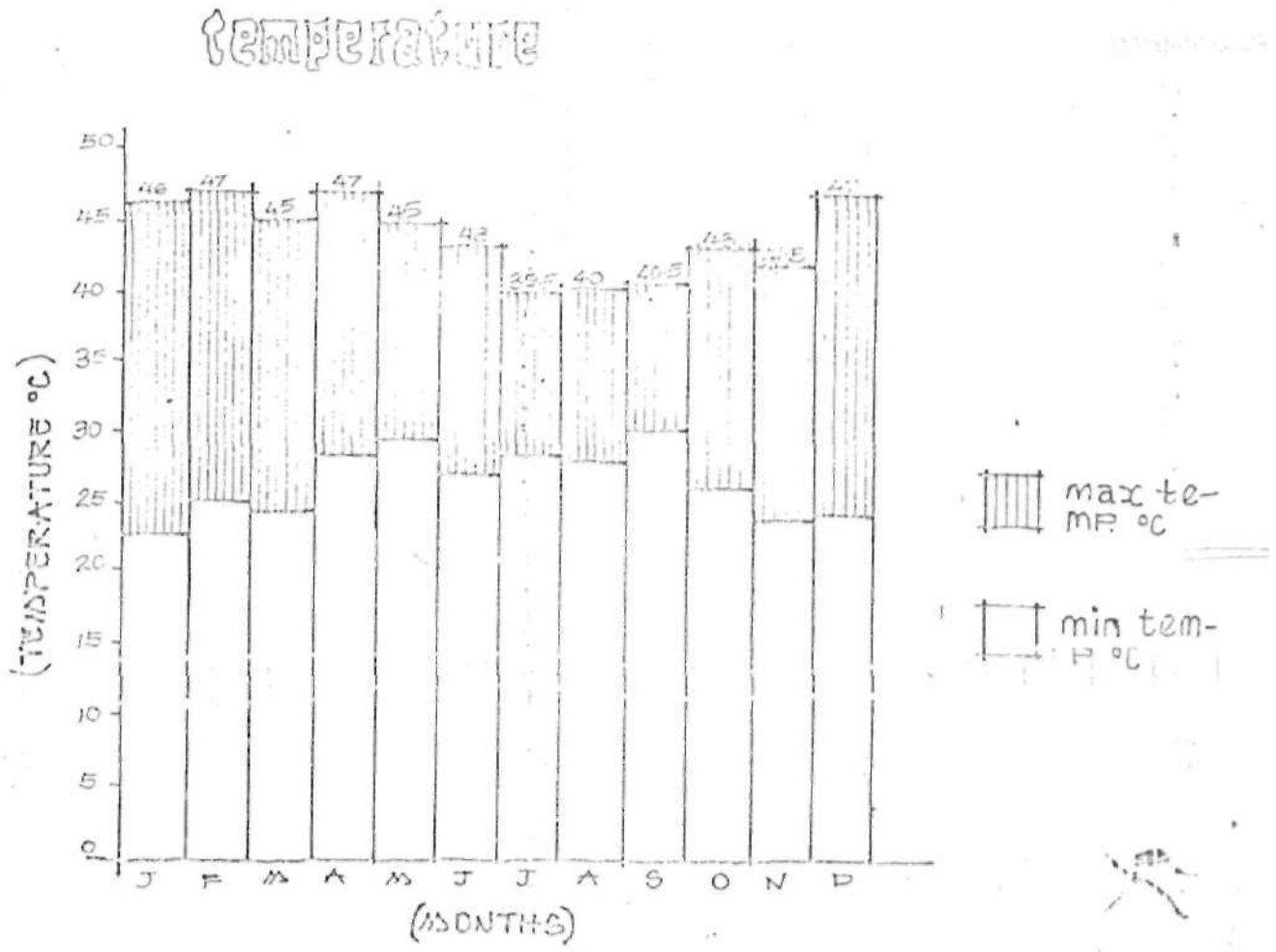
KAFANCHAN AVERAGE RAINFALL (M
FOR 1973-1984



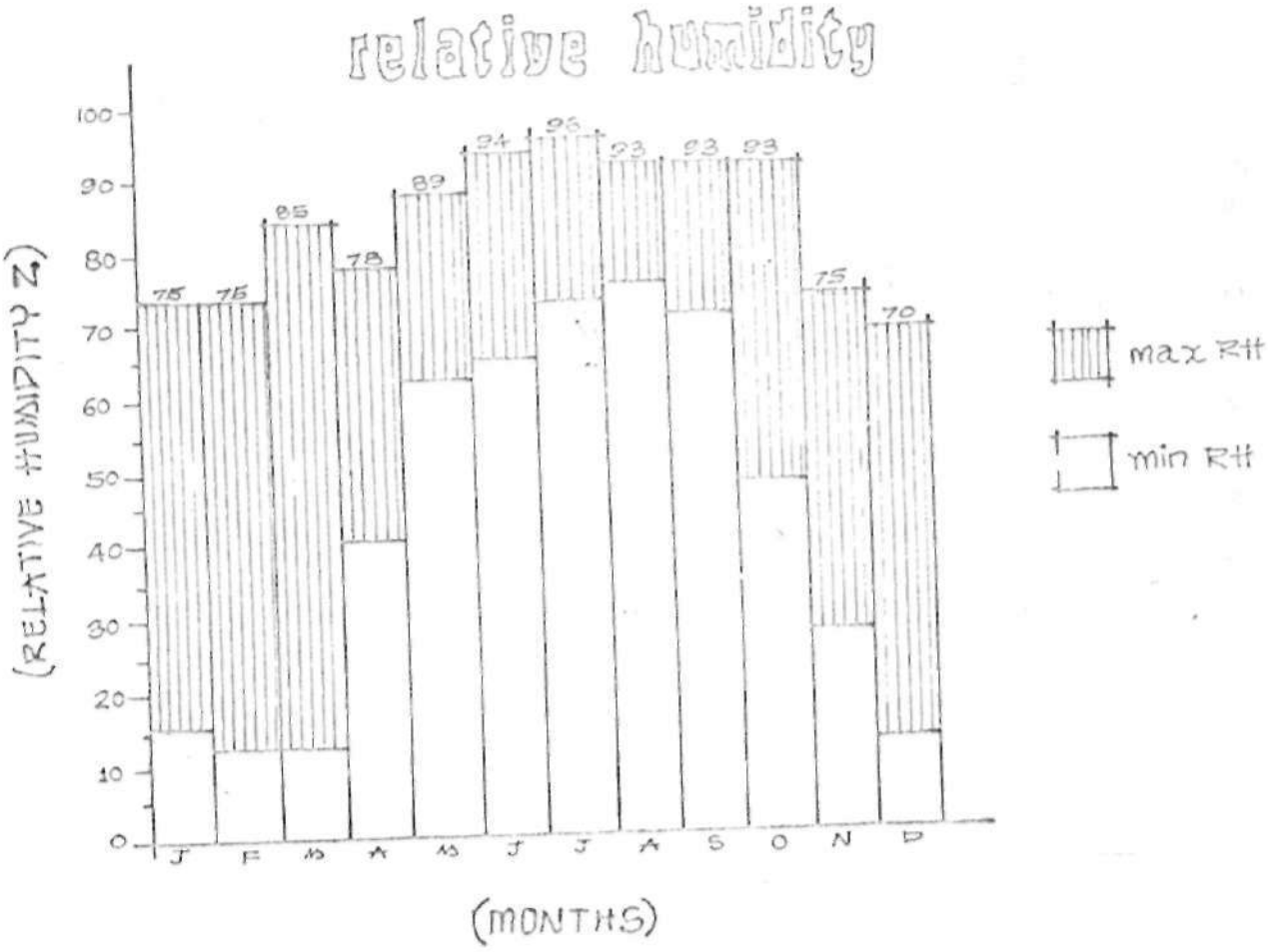
KAFANCHAN AVERAGE EVAPORATION IN (MM)
FOR 1973-1984



KAFANCHAN WIND RUN IN Km/DAY
FOR 1973-1984



KAFANCHAN AVERAGE TEMP °C
(1973-1984)



KAFANCHAN MONTHLY RELATIVE HUMIDITY %
FOR 1973-1984

Choice of materials should reflect the heat generated by them infact, designs have to be tropicalised.

Since there are at times periods of high rainfall, proper drainage system both at the roofs and on the ground should always be thought of as total neglect might create waterlogged surroundings and other associated problems, pitching of roofs, proper workable roof joints details paved areas, covered walkays etc could be remedifying steps towards achieving optimum comfortable environment.

VEGETATION AND SOILS: The vegetation of the northern middle belt falls within the northern guinea savannah. Matured trees and long and hard elephant grasses could be seen growing in this area. Because of the vegetational advnatage of the area, the top soils are relatively fertile for agricultural purposes silty soils on top then overlying sedentary decomposed rock. Soils become water-logged during rainy seasons, thus need for paved walk ways. Laterite soils available are nuisance to agriculture but could be adventageous or useful to foundations of buildings or the buildings themselves since they (laterite soils) solve the probelm of differential settlement.

HUMAN ENVIRONMENT: History has it that the Jaba people originated from Egypt and first settled in Bauchi State before travelling down to Bitaro. It was from Bitard that the populace emerged to different settlements may be after the wars and counter wars.

Population of the district is presently about 120,000 with the breakdown as follows:-

Kwoi Area	48,910
Daddu Area	14,050
Chori Area	13,027
Sambam Area	12,663
Nduya Area	12,535
Feri Area	12,035
Nok Area	7,500
Total:	120,600

This breakdown was since 1979/80 population statistics. New figures are bound to emerge with the indiscriminate giving birth of young adults and unwanted marriages.

As per Industrial and commercial activities these have not been fully around. Fridays which are the market days for Kwoi, see people with the only source of income - their farm produce. Administratively and economically, Kwoi is a reference point in the set-up.

5.4. DESIGN CONSIDERATIONS:

ACCESSIBILITY: The site is very much accesible to all villages and to all the people without much headache. This is evident in the fact that it is strategically located so as to create no complication when one comes to the centre. From the general motor park, since there are no town service taxi cabs, the commercial vehicles will always take patients down to the centre. Accessibility which is a very strong phenomenon when it comes to architectural language it's highly achieved as far as this project is concerned.

CIRCULATION: Circulation within the various departments or units of the centre is yet another factor that deserves attention. The architect must make sure that patient is directed from one unit to the other without much confusion. This could be achieved by adopting a concept that doesn't complicates the general circulation routes, a concept that is simple with yet some architectonic language is the answer to circulation problem. The rectangular circulation routes is adopted as this separates each unit with simple connecting routes. At the out-patient department a new patient can always get his/her way through with the direct access routes to the ancillary services and public health which are at forty five degrees and the direct perpendicular route leads one to the nursing units.

RELATIONSHIP OF UNITS: Relationship of functional units is an architectural necessity to be achieved if a design is to be functional.

It's clear that one specific department or unit may need to be in close contact to a particular unit than another. For example the examination rooms should be in close proximity with the general waiting area. The two can't be kept at arm's length or designed in isolation and expected to function well.

A functional relationship diagram was thus produced for each unit just as the earlier units functional diagram was produced. This however made my functional relationship of units and functions a success as every unit seems to be working as it should be the case.

FUNCTIONALITY: Functionality goes with relationship of departments. For a design to be functional, a thorough understanding of relationship of units must have been achieved and demonstrated architecturally in the planning concept. Functionality when successfully achieved, doesn't complicate circulation, but does ease it. To the best of my knowledge, I think this has been achieved in my planning concept and the design.

AESTHETICS: Architecture speaks well with some aesthetical elements adopted in its facades. No wonder Le.Corlonsier adopted the free facade principles.Where a facade doesnt present some aesthetical components that are adoptable by the type of design to conform with widely accepted school of thought in architecture that 'form follows function, the architectural input of the architect is always considered a failure and a flop. After all, every person can sit down with a pencil and begin to give you a functional relationship sketch of units that could be logical. The architect is to assume his leadership and professional role when he treats his facades with a difference, exploiting all those natural creative qualities in him/her that will present a conducive environment and do away with sight discomfort. I mean, architectural facades designed by architects should be appealing to the eye and mind. The very few elements adopted in my elevations at the same time as shading devices do not depart from the quality of the project, nor do they speak less of the quality of same.

5.5. SITE ANALYSIS:

As earlier mentioned, the site is found between the heart of Kwoi and Sabongari on the way to Keffi in Plateau State. The site has no spectacular feature since its essentially a farmland. The presence of trees at uneven positions and more especially towards the stream or river, sort of create an impression that the land or site has been a fallow one for quite sometime.

A footpath is passing through the site may be as a short-cut for pedestrains passing to one of the clan in the town called Ngarshang where a new Day Secondary School wes sited. Overlooking the site are some low hills and it is through this site that lovers find their way to the hills for picnics and other social gamborees.

5.5.1. SITE PHYSICAL NATURE AND LAND-COVER:

The physical characteristics of the site in terms of topography, geology, vegetation and soils, temperature or climate is as discussed in the previous sub-headings. More closely and specifically, the topography of the site is never rugged, but rather relatively flat as one progresses from the possible ingress to the east. Found to the north and south of the site are slopy areas with slope not up to 5%, since there are no up-to-date topographical maps to compute an exact figure. Geologically, there are rocks on the site. Found only but at distant spacing, are the granite small stones which are only usable in flooring.

The vegetation of the site as earlier pointed out in the early chapters is only trees and some elephant grasses spaced at intervals. Otherwise the site is farmland.

Soils consist of the clay soils, the silty soils and the thin laterite soils in the southern part. These laterite soils are nuisance to agriculture. Climate is a wide phenomenon, describing it for the site invariably means describing that of the whole area, since there is no close contact geographical specificism in climate.

5.5.2. DYNAMIC LINES AND SITE GEOMETRICS:

The site is bounded to the west by the Kwoi-Keffi road, to the north by the river and at a distant by the Kwoi-Kafanchan road. To the east and south the site is bounded by farmlands. The shape of the site is almost rectangular. Infact this was my own wish since there were no site constraints, I wes to take my portion and I did. Any shape could be taken, after all.

There are no traffic problems as far as the site is concerned. If the hypothetical idea of the whole exercise is to be made realistic, then traffic problematics could only be along the Kwoi-Keffi main road. The pedestrian route almost bifurcating the site into two identical halves, can be controlled just as it has been done as demonstrated in my site planning.

5.5.3. SITE ACOUSTICS:

Site acoustics to every design or project are problems that should always be planned against. While some functions are sensitive to acoustic problems, some tend to contain them. This hierachy should be obeyed but synchromically obeying the intact functional relationship whatsoever.

The sources of noise to the site are never many, since there are

The only source of noise here is the noise from moving vehicles along the Kwoi-Keffi road. However, good site zoning as mentioned above, good landscaping with trees and proper segregation of noise zones from the site could be noise remedifying steps.

5.5.4. SITE MICRO-CLIMATE:

The south-west trade winds, the North-east trade winds which blow from the south-west and north-east directions are always welcomed and unwanted respectively. The south-west trade winds originates in the atlantic ocean and brings rainfall. Its cold and humid with average speed of 2.52 m/s. This is always desirable.

The North-East trade winds with its origin from the Sahara, causes harmattan. Its dry and dusty with an average speed of 1.98 m/s. This is not desirable. Infact trees are always planted in this direction to trap the effect of these winds.

Solar track direction is the east-west direction. The sun rises from the east at dawn and sets to the west in the evening.

5.5.5. CONSIDERATIONS:

a) Buffer or noise trapping provision all roud the main road (trees).

b) Main entrance should be along the main road passing by the site.

c) The flatness of site has some accompanying drainage problems. A more careful system should be designed for this situation.

5.5.6. DESIGN CRITERIA:

- The whole land surface should be treated against unforseen waterloggeness of sections. This could be done by identifying likely drainage problematic zones and drainage paths provided.

- Where materials need flexibility, they should be emphasised in the design.
- Use of various levels of land scaping could help maintain an organic atmosphere that is worth accommodating patients and the people in general. This will however provide some cooling effect.
- Vehicular movements should be controlled on site in order to maintain order.
- The freest possible circulation pattern should be provided in any design.

5.5.7. DESIGN PROPOSAL AND SPONSORSHIP:

This thesis topic was chosen hypothetically, even though the moving spirit was not without the ever obvious fact that such a project is needed in the area. Apart from trying to satisfy Users' need, the associated architectural problem of Noise was picked out for thorough architectural diagnosis.

The sponsors of this project are the Kwoi districts inhabitants, the Local Government (Jema'a) and the Kaduna State Health Management Board.

ARCHITECTURAL PROGRAMMING AND CONCEPT EVOLVING

PROGRAMMING: DESIGN GOALS AND OBJECTIVES:

Right from the genesis of this report, the goals and objectives were already stated as it is aware, these were guiding principles to discover more facts and information. There is every need, nonetheless, to re-evaluate those statements with the view of arriving at some definitive design goals and objectives based on data collection and analysis of facts and figures.

GOALS: To bring back into life the dying culture of the Jaba people in terms of health traditional practices even at a more conducive and hygiene conscious atmosphere that will research into Oddities with the prime desire and hope to evolving a working standard.

An architectural atmosphere or environment serving as a therapeutic milleu for the dying populace of the Jaba people has an instinctive base in the choice of this thesis topic.

A centre that after some architectural considerations of site constraints, location and proximity to the entire catchment area, will be strategically located in terms of accessibility and centrality. A radius of say 15km from the site okay to some extent.

That one is able to achieve some cultural involvement in the therapeutic and diagnostic procedures is an everlasting achievement. Traditional Birth Attendants if well trained could actualise this proposal.

OBJECTIVES: Major objectives in the architectural content are to encourage the interaction of the people and give them a sense of liveliness and belonging and in syndromy instiling some air of value and humanity with some privacy reflecting sex difference and unity.

5.6.2. RE-IDENTIFYING THE PROBLEM:

Re-identifying the existing problems on site has to do with these four basic keypoints in architectural designs:- Function, form, economy and time.

FUNCTION: The function of the centre is the keypoint at stake. Whether the centre is going to serve its purpose or not, by its location, erection at this site. These are the initial questions I had in mind before making my conclusions. Anything that was within my reach in order to making the hypothetical content of the whole work have a hypothetical reality in terms of function was actually done.

FORM: The form of any structure has to go with the function. A building meant for performing acts should show even from the outside or physical facades. Similarly, a health centre has to look as a health centre. This will be achieved in the architectural finishing input and the conceptualisation of the finished product. This was taken care of in this thesis/dissertation.

ECONOMY: The project is intended to be executed by the trio's efforts of the people, the local government and the Health Management Board of Kaduna State. Whatever structure adopted, whatever material and finishes employed should be reflected and weighed with the economic viability of the people, whether they could contribute towards achieving the structure proposed, whether the coming by of some finishes is plausible or not and so many intelligent considerations. The quest and craze for aesthetics shouldn't be over-elaborated by irrationality, but should go hand in hand with economic plausibility. At these times of economic squeeze starting from the top of the ladder to the bottom in the political hierarchy, designs should always be economy conscious.

T I M E: The time by which a structure or a project should be completed is yet another problem that architects, contractors, Quantity Surveyors, Engineers, Sub-contractors, and all the remaining personalities in the building industry should address themselves towards. The type of structure proposed may not fit into the time of completion wanted, a compromise will have to be reached as unforseen problems can crack up at a time one is never in the least expecting. Time is a concept that has respect for history with projection into the future.

5.6.3. THE WHOLE PROBLEM:

The enumerated problems above plus some unechoed considerations make the whole design problem to be an Integrated Health Centre complex.

A health centre or any complex that serves a diagnostic and therapeutic function in a down-to-earth and organic perspectives and holding humanity as the only strong 'constant' of the living animals will have to be identified in three categories, with unnumbered associated planning, siting, constructional or functional problems.

The out-patient department of the health centre is supposed to be the biggest even as it houses almost all the functions of the centre. It is here we have the clinics which include, Dental, Opthalmic , obstetric and gynaecology, orthopaedics and paediatric clinics. The adjunct facilities or services are also located in this unit, the laboratories, pharmacy department, the X-ray unit, Eye, Ear, Nose and Throat (E.E.N.T.) clinic etc.

Following almost directly the out-patient department is the Nursing Unit. This is basically the unit that houses the Nursing beds and some auxilliary necessary facilities. Naturally, these beds are not meant to be too elaborate and shouldn't be exaggerated in number.

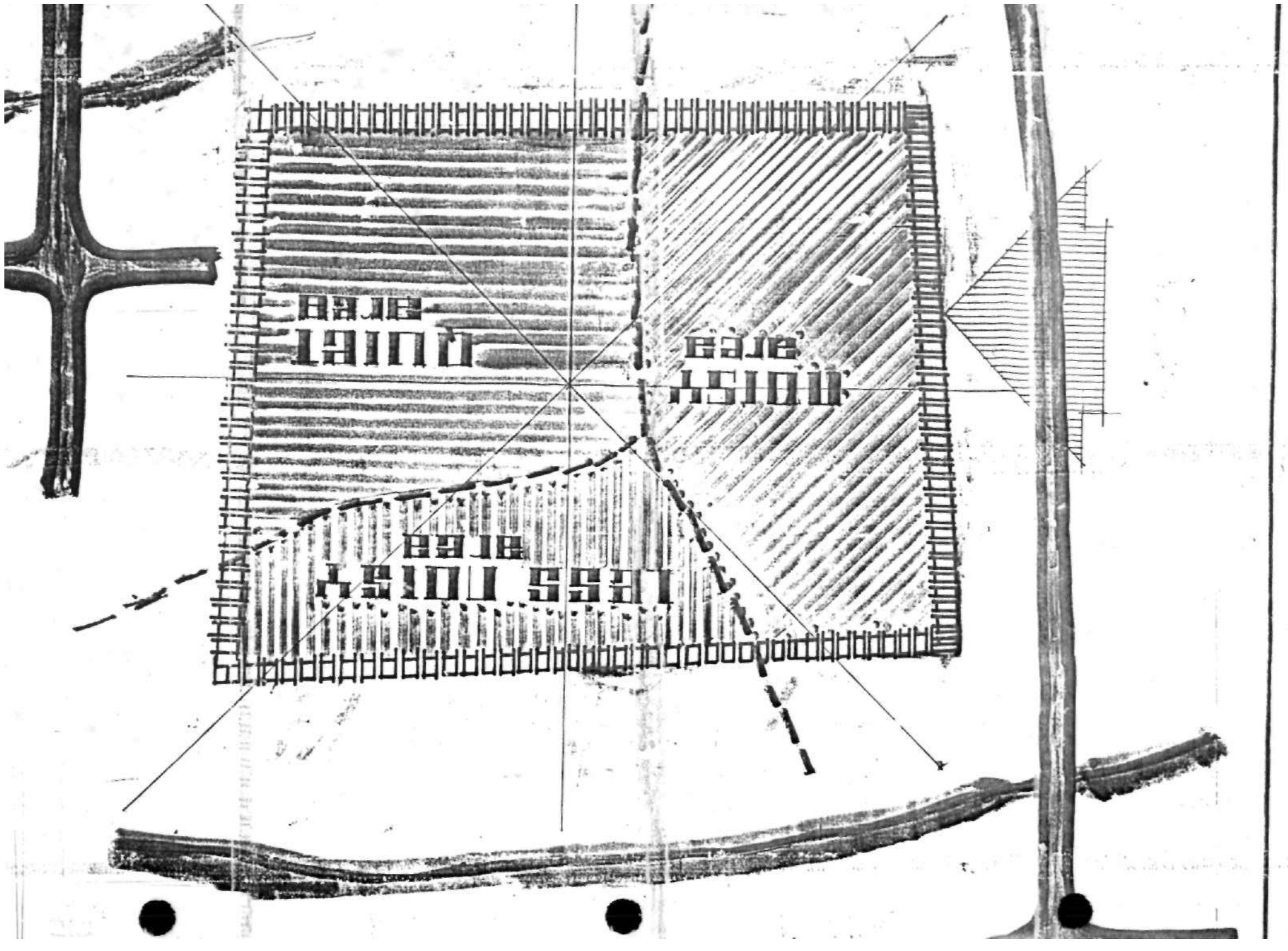
The ancillary services unit which is the third and the last unit concentrates those functions that are supplementary or supportive to the therapeutic processes. The mortuary, the central sterile supply department (C.S.S.D.), general store, kitchen, Laundry, the maintenance unit and others. The health centre will cease to function successfully and as a homogenous whole with the absence of these supporting facilities.

Academically, a health centre complex is not left without some challenges. It is known that health buildings are always associated with problems like Noise control, fire protection and traffic lines to mention but a few. I have decided to descend on Noise control with all/my might in order to tackling its problems optimumly if not maximumly. The site zoning design concept, finishes, landscaping and the general planning could go a long way solving the problem of noise control.

5.6.4. SITE DEVELOPMENT AND CONCEPT:

The development of site or its concept is akin to the associated problems of site, spectacular features and what have you.

As there are no striking problems and features on the site, development and concept or zoning of site was based on-site circulation, and approach, site acoustic (leading factor) and-priority of functional units.


Base
Base

SITE CONCEPT / STRUCTURE

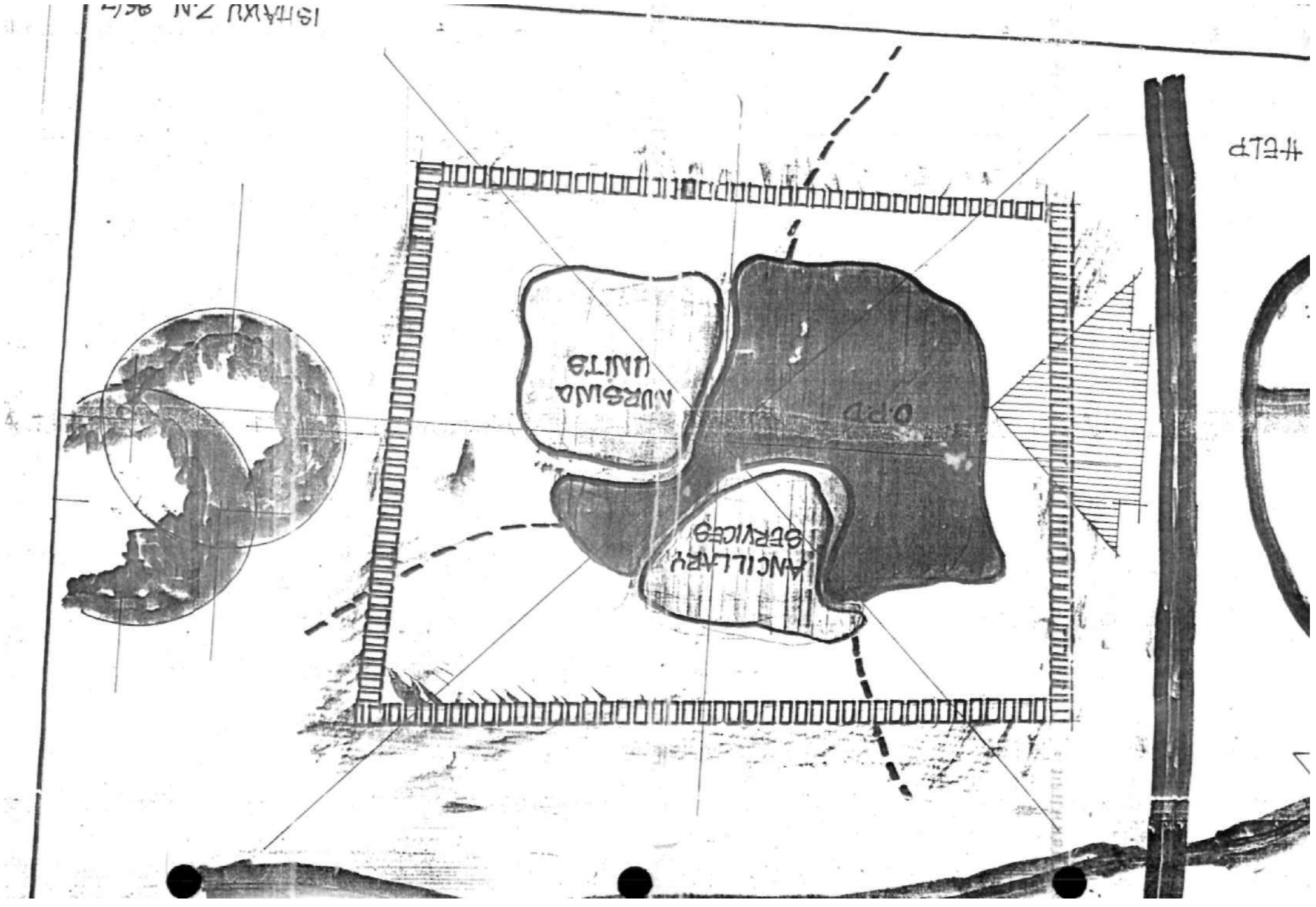
NOISE:

OUT-PATIENT DEPT. CAN TOLERATE A BIT

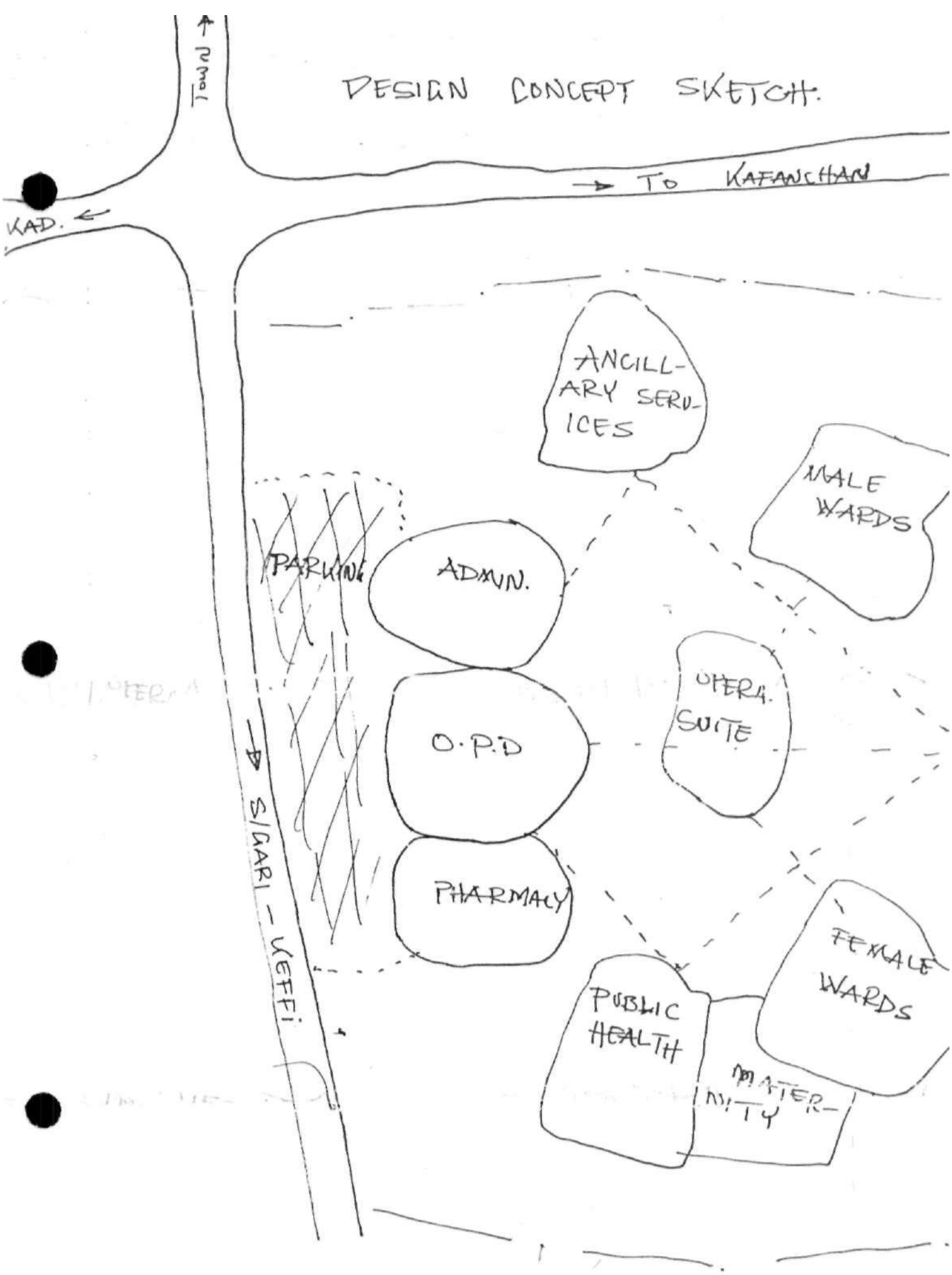
NURSING UNITS - CANT TOLERATE AT ALL..

ANCILLARY SERVICES. CAN TOLERATE TO A GREAT EXTENT.

NB: ALTHOUGH THE ZONING RESPECTS THE ABOVE, THEIR FUNCTIONAL RELATIONSHIP WAY ALSO RESPECTED.


NURSING UNITS
OPD
ANCILLARY SERVICES

DESIGN CONCEPT SKETCH.



CIRCULATION AND APPROACH: Development of site in this respect reflects pedestrian movements, vehicular movements and service or delivery routes. The main entrance into the complex is almost directly facing the general waiting area almost overlooking the parking area for the administrative unit and the patients. The vehicular route is controlled at this point and any other passage along this direction is pedestrian oriented. Delivery route or service yards are served by a service road entering the complex through a supplementary gate. Inside the site, parking is the first to be considered (administration and delivery or service parking) followed by the real structure in compartments.

SITE ACOUSTICS: Parking areas, all sensitive noise areas, should be conceptualised in a way that they are away from areas that don't tolerate noise. Such areas are the Nursing units, and may be the clinics.

PRIORITY OF FUNCTIONAL UNITS: Public and non-public segregating areas with the appropriate approach systems. Priority of functional units when one enters the gate is the out-patient department, the Nursing units and the ancillary services which can come at either side of the hierarchy.

The site concept is evolved so that there is a segregation of movements and approaches between areas or public use and those units to serve as therapeutic and diagnostic areas, ancillary services and administration.

5.7. MAJOR FUNCTIONAL DIVISIONS:

Basically, a health centre has three units, the out-patient department, the Nursing Units and the anxillary services Unit. All these units are subdivided into fundamental units as already mentioned above.

5.7.1. *DEFINITION OF UNIT SPACES:*

O.P.D.: The out-patient department (O.P.D.) is the first to be approached in the centre with numerous functions. First and foremost, it is the unit where the reception and card rooms are located, for registration of new patients and card collection for old.

b) It houses the casualty department, where emergency treatment is rendered.

c) It is the centre at which continuation of treatment is provided for patients who had been discharged from the centre.

d) The consultative centre for specialist investigation and treatment which cannot be efficiently given in the home but does not necessitate the admission of the patient to a health centre or hospital and to which patients from local authority's clinic may be referred.

e) The out-patient department in case of a health centre, houses all the clinics (Dental, Orthopaedics opthalmology, Paediatric, (E.E.N.T etc.) and the adjunct facilities such

While in the case of a hospital, be it district, community or general, these units have individual departments and function to a fair degree in isolation and independently even as they are always self-contained in terms of social facilities such as toilets, dirty utility, storage etc.

NURSING UNIT: This is where a patient is put to bed, fed and kept comfortably and provided with necessary nursing attention from the time he/she is admitted to the time he/she is discharged.

Nursing Unit is basically divided into three, the medical nursing unit, the surgical nursing unit and the maternity nursing Unit.

MEDICAL NURSING UNIT: This is where patients with medical nature are accommodated, e.g. Neurology etc. patients here are admitted without proper knowledge of the disease. They stay longer in this Unit, comparatively. Thus number of bed here must be more.

SURGICAL NURSING UNIT: This is where patients of surgical nature are accommodated. This includes cases of gynaecology, rectal, genito-Urrinary etc) patients require surgical suite, emergency suite and X-ray, thus there is need for their close proximity.

MATERNITY NURSING UNIT: This consist of both ante-natal and post-natal beds. Beds of these two places should be separated. Maximum flexibility of beds should be employed in the design of these places.

The number of beds in a health centre is always minimal, because a health centre is meant to follow the referral system of medication. Sophisticated facilities are therefore minimal.

ANCILLARY SERVICES: Helps the centre to function as a complex on its own. This is sub-divided into four active departments.

The Kitchen, which serves the feeding problem of the centre, the CSSD which helps store and supply all sterile equipments, the central general stores which stores and distributes all sorts of goods both new and old and lastly the Laundry which is for processing soiled linen for re-use.

The Motuary is yet an ancillary service which helps in the body storage of dead persons. The maintenance unit which takes care of the general maintenance of the centre in terms of carpentry painting, plumbing, security, electricity, fire control, telephone exchange etc. is equally an ancillary service.

5.8. EXPLANATION OF SPACE REQUIREMENTS:

Architectural spatial determination is usually done technically and scientifically and not by sheer intuition, estimation or assumption.

The different equipments, contents, activities, and all that is going to be put in a functional space and all the expected or envisaged activities are first of all put into consideration, then each of these equipments or contents is evaluated, its size or area known then the quantity arrived at, which will then pave way for a conclusive statement as per the total square metres needed for the functional space. An allowable space of some percentage is always given for circulation which varies from function to function.

Any architectural functional space, that is based on approximation is totally unscientific and against the architects ethic that preaches sincerity. However all spaces in the health

centre are concluded after the rigorous and tideous application of the scientific architectural procedure of space analysis.

5.9. FUNCTIONAL ORGANISATION AND SPACE RELATIONSHIP:

To effect a quick designed plan, a functional relationship diagram could be the only solution. A functional flow chart or diagram is in a way a 'Plan' of functions having the same space area. It presents in clearer language the relationship between functions; infact, a flow diagram is what any other person can draw be he/she an architect or not. Space relationship of functions can be effectively got by simple definitions of all functions.

5.10. MECHANICS OF CONCEPT EVOLUTION:

After arriving at a workable site structure which was based on some points, the next step in the designing of the complex was the conceptualisation of a design concept.

Basically, design concepts in health buildings are based on what is general known as 'hospital street'. The 'hospital Street' is the principle of a line of communication to which fingers or modules of accommodation are attached. This can come in form of a linear, a loop, a figure of eight, a cross or a combination of these patterns. However, all of these have their individual pros and cons.

More recently, two basic concepts have come to stay which were based on the previous patterns. The Harness and the Nucleus.

The Harness is a concept that is based on linear hospital Street to which standard and non-standard units of accommodation with different configurations, planned on a 15 metres square grid

are attached with relative freedom but geometric consistency and enclose courtyards that provide natural light and ventilation.

The Nucleus design concept of health buildings is essentially an improvement of the Harness ideology. This is a cluster which contains wards, departments or combinations of smaller departments placed side by side and connected to a linear hospital Street, the clusters produce a chequer board of squares. All vertical circulation is related to the hospital street in cases where they are present.

However, all the two concepts have their merits and demerits as its always the case.

In considering the spread of any building, it either should go horizontally or vertically. Health buildings are not left out in this consideration. The above concepts have been classified into two. The PAVILLION SPREAD and DEEP PLAN OR MONO-BLOCK CONCEPT that preaches contiguity of departments. Naturally and presently, a health building or any other building should either grow horizontally (the Pavillion spread)or vertically (the mono-block concept).

At this juncture, the need to investigate into the advantages and disadvantages of each of these concepts with the view to evolving a suitable design concept,was always there.

PAVILLION SPREAD: This is the horizontal arrangement of functions, either on a linear hospital street or in a scattered form.

MERITS: Allows maximum cross natural ventilation and lighting as courtyards could be employed.

- Construction or erection is cheap as simple construction methods could be employed.

- Services are cheaper as there are no complications, since the buildings are always low-rise.
- Provides the potential for a low-key, domestic and humane atmosphere.
- Cross infection can be minimised since wards can be separated with all ease.
- Provides a zoning strategy for the distruct and from the roof plant rooms.
- In some cases, if the units form clusters with basic dimension, it permits a veriety of methods of construction, a choice of meterials, and differences of architectural treatment.

DEMERITS: Demand a lot of space:

- Result in travel distances extended.
- Encourages the isolation of specialities in separate units and may create physical and psychological obstacles that inhibit inter-communcation.
- The question of contiguity of functions is out, and is always a problem here.

DEEP PLAN OR MONO-BLOCK CONCEPT OF CONTIGUITY: This is the vertical arrangement of functions in a single block.

MERITS: Achieves the contiguity of departments pre-aimed, which invariably reduces long travel distances.

- Is the answer to a project with site constraints in terms of space.
- Practicable in urban set-ups.

DEMERITS: Natural ventilation and lighting cannot be maximumly achieved:

- High cost of erection as services in the vertical direction are costly.
- Dampens the patients psychology to be part of the earth as Nursing Units are always in the higher floors.
- Cross infection might be increased even as there is congestion of wards. Mention mustn't be made of all the demerits as this might be impossible in this limited scope of mine. However, rationalisation of ideas has always being the guiding point of my proposals.

Considering these above and reconcilling them with my site and the economic viability, realities of the sponbors tye pavillion spreading type is adopted as a matterof principle.

CHAPTER SIX

DESIGN AND TECHNOLOGICAL SOLUTIONS

6.1. PATIENT FLOW:

Patients flow in the health centre is a basic requirement worth maximum consideration in its design. This goes together with the general circulation within the centre.

The patients arrive and need a waiting area, some form of sorting, for example, preventive medical care, diagnostic medical care etc. will take place at the first instance. The patient is then examined and may be sent for further examination to other medical personnel or to the laboratory for some tests either of blood, urine, stool etc. From here, he or she then returns to the examiner or doctor and may be referred for some form of treatment such as dressing or injection. He/she after collecting the medicine from the pharmacy department and after the injection leaves the centre for home. He/she shall have to come back either the next day or some other described for him/her.

The case above is for an out-patient, for an in-patient, the cycle is a bit different per se.

When the patient is examined by the doctor, he is immediately directed to the ward after some injection and collecting the medicine from the pharmacist. He/she might need not come to the opd the next day for injection and medicine as treatment rooms are available in the wards.

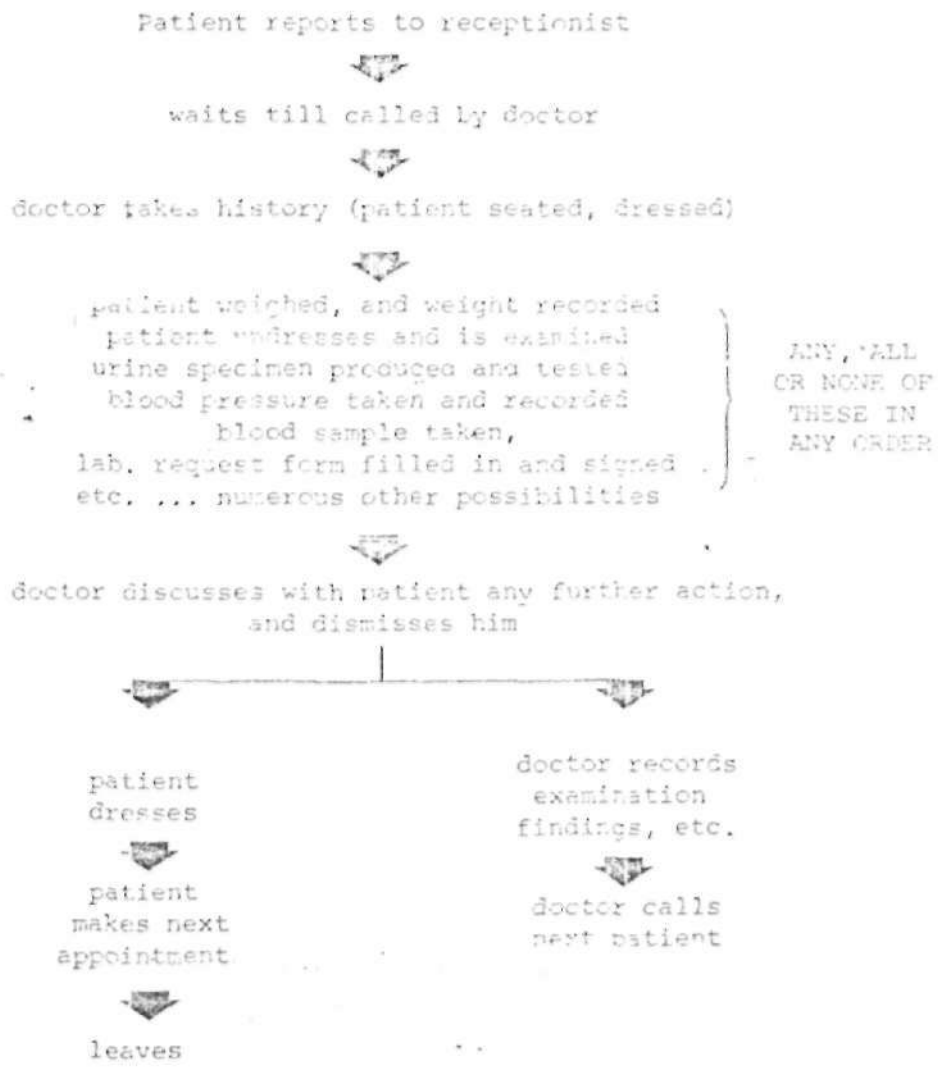


Fig. 2.0 Activity sequence: Personal call type session: GP survey

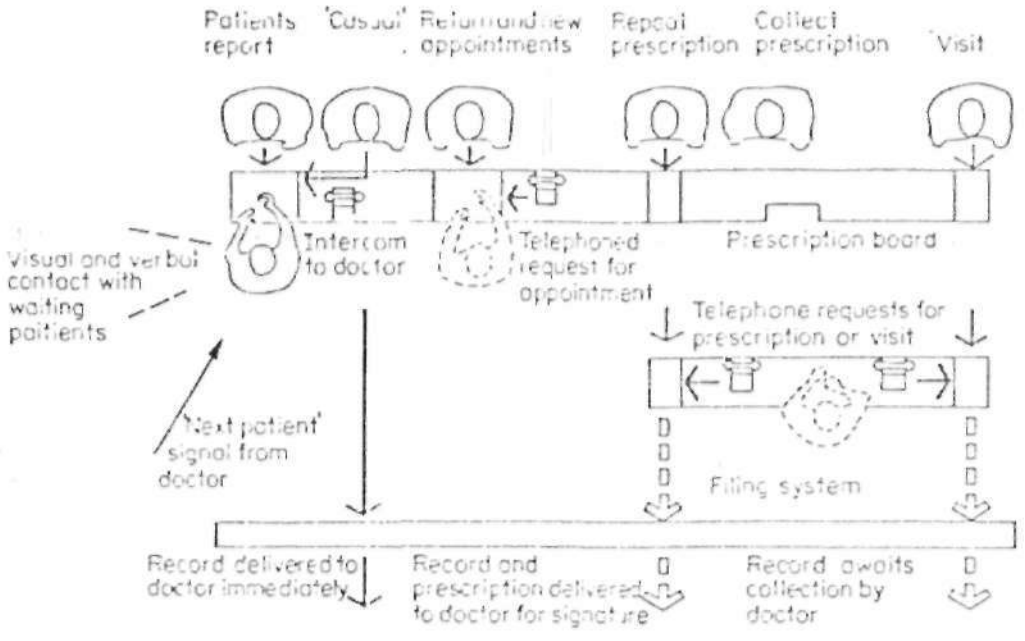


Fig 1.0 Activities at reception desk. Doctor's appointment system

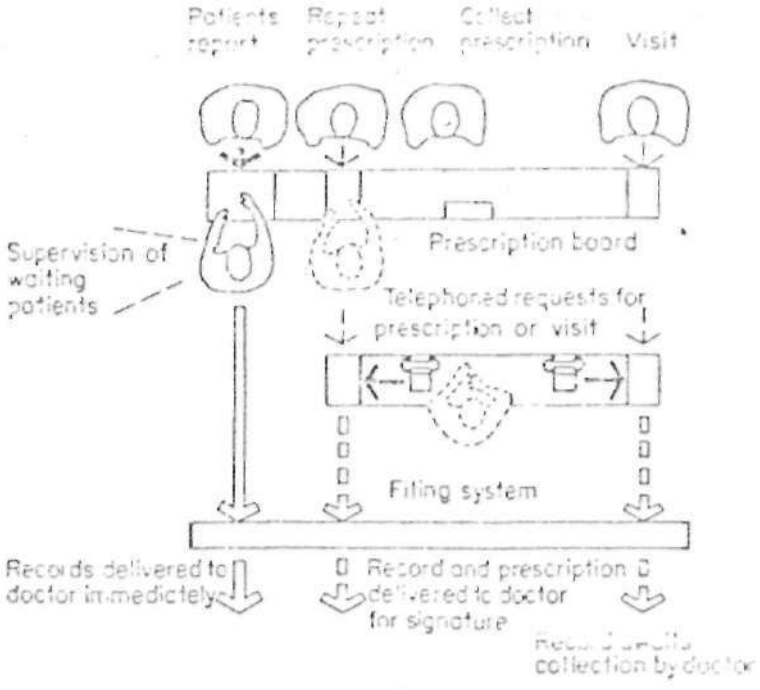
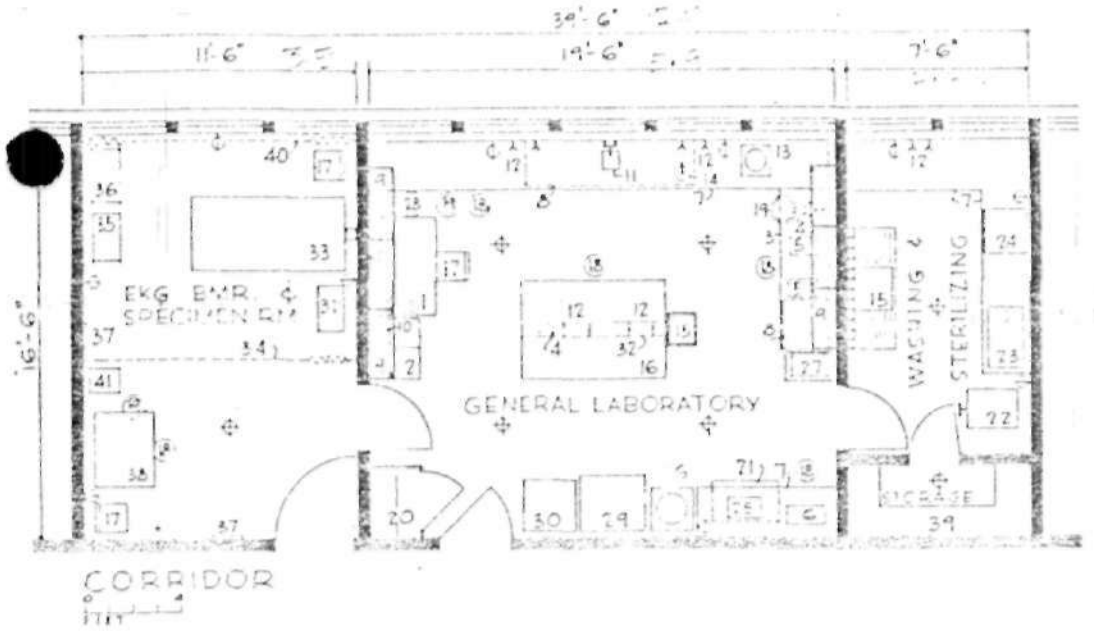


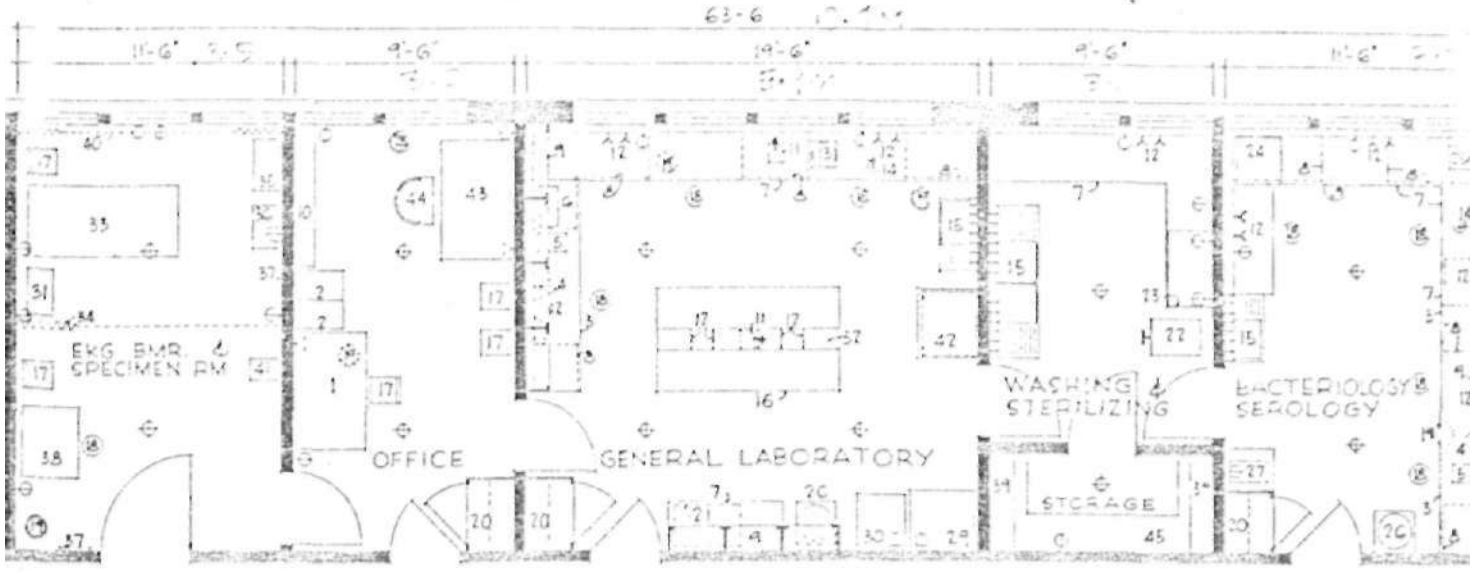
Fig 1.0 Activities at reception desk. Doctor's appointment system

59.—LABORATORY FOR A 100-BED GENERAL HOSPITAL



1. Desk
2. Filing cabinet
3. Microscope table, 30 inches high, with cabinets and slide drawers below
4. Cup sink with gooseneck spout
5. Microscope
6. Analytical balance with weights
7. Acid resisting counter, 30 inches high
8. Cabinets below counter
9. Wall cabinets
10. Book shelves
11. Acid resisting laboratory sink with gooseneck spout
12. Air, gas and electric outlets
13. Single element hot plate
14. Bunsen burner
15. Acid resisting laboratory sink with peg boards
16. Chemistry table
17. Straight chair
18. Stool
19. Sanitary waste receptacle
20. Closet
21. Wheel cart for frozen sections
22. Laboratory autoclave, 17½ x 26 inches
23. Hot air sterilizer, 18 x 18 x 27 inches
24. Incubator, 19 x 16 x 14 inches
25. Water bath
26. Centrifuge
27. Shaking machine on stand
28. Waste paper receptacle
29. Refrigerator, 8 cubic feet
30. Refrigerator, 6 cubic feet
31. Bedside table
32. Shelves over chemistry table
33. Hospital bed
34. Cubicle curtain rod and curtain
35. Basal metabolism apparatus
36. Electrocardiograph apparatus
37. Hook strip
38. Table, 24 x 36 inches
39. Shelving
40. Sliding window curtain
41. Adult scale

60.—LABORATORY FOR A 200-BED GENERAL HOSPITAL



1. Desk
2. Filing cabinet
3. Microscope table, 30 inches high, with cabinets and slide drawers below
4. Cup sink with gooseneck spout
5. Microscope
6. Analytical balance with weights
7. Acid resisting counter, 36 inches high
8. Cabinets below counter
9. Wall cabinets
10. Book shelves
11. Acid resisting laboratory sink with gooseneck spout
12. Air, gas and electric outlets
13. Single element hot plate
14. Bunsen burner
15. Acid resisting laboratory sink with peg boards
16. Chemistry table
17. Straight chair
18. Stool
19. Sanitary waste receptacle
20. Closet
21. Wheel cart for frozen sections
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26. Centrifuge
27. Shaking machine on stand
28. Waste paper receptacle
29. Refrigerator, 8 cubic feet
30. Refrigerator, 6 cubic feet
31. Bedside table
32. Shelves over chemistry table
33. Hospital bed
34. Cubicle curtain rod and curtain
35. Basal metabolism apparatus
36. Electrocardiograph apparatus
37. Hook strip
38. Table, 30 x 36 inches
39. Shelving
40. Sliding window curtain
41. Adult scale
42. Fume hood
43. Executive-type desk
44. Executive-type chair
46. Counter, 36 inches high, cabinets below

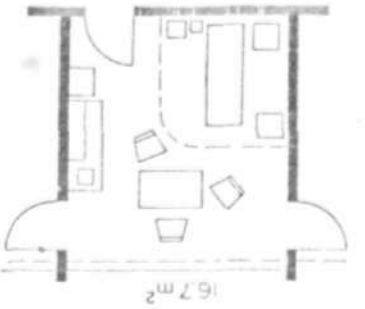


Fig. 3.0 Combined consulting room

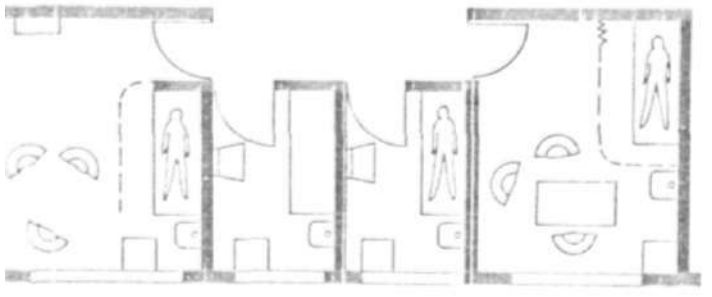


Fig. 3.0 Suite of two consulting rooms with shared examination room

6.2. FUNCTIONS:

GENERAL WAITING: This is basically supplied with wooden benches. Chairs are never advocated in any way as they might be taken away by some dubious characters.

CONSULTATION AND EXAMINATION ROOM: Generally speaking, the buoyancy of any establishment or institution could be reflected in the mannerism provisions are made in same. As such, if finance permits, there should be separate ways in and out, preferably at the same end of the room so that the examiner/doctor has his territory at the other end. Doors should open into the room and not out into the waiting crowd, and a connecting door between adjacent rooms is useful for allowing consultation between colleaques.

A desk, chair, a small book case for hand books, a lockable cupboard, a handwash basin, a chair for the patient and a bench for accompanying children or other relatives. Children should be allowed to come to the centre with their mothers so that they become familiar with the centre and erase the possibility of disturbances or distraction as they cry outside the door of the examination room helplessly. An examination couch capable of been screened from the rest of the room should be provided.

LABORATORY: Size, arrangement and equipments of a laboratory vary according to the size of a medical unit, the number of out-patients and the staff available.

Ideally, at least two rooms are necessary for the laboratory. The first for the (1) Examination of unclean samples, stools and urine and the second for:

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2) Haematological and Biochemical work.

In a rural area and considering the population of the catchment area, the two can be brought together in a big block.

Much laboratory work depends upon colorimethic tests which require day-light for reliable and easy reading. Thus, the need to place work-tops near to the windows using the darker areas for storing the samples.

Microscope can be best positioned at the sideways near a window for adequate light, with the microscopist facing a relatively dark wall. Generally, laboratory spaces should have as much urgent or imperious worktop areas as possible, and placed 900mm above the floor for comfortable standing work, with cupboards underneath and shelves above. Frequent clear spaces are neded under the worktops as knee spaces where stools are to be used. Each section will need a sink and the clean area a refrigerator.

DRESSING AND INJECTION ROOMS: Basically, the services of these two rooms are almost the same, as such they can be of the same size as they have similar design features. Narrow spaces or bottlenecks often occur in the treatment rooms because the procedures involving preparation of injections and dressings plus the cleansing and sterilizing of instruments are time consuming. This can be discouraged if the rooms are in effect divided into two zones, one in which the staff can make notes and prepare their instruments undisturbed and the other in which the patients queue up in batches to receive their treatment. In the staff zone cupboards worktops and shelves should be within easy reach so that

unnecessary movements are kept to a minimum. A sink for cleansing and sterilizing instruments is needed. It is also useful, if by the provision of interconnecting doors, utensils can be collected on a trolley for clearing in a separate service room.

DRESSINGS: A two-tier bench fixed against the wall in the patients area is indispensable. Patients who need dressings etc on the upper part of the body sit on the lower bench, while dressings and attention to ailments on the legs and feet are much easier for staff when the patients sit on the upper bench. The staff will require stools or ideally typist type chairs with castors, to sit on while they attend to the patients.

INJECTIONS: In the injection room a free standing bench forming a separation between staff and patient areas is ideal for patient to sit on while receiving injections, it allows the discreet uncovering of the part of the buttock usually chosen for injections.

CASUALTY THEATRE OR MINOR THEATRE: The casualty theatre is needed for minor surgical procedures such as suturing of small wounds, opening of abscesses and application of plasters. There are three basic requirements which must be fulfilled:- cleanliness, adequate space and good quality lighting and ventilation.

CLEANLINESS: The theatre must contain as few niches and crevices as possible for these are places where contaminated deposits from breeding grounds for micro organisms. All surfaces should be smooth, crack free and impervious. A smooth concrete finish is acceptable, or terrazzo floor finish. To ease washing down, the floor should have a plugged outlet leading directly outside to an open gulley.

Where electricity is available an arrangement of three flourescent tube lights in a triangle and suspended over the operating table gives a surprisingly good and shadow free light. In absence of electricity, daylight could be utilised.

Most importantly, the head of the windows should be high, at least 3.0m above the floor to give a good angle and spread of light into the room. The cill can be of about 1.6m above the floor so that the wall below can be used for shelving and to ensure privacy from outside. The windows should of course face North and South and be shaded by a proof overhang of at least 800mm. Roof lights here in the tropics cause excessive heat gain by solar radiation hence should be avoided.

Besides the space for an operating table there must be at least two sinks. In addition a desk and chair are needed for making notes, a small book case for handbooks, a lockable drug cupboard and a large amount of worktop area and cupboard space.

PHARMACY AND STORE: Facilities for storing, preparation and distribution of drugs can be situated together in the best position to serve the whole health centre.

STORE: The location of the store should be in such a way that it will be secured and visually controllable during working hours. The main requirement is for plenty of floor to ceiling shelving with the shelves spaced at varying heights, so that while tall bottles can be stored, smaller items need not be pilled on top of one another to avoid waiting space. The storekeeper will need not be pilled on top of one another to avoid wasting space.

The storekeeper will need a desk from which he can issue items to staff members from different departments.

Pharmacy Unit must be well, lit, should have as much worktop area and cupboard space as possible and at least one sink. At the other end of the room a counter upon which the most commonly prescribed drugs can be set-out should be situated next to a hatch through which the patients are served.

X-RAY UNIT: The location of this unit as earlier emphasised in my earlier chapters should be close to the operating theatre and Nursing Units. It should be strategically placed and with a waiting area for patients.

In the waiting area some benches or straight chairs could be used and light proof doors leading to the changing or dressing section of the department, where you have seats and mirrow and hook strips, best arranged on the opposite walls of the room.

This Unit has many equipments especially in the viewing area where we have seats, filling cabinet, letter size, drawers, film filling cabinet, three drawers, footstool and so many others. The darkroom consists of storage cabinets, film loading counters, some ceiling light both white and red, Timer, X-ray film illuminator, wall mounted to mention but a few.

The exercise of X-raying is never a one-day one, the patient would have to go an' come back on a routine or appointment as the case would be.

It is always assumed that this unit is hazardous and catastrophic as such its location in isolation to some extent is always the best. But control rooms have come to clear the doubt of safety in recent moments.

PHYSICAL THERAPY: Physiotherapy is practised by our fore-fathers since time immemorial. As the name implies, it includes the physical and manuel massage twisting and straightening of dislocations, fractures but simple and compound with the view of achieving a physical return of normalcy of the physical and internal anatomical components. It is obvious then that equipments like stools, desk, tables, carpet might be employed in this unit. The advanced practice includes a whirl pool for hydrotherapy baths, remedial exercises by means of gymnastic apparatus, free movement and games, where a gymnesium, treatment and examination rooms are required.

DENTAL CLINIC: The recovery room of the dental Unit should have some couches and a basin for post anaesthesia patients. The workshop with the central rotating chair with lights directly above both white and otherwise, the worktops and drawers, human height shelves, sinks, disposal Unit and waiting space. The store room usually with shelves, tables and drawers etc. Since the surgery rooms are two one could be used for cleansing or painting while the other for cases that need up-rooting or total removal.

NURSING UNIT:

There are numerous basic ward types: the Florence Nightingale ward, the Rig ward, the linear ward, Deep ward or Race track ward and the courtyard plan ward. The only two that can be employed in a Rural Health Centre such as this at Kwoi would be the Florence Nightingale's and the Rig. This is because they lack complications, the arrangements of beds are simplified which will go well with the village's situation.

The Nightingale's ward has beds arranged in rows at right angles to the length of the room with a general circulation area down the centre. It's low floor area per bed ratio and a relatively narrow building width of 6.4m which allows for an inexpensive form of roof construction are the systems economic advantages over the Rig's type. Also, supervision of the whole ward is easily possible from one position and the bath from the Nurse's station or duty room to any bed is direct with the Nightingale's system which is not the case with the Rig ward. The only Chief disadvantage with the Nightingale's ward lies in the poor patient environment partially due to the barrackroom experience and the glare experienced by sitting in bed with a row of windows immediately opposite can cause considerable visual discomfort. These duo problems are not found in the Rig ward. Nonetheless, both problems can be offset to some extent, may be by creating or erecting partitions, say four beds interval, by making the head heights of windows low or by providing lean-to verandahs which will cut out most of the skyglare. Wards should have verandahs as a matter of fact, for patients relaxation during the day.

Bed spacing of 1.6m is suggested based on an 800mm wide bed with an 800mm space in between. Ideally, verandahs where patients can relax during the day, should run along each side of the ward. These can be connected to the ward by several doors so that patients and visiting relatives do not cause congestion around the main entrance.

Wherever possible, bed tables and cupboards should be fixed directly to the wall clear of the floor and the floor itself should slope towards the outside doors to facilitate washing down.

The nurses station or duty room ought to be immediately adjacent to the bed ward.

It should contain a work area with standing heights worktops and cupboards, at least one of which should be lockable for drugs also a sink and space for a boiler.

SANITARY FACILITIES: A sanitary block containing a W.C. shower and wash basin for each 8 to 10 patients should serve each nursing unit. An important design factor is the location of the sanitary facilities. Most people will not use a toilet which opens directly off a habitable space, including a ward. This fact coupled with the nuisance that can arise from the spread of odours from the toilets into the nest of the building make it desirable that the sanitary block is situated outside the main building.

MATERNITY UNIT: This consists of Nursing Unit with minor modifications, can be of the same basic design as the general nursing units and a delivery unit.

The cots for new born babies could take the form of cradles attached to the foot ends of the mother's beds where they will take up no extra space.

There should be a room in the maternity bed ward for a free standing table where the staff can demonstrate simple practical baby care to the mothers. Free wall space should be fitted with black boards, pinboards, and any other teaching aids so that maximum use can be made of the patients stay in the health centre for health education.

All maternity units should have at least two single bedrooms where special cases such as eclampsia patients can be adequately nursed. A special room for premature babies is a necessity.

It should be designed in such a way that it is close to and have large glass windows facing the Nurses' duty room, for easy supervision and so that parents can see their babies without having to enter the room.

The delivery unit should contain a waiting bay for patients in beginning labour which can also be used for the examination of the patient when she arrives. Close to it a shower room is needed which is large enough for the nurse or mid-wife to assist the patient in bathing and hand-nails should be provided for the patient to hold unto.

The midwives duty room should be placed so that easy supervision of both waiting area and delivery room is possible.

Also, next to delivery room, a W.C. is needed. Enemas are often given during labour and it is impractical for the patient to have to move to the other end of the building to reach the toilet. Sluice room, storage of clean linens are also necessary.

The design criteria for the delivery room are similar to those of the theatre (earlier treated in this chapter).

The same considerations for lighting ventilation and floor and wall surfaces as in theatre. There should be space for two delivery beds with ample room on both sides as well as at the foot. Two ceramic sinks with adjacent worktops are essential, the latter placed high enough for trolleys to be pushed under them. Shelves for sterile drums and a high shelf for gloves and gowns are useful.

OPERATING THEATRE: Essentially, the requirements in theatre design such as patient flow, entrance, control, recovery clean up etc. are the same as discussed earlier. The equipments are also basically the same with little addition.

At the centre of the suite is the table with the surgeons stool and the deep cadity surgical illuminator. This arrangement is always enclosed by some equipments such as Kick bucket, has, anaesthesia table, anaesthesia gas, monitor, double basin, single panel and ceiling gas. At the sides of the walls found are electro-surgical unit, X-ray film illuminators, case cart/trolley, mobile

television camera and recorder and isolated power.

9.3. ANCILLARY SERVICES:

Besides the strictly medical functions of the health centre, there are a number of essential supporting functions to be housed. The most important of these are the Laundry, Kitchen, Workshop and garage. These elements besides sharing a common service function, require a similar standard of construction so that they could be placed together in a single block somewhere on the edge of nucleus. Kitchen and laundry placed together, serve the same parts of the centre and both consume both hot and cold water. The garage and workshop on the other hand serve the centre in a less direct way and it is probably more important to consider vehicular access and the noise nuisance they may generate.

KITCHEN: In cooking, a raised concrete plinth with a large galvanized metal hood above connected to a flue to collect the smoke, can serve as a hearth upon which cooking can take place.

A large wooden table (say 1.2x24m) around which a number of people can sit preparing food. Drawers and cupboards are needed in the kitchen for utensils in regular use and a well ventilated and secured room is needed which can be compartmentalised for dry goods, fruits and vegetables.

LAUNDRY: Dirty linen usually collected daily into a central location for laundering. An area is needed for receiving and sorting the dirty linen and a sink should be provided for soaking badly soiled items. Laundry sinks can be made of concrete or galvanised metal if that can be fabricated locally.

Stainless steel sink units are totally inadequate for laundry purposes and ceramic sinks are too vulnerable to chipping.

After washing, a large area is needed for drying linens ($0.8m^2$ per bed sheet), this is generally outside except of course during rainy periods when there must be adequate indoor drying. Nearly the washing area should be found a large ironing table with switches for same on the side walls.

Finally, a clean linen room is needed with ample slatted shelving for airing and from where linen is despatched back to the different parts of the health centre. A small lock-up store for keeping laundry materials is useful. The construction of the laundry can be a very simple open type, but the floor should be made of concrete laid to slope so that it wil drain itself.

CENTRAL STERILE SUPPLY DEPARTMENT (CSSD):

Centralised receipt, cleaning, packing, sterilisation, storage and distribution of re-usable supplies are all that happen in the CSSD.

Main planning options include closeness of relationship to other materials handling functions, obstetrics, surgery means of conveyance for sterile goods to other departments etc. and provisions in terms of equipments should be made to actualise all these. Key spaces include decontamination, sterile processing preparation, storage and issue. Their should be strict separation of dirt and clean work areas, use of steriliser bank to form separation, location of sterilisation function for surgical instruments as they seem the main design issues.

Equipments include, table with shelf over (42x96 inches), straight chairs around the table, counters, sterile supply cabinets, step ladder, dressing sterilisers, sinks to mention but a few.

MORTUARY: Basically, where dead bodies will be stored for a short period before being packed down to respective regional and destinations for burial.

Equipments consist the washing basins or bathing materials in the body washing room, the autopsy table with sink, overhead light, footstools, mayo table, section apparatus, the refrigerators, W.C showers, Kick bucket, doubled recessed view base etcetera, etcetera.

GARAGE AND WORKSHOPS: A nice maintenance unit for both equipments and vehicles is essential. So much potentially useful equipment lies iddle for the want of some small repairs. A good workshop can also be used for the manufacture of items of furniture from locally available materials, avoiding the cost and difficulty of obtaining such things from outside.

GARAGE: This should have at least a maintenance bay (6x3m) with inspection pit. A strongly made standing bench should run along the wall at the end of the bay.

It is common to include in the maintenance block a large general purpose store for bulk items such as building materials, gardening supplies and odd pieces of furniture and equipment. In any case a store for garage and workshop supplies is needed.

6.3. CONSIDERATIONS OF CLIMATE ON DESIGN

6.3.1. NATURAL LIGHTING:

Examination, consultation room, injection, dressing, surgery, delivery rooms which are clinical rooms need natural lighting of about 400 lux. wards 100-300 lux, Nurses' station or duty room 300 lux, circulation space 100-200 lux. these are all non-clinical rooms or spaces.

The laboratory; pharmacy, sorting registration, offices have 400 lux. kitchen, 200-400 lux, laundry 200 lux, bathroom, toilet 100 lux. These figures are the minimum values of luminance for daylight requirements.

6.3.2 NATURAL VENTILATION: Basic requirements are supply of fresh air, dilution of odours and gases and control of airborn infection etcetera. The amount of air required for respiration is extremely small, but dissipation of odours in general and body odours in particular gives the requirement for minimum ventilation standards demonding about $25m^3$ of air per hour per person. For medical rooms and wards where an aseptic environment is needed ventilation of say 10 air changes per hour might be useful.

6.3.3. AIR FLOW: In offices and clinical rooms, even in hot humid climate, high air velocity at desk level may disturb work. The main air stream should be directed at and above the head level, that is about 120-180cm above the floor. In wards and sleeping rooms especially in hot humid climate, it is important that the main air-flow should be at a height a little above the bed level that is from about 50 to 80cm above the floor.

Direct sunlight should be discouraged in rooms to prevent over-heating of same.

On a general note, the treatment above is intended to be accorded to clinical rooms only since they are the most crucial of the complex.

6.4. DESIGN REPORT:

PLAN: After the conceptualization of the planning idea with the pavillion spread design concept taking precedence and deemed the best for the area, out of principles, the plan was then to take effect.

Circulation, simplicity, and services are the basic ingredients of hospital planning.

"It is of utmost importance to remember that a health building or complex is more than just a building with bedrooms. It is a complicated, highly specialised functional structure which must be designed for the various facilities, instead of having the facilities forced into certain areas because of a desire to produce some particular architectural appearance. Such errors result in nothing but regrets and censure of the planners and builders, with dissatisfied patients, staff and employees and excessive operating or remodelling costs".

Design consists a big rectangular circulation path spreading at fourty-five (45) degrees, around which the functions have their geography in conformity with the design concept evolved.

The organic posture deserved of a health complex is achieved as at intermittent positions, courtyards are found and well landscaped.

It is because of the above that two mini nutrition gardens are provided and in close proximity with the nutrition room. Women and other specie of humans can be taken to these gardens for demonstration and practicals.

To the right hand side of the general waiting the provided 1.8m walk-way leads one to the obstetric and gynaecology department simply called the maternity unit. Along this same route is the public health unit which is part of the out-patient department.

A turn to the left takes one to the operating suite then to the female nursing unit.

At the general waiting in the opd is the path to the left which takes one to the casualty unit, administration and down to the ancillary services consciously segregated because of noise effect.

A turn to the right immediately after the administration unit leads one again to the operating suite then to the male nursing wards. Between the male and female wards are two day-spaces for the individual two sexes.

At the OPD, provisions are made so that females have their own wing with their consultation and examination rooms arranged by them. This treatment is squarely accorded the male wing.

The pharmacy unit has separate waiting for males and females for the collection of drugs and injection. Adjacent and at the back of the waiting spaces are toilets, laboratories for demonstrations, experimentations for clearity and family planning room for the females.

The thesis is 'preventive services' oriented, thus demonstration rooms, lecture hall in form of an auditorium, immunisation room, general waiting for immunisation services, training co-ordinators room, field nurses room, drilling committee room, sanitary engineers room, non-formal educationists room and so many other relevant functions are provided for maximum good preventive medicine results.

Research into the traditional medicine practices suggested that only traditional birth attendants can be incorporated in the centre as bone-setters, psychiatric traditional medicine men and general medicine possess some mysteries that until when these are de-mystified, their successful coming together with orthodox medicine remains a dream, hence announcing the continuity of their parallel motion.

Therefore, at the maternity unit, two lecture rooms are provided with laboratory for demonstration and practicals. Squating facilities for delivery are also provided.

The major clinics and the adjunct facilities are located around those radiating paths and close to the general out-patient department waiting area.

To some extent, the author believes that circulation will not be a problem even as simplicity is adopted to its utmost.

ELEVATION: Facades of hospital buildings don't always express grandeur and too much aesthetics. As mentioned above, the primary thing is functionality and circulation.

Facades face both the north-south (desirable) and west-East directions and for the latter are shaded. The former's facades can be shaded with shading devices as done in my design. This will not only help to trap the effect of sun but will create some cooling effect in the inside of the rooms.

Vertical and horizontal shading concrete columns and slabs are adopted in the wards, auditorium and garage.

STRUCTURES: Simple structural system is choosen. A module of three metres (3m) is adopted in the wards auditorium, garage and carpentry workshop.

Double-pitched steel roofs are choosen for the OPD, auditorium, operating suite and the maternity ward. Timber Rafters are employed in the male's and female's wards and the rest of the functions.

Drainage is via the gutter at side of the roofs through pipes with proper consideration given to cases of over-flow as can be seen in my working details.

SERVICES: There are possibilities of problematics in the services of the design since proper care was taken to avoid closed courtyards which usually pose irritations in the drainage or sewage disposal system.

The land is flat, thus drainag system will have to be problematic. The slope will then solve the problem. To the north of the site is a stream where disposal systems or pipes can be directed towards this direction.

MATERIALS AND FINISHES: Basic materials employed are concrete hollow blocks 9' for walls which are serving as structural walls, Timber, Steel, Asbestos cement roofing sheets and anodised louvres, casement windows.

Finishes are terrazzo, both for walls and floors for economic. With buoyant economy, cork tiles, linoleum floors, carpets etc. can be employed as finishes for noise control.

6.5. SCHEDULE OF ACCOMMODATION:

OUT-PATIENT DEPARTMENT:

FUNCTION	NUMBER	AREA(M^2)
Card Room	1	20.0
Store	1	10.0
General Waiting	1	309.6
Consultation/Examination Rooms (Males)	2	40.0
Consultation/Examination Rooms (Females)	2	40.0
Under fives clinic	1	37.5
Dental Clinic:		
Waiting Area	1	47.5
Tobby (Entrance)	1	15.0
Surgery Rooms	2	18.0
Dark Room	1	7.2
Store	1	8.0
Recovery Room	1	20.1
Eye,Ear,Nose and Throat Clinic	1	33.5
Health Education and Nutrition	1	37.5
Demonstration	1	81.3
X-Ray	1	52.3
Dark Room	1	7.5
Changing Space	1	5.0
Waiting Space	1	29.3
Store	1	7.5

FUNCTION	NUMBER	AREA (M^2)
Physical Therapy	1	33.5
Casualty Theatre	1	37.75
Nurses and Reception	1	25.0
Clerk	1	9.0
Store	1	12.5
Waiting Space	1	27.5
Female Dressing	1	16.5
Sluice	1	5.5
Sterilising	1	5.5
Male Dressing	1	16.5
Basal Metabolism Rate	1	25.5
Mental Hygiene	1	124.75
Courtyard	1	135.0
Store	1	9.2
Treatment (Male)	1	20.0
Male Waiting	1	117.0
Pharmacy	1	71.5
Store	1	22.0
Treatment (Females)	1	25.0
Laboratory	1	55.0
Toilets	2	6.0
Female Waiting	1	117.0
Laboratory	1	25.0

FUNCTION	NUMBER	AREA(M^2)
Family Planning	1	25.0
Toilets+ Lobby (Females)	3	15.00
Toilets+Lobby (Males)	3	15.00
Laboratories	2	50.00
Courtyard	1	120.00
Nutrition Gardens	2	1091.2
ADMINISTRATION UNIT:		
Health Officer	1	12.00
Health Visitors	1	14.00
Toilets and Lobby	2	8.00
Administrator's Office	1	21.00
Secretary	1	9.00
Toilet, Administrator's	1	3.00
Conference Room	1	22.00
General Office	1	26.00
Staff Common Room	1	24.00
Toilets (Females) + Lobby	3	14.00
Toilets (Males)+ Lobby	3	14.00
Courtyard	1	114.75
PUBLIC HEALTH:		
Waiting Open Area (Courtyard	1	227.7
Reception	1	12.5
Immunisation	1	20.0
Sanitary Engineer's Room	1	14.0
Field Nurses' Room	1	33.0

FUNCTION	NUMBER	AREA(M^2)
Training Co-Ordinator's Room	1	33.0
Chief Nurse's Room	1	12.0
Non-formal Educationists Room	1	12.0
Drilling Committee Room	1	16.00
Auditorium	1	180.00
Store	1	5.4
Health Officer	1	10.8
Secretary	1	7.5
Toilets + Lobby	4	12.0
MATERNITY DEPARTMENT:		
Reception and Store	1	18.72
Waiting Area	1	132.68
Children's Ward	1	78.00
Nurses Duty Room	1	12.00
Treatment	1	7.5
Nurses' Changing	1	9.0
Sluice	1	6.0
Toilets + Lobby	2	6.0
Shower	1	1.50
ANTE-NATAL CLINIC:		
Consultation Room	1	14.0
Examination Room	1	16.0
Instruction Class	1	48.0
Urine Testing	1	5.0
Toilets + Lobby	2	5.06

FUNCTION	NUMBER	AREA(M^2)
Labour Room+Toilet	1	39.0
Delivery Room	1	33.0
Sluice Room	1	4.0
Store	1	5.0
Sterilising Room	1	4.0
Recovery	1	14.0
Squat	1	12.0
Laboratory	1	14.0
Traditional Birth Attendants:		
Classrooms	2	68.5
POST-NATAL CLINIC:		
Maternity Ward	1	96.0
Treatment Room	1	9.0
Nurses' Duty Room	1	9.0
Room (isolation)	2	12.0
Nurses Changing Room	1	9.0
Sluice	1	6.0
Toilets	2	6.0
Shower	1	1.50
Courtyard	1	203.0
OPERATING SUITE:		
Reception	1	13.5
Patients Waiting	1	19.2
Changing Room	1	13.5
Toilet	1	1.5
Scrub-up and store	1	12.7

FUNCTION	NUMBER	AREA(M^2)
Preparation Room	1	7.5
Anaesthetisic	1	7.5
Lobby	1	19.25
Operating Theatres	2	78.0
Sluice Room	1	8.75
Sterilising	1	8.75
FEMALE WARD:		
Ward (Surgical)	1	78.00
Treatment Rooms (7.5)	3	22.5
Nurses Duty Room (12.0)	3	36.0
Courtyard	1	102.0
Toilets + Lobby	4	12.0
Showers + Lobby	2	6.0
Sluice	1	6.0
Nurses' changing	1	12.0
Isolation Spaces (19.5)(Medical)	2	39.0
Day Space	1	50.4
Wards (Medical) (58.5)	2	117.0
MALE WARD:		
Wards (Surgical)	3	28.00
Treatment Rooms (7.5)	3	22.5
Nurses Duty Rooms (12)	3	36.0
Courtyard	1	102.0
Toilets + Lobby	4	12.0
Shower + Lobby	1	6.0
Sluice	1	6.0

FUNCTION	NUMBER	AREA(M^2)
Nurses' Changing	1	12.0
Isolation Spaces (19.5)	2	39.0
Day Space	1	50.4
Medical Wards (58.5)	2	117.00
ANCILLARY SERVICES:		
Central Store	1	63.0
Maintenance Unit	1	22.05
Kitchen Yard	1	45.1
Kitchen	1	41.5
Changing Room (Males)	1	13.5
Toilets+Lobby	2	10.0
Changing Room (females)	1	13.5
Toilets+Lobby	2	10.0
Store	1	13.5
Staff Dining	1	39.0
Laundry	1	41.5
Ironing Space	1	12.25
Boiler Room	1	25.00
Central Supply Sterile Department	1	32.5
Office	1	5.0

FUNCTION	NUMBER	AREA(M^2)
MORTUARY:		
Ambulance Park	1	15.0
Body Washing + Toilet	1	15.75
Autopsy	1	8.75
Body Storage	1	15.75
Chief Engineer's Office	1	12.00
Toilets + Lobby	3	10.5
Telephone Exchange	1	9.0
Business Office	1	14.0
Workshop	1	35.0
Store	1	12.5
Timber Store	1	18.0
Garage	1	42.0
Store	1	18.0
Reading Room	1	35.0
Television Room	1	35.0

6.6. BUILDING SERVICES: Medical buildings are great consumers of water with complicated sanitary services and their proper provisions and design is critical to the health and well-being of the patients and staff.

6.6.1. WATER SUPPLY: Water is the most precious resource in the operation of any kind of health facility and an adequate and suitable supply must be ensured before building commences. In many cases, the demand will exceed the supply, hence the provision of water using fittings must be limited. In this connection, it has been noticed that:-

a) High level W.C. cisterns require eight litres to flush and will be used an average of three to four times a day by each patient.

b) Low level W.C. suites use more water (ten-twelve litres).

c) A bath takes about 150 litres each time it is used.

d) Showers require only about 50 litres and therefore should be preferred to baths, where possible.

e) A tap usually delivers about 11 litres of water a minute but this of course varies according to its function and amount of control exercised over its use.

f) Wastage of water through leaking pipes dripping taps, etc. can account for as much as 25% of the total consumption and must be guarded against.

WATER SOURCE: In rural areas where pipeborne water is not available, just as it is the case with Kwoi town presently, the use of water from wells should be preferred to surface water, (lakes, rivers etc)

due to the latter's high possibilities of pollution, rain water in rural areas is generally pure, except perhaps for the presence of dust particles.

Conservation of rain-water is therefore being considered in the design of the buildings. To avoid the formation of stagnant pools which invariably form breeding grounds for mosquitoes, large capacity gutters are fitted with sufficient fall.

The use of mono-pitched roofs will cut the cost of collection by having the number of gutters and generally simplifying the system. This is employed in some structures in my design.

Cheap windmills of bamboo support can be used in drawing the water out of the well to the storage tank.

From the storage tank, water can be distributed to each department by gravity feed, though small diameter pipes, 13mm being adequate for the branches.

Units such as the theatre and maternity, for which the supply of water is critical should have their own storage tanks of about 500 litres to act as a secondary reservoir in times of shortage. A stopclock should be incorporated at the point where the main supply enters each section of the buildings so that the fittings in that part can be maintained and also so that low-priority users can be cut off from supply during times of acute shortage. Pipeborne water has to be available in order to actualise this project.

6.6.2. WASTE DISPOSAL: The most common way of dealing with water borne sewage is by the use of septic tanks assuming that public Showers are not available. Septic tanks are not merely storage containers for effluent, but provide the first stage of sewage treatment

by bacteriolytic action. Septic tanks should be designed to cope with all types of liquid waste, but surface water should be excluded.

The effluent from the septic tank should be discharged into a soak-away pit at least 15m from the nearest building or distributed into disposal trenches between 600-800mm deep containing ballest with sand binding. The sludge from septic tanks should be removed periodically, say every 3 to 5 years and buried or composted.

It is common knowledge that both the high level W.C. cisterns and the dow level W.C. suites have grossly failed in the rural areas. The use of tough paper and solids and also the issue of water shortage in the maintenance of these toilet systems have more often than not led to their blockage and consequently they become an environmental nuisance. The traditional pit latrines on the other hand always poses the problem of soil pollution which can travel distances up to 30m where the water table is penetrated.

A sanitary system must provide security against the possibility of ill-health.

An efficient sanitary system doesn't necessarilly mean a sophisticated system. The provision of a sanitary system beyond the technological competence of the community could be a waste of money and effort. The deteriorating posture of the existing situation can be prevented or minimised only by the introduction of an appropriate intermediate solution, which can be afforded by both the state government and the users.

The waste water from the shower and wash-basins is discharged into the gutter system, that connects the latrine cubicles.

The top of the gutter is covered with a concrete slab which holds the shallow water seal bowl which is manually flushed. This prevents insects breeding in the pit, cuts down the odour nuisance and requires less than 2 litres of water to flush. The bowl could be of clayware, concrete or plastic and can be removed for cleaning. The last portion of the concrete slab can also be removed for checking.

The gutter drains into a man hole just outside which inturn drains into an aqua-privy tank. Other units are also connected to the manhole. In this way the issue of blockage has been completely taken care of.

6.3 BUILDING CONSTRUCTION:

FOUNDATION: Concrete pad foundation is adopted, since the weight of the super structure is transmitted as point loads under the columns in wards. As the land or site is relatively flat, complications in the foundation laying might be minimal or totally absent.

FLOORS: Most rooms will require an 800mm thick concrete floor slab cast over a 300mm layer of hardcone of stones or broken blocks with sand or ash blinding.

Floors should not be strictly smooth even as trowels are employed sometimes in making the floors sufficiently so which invariably become slippery when wet. Here, the need to disallow cracks in the clinical rooms for the fear of germs might have been exaggerated in such conditions. The finished floor level should always be at least 150mm above the surrouding ground level to avoid moisture penetration.

If the quality of workmanship is low again, leaving a poor surface on the slab then a sand cement screed of no less than 2.5cm thick can be applied to the slab. This is an expensive item, being rich in cement and is liable to cracking if not properly laid.

ROOFS: Self-supporting asbestos roofing sheets (amientos) on timber rafters in some cases and on steal on others has been employed. Amientos has a very attractive profile, with high flexual strength. It is available in a varying length of 3.66-9.41m. It's main advantage is the savings on structure and erection time. It is waterproof corrosion free, incombustible termite proof and maintenance free. When laying amientos sheets, the direction of laying should be opposite the prevailing wind. After postioning the sheets on roof, drill first and last sheets for hook bolts, on very long structures, intermediate sheets should also be drilled. Thereafter, the bolts are fixed and the sheets aligned. The hook bolts are joined with bitumen and metal washers. The hook bolts should always be placed on overlap and not in valley of sheets except for end sheets.

The roofing is made in such a way that the pitched roof is not visible from any distance from the outside. This is because a parapet wall is employed with gutters smoothly designed for drainage through or via which rain-water passes through the drain pipes where necessary to the ground gutters or through the normal drainage passage. The details of the system adopted is always clearer in a sectional drawing.

WINDOWS AND DOORS: Two types of windows have been adopted. The adjustable louvre windows and the popular casement type. The louvres although are cheaper than the factory made casement, although they give variable ventilation up to 100% when open and also allows the direction of the breeze to be controlled and finally the advantage of the variability in the size of width of opening, it still cannot go well in some functions. Thus the need to employ the casement.

Burglar proof strategies could be possible with these types of windows.

Flush doors are employed with some sliding ones intermittently found and scattered within the complex. Flush and panelled doors seem to be the solutions to the illiterate populace the complex is intended to serve. If these doors are well placed, they can provide the low level ventilation necessary in hotter areas such as Kwoi or Nigeria. Doors employed are extremely versatile for both light and ventilation and deserved to be more extensively used

6.0. ARCHITECTURAL QUALITY:

The character of the medical unit and its acceptability to both patients and staff is determined by the shape of the buildings and the spaces between them. Out-spaces are important and often have a function and character as clear as inside spaces. They should therefore be designed in a deliberate way as "outside rooms" which people will use for working, relaxing or even for the temporary storage of furniture while adjacent rooms are being clean. This is effectively achieved through proper landscaping.

6.8.1. LANDSCAPING. Both the preservation of existing foliage and new planting is of the utmost functional and psychological benefit. Not only is the shade afforded by trees almost always welcomed, but more general planting can have an overall cooling effect through the absorption of solar radiation and by evaporative cooling. Trees are also useful for defining outside spaces just as flowers, they provide windbreaking advantage.

Finally, the planting of a vegetable garden besides providing a reliable source of food to the centre, can serve as an outdoor classroom for nutrition education.

6.8.2 SERVICES: Sewage and water services always pose some expensive problems, therefore, buildings should be arranged in such a way that their connection is short and direct as possible. This essentially applies to those parts of the building such as toilet blocks and Laundaries which consume most water and dispose of most waste material. Due to the frequent maintenance required by most services, the main runs should be easily accessible for example, running at the side of footpaths or roads, and should never have to run beneath buildings.

6.8.3. SOUND AND NOISE: Sound or Noise in any type of building or design has its level of appreciation. At a given time noise or loud sound becomes an irritant. Buildings therefore should be planned with this consciousness

When buildings are spaced 10m apart for conversational privacy and in cases, where windows are open, it will help reduce the transfer of noise from one part to the other.

Courtyards, nurses' stations, most of the ancillary services etc. are all good sources of noise in health buildings.

Soft ground surfaces such as grass absorb sound, trees and folliage are fairly poor sound barriers tending only to diminish high frequency noises.

6.8.4. TOPOGRAPHY: Diffuse arrangements of smaller units are the most adaptable for undulating sites. But fortunately this is not the situation with my site. Longer buildings should run with the contours for the need of proper settlement.

Flat sites such as mine, present fewer building problems but may need special drainage provision.

6.8.5. EXPANSION: The layout of buildings should be loose enough to allow for growth. It is ideal to allow for the extension of individual buildings by leaving space beyond the gable end of each block and for the addition of further units by setting aside zones for expansion within the master plan. The future growth of the circulation and services networks should also be considered.

6.9. DESIGN CONSIDERATIONS: CLIMATE: Being in the tropics, the sun should be excluded by facing buildings towards north and south and any available breeze should be caught. Open arrangement of buildings allow for greater ventilation but at the same time provide less protection against high winds and dust storms.

Sufficient natural light and ventilation is not normally a problem in tropical areas if some scientific deductions are strictly followed. For example, buildings having the same height and are parallelly spread should have the space between

them equal to two times their height. Let H equal to the height of one of the buildings, then the total space area expected should be equal to 2H. There are other scientific hypotheses which have been theorised with scientific basis worth adoption.

6.9.2. SITE PLANNING: The nucleus as earlier mentioned comprises the preventive, registrative, diagnostic and treatment units which forms the out-patient department.

Emergency, observation unit, children's unit and the maternity form the in-patients department.

6.9.3. RULES GUIDING PLANNING: All buildings have an obvious connection with at least some part of the nucleus.

Any function likely to cause air pollution (smoke) or smell) should be to the lee-ward side of the nucleus.

Most buildings, particularly the garage and main stores, will require vehicular access.

Most important of all is that peripheral buildings should never be placed in such a way as to restrict the future expansion of the nucleus.

Kitchen, Laundry garage, workshop, store constitute the periphery. The mortuary which has in the past been neglected in health centre designs when employed also constitutes the periphery and should have its geography at the periphery.

MATERIALS AND FINISHES: Naturally, choice of materials in any one design is always affected by availability, accessibility and capital. A rural settlement might not find it easy in effecting a design that its materials are either foreign or unavailable for obvious reasons. A rural area should as a matter of fact be treated as a rural area at least with a minimum sophistication.

Concrete Hollow blocks are employed as the structural walls, they could be used in the foundation laying. Timber and steel rafter are employed and asbestos roofing sheets (amientos) for the roofing. Concrete sand screed for floors and plastering floors in the wards could be of granolithic floor finish and many other finishes.

Materials and finishes would be extensively treated in the next chapter.

6.9.4. CONCLUSION:

The overall design has been an Integrated Health Centre for Kwoi and its environs. The architectural in-put, the cultural involvement, the realisation of the economic realities of the people and the state, the patients comfort and circulation, the reflection of an organic habit at or environment through landscaping and many other scientific and intellectual considerations employed in the design and general planning, have always being the ingredients that hold unto the needed architectonicity of a thesis work. However, this can be glamourised by the digestive intellectual rationalisation of a duo if not trio's amalgam of rational and aesthetics conscious architectural personalities.

6.10. NOISE CONTROL IN HEALTH BUILDINGS

6.10.1 INTRODUCTION:

The great majority of the sensations caused by the environment are perceived by man through his eyes and ears. Sound phenomena have been present since time immemorial. The primitive human the 'homo sapiens' had 'learnt' to produce noises of relatively high intensity and long duration. The advent of gunpowder finally enabled him, much later to compete with the noise level of the strongest of the commonly encountered natural phenomenon - thunder - only to leave it far behind with the development of nuclear bombs.

If high intensity noises occured in prehistoric times, they were mostly connected with some events actually threatening life. The roar of lions and the sounds of other predatory animals close to the listener, storms and floods, a flash of lighting nearby, an avalanche, a landslide and the eruption of a volcano were all sources (external) that could be irritating to the ears and general comfort of a listener. Noise spells danger and induces fright as a matter of fact.

To this very day and hour, man has been unable to free himself completely from the almost instinctive and certainly involuntary link between noise and fear. The well-celebrated expression "whistling in the dark to keep the spirits up", on the other hand, shows the intimate connection between self-created noise and the suppression of fear.

Noise, as a natural phenomenon has its level of perception fluctuating from one individual to the other and from one sick person to the other. This can be clearified by discussing 'Silence' and susceptibility as components or derivatives of noise.

SILENCE: Since, time immemorial, silence or deep calm and quietness have become symbols of death, in poetry as in everyday language. A specially eerie effect is always produced by the sudden silence cutting short the sounds of normal life. When the situation is tense, on the other hand, 'calm before the storm' presages impending disaster, frightening people even to the extent of hypnotising them into immobility. This happens to the healthly, talk more of the sick.

SUSCEPTIBILITY: Susceptibility to sound, like most human qualities and attributes, differs not only from person to person but has been known to change in one and the same person within relatively short periods of time. In order nevertheless to be able to make certain generally valid statements, the following trichotomy has been found of help:-

(1) Persons susceptible to sound;

(2) Persons middling susceptibility; and

(3) Persons insensitive to sound. Noise regulations are exclusively tailored to the requirements of the "average" person of middling susceptibility to sound.

Individual differences in sensitivity become manifest not only when noises are obnoxious; they find almost literally objective expression in the lessions to the auditory system suffered by persons

constrained to work in noisy surroundings, that is, in such that have a noise level exceeding 85dB (B).

6.10.2. ILLNESS AND NOISE:

In the words of the highly celebrated corpus Hippocraticum, the great medical compendium ascribed to Hippocrates him self, 'noise and stench are to be kept from the sick'. This ancient wisdom has been completely vindicated by modern medical research. It was found that the sick are almost invariably much more susceptible to noise than the healthy, yet although the levels and durations of noise effects are constantly on the increase in modern life, little attention has unfortunately been paid to the protection of the sick from the impact of noise. Steady noise levels of 40 L 60dB (A) where L is equal to noise level may even in daytime, adversely affect health-giving rest. Since undisturbed sleep too is of prime importance to the sick, while on the other hand their sensitivity thresholds are lower than those of the healthy, no effort should be spared to reduce the steady noise levels in hospital's to values that are lower by at least 5dB (A) than those accepted as normal at night.

Many doctors believe that daytime sleep which they term "therapeutic sleep" accelerates recovery. Given the right planning, the maximum steady noise level of 35dB (A) permissble for that purpose is certainly attainable.

From a generic insinuative standpoint goals similar to those applicable to hospitals should also be envisaged for rest homes for the aged, for sanatoria and enlarging the scope somewhat for health resorts, since only in a calm environment can modern

men rest from the effort or his work-days and gather new strength for the labours to come.

GLOSSARY: Decibels or dB(A): This is a linear scale defining a logarithmic amplitude scale. The scale dB(A) is used as it is a weighted scale designed to represent more closely the range of the human ear.

6.10.3. SOURCES OF NOISE IN HEALTH BUILDINGS:

Distinctively, source of noise in health buildings can be broadly categorised into two: The within and without sources or the internal and external sources:

Identifying the external (without) sources mention must be made of the following:Air-craft movements, Industrial activities, street traffic noises, railways, ships, Building construction close to site, natural thunder, avalanches or volcanic erruptions and so many others. While some of these sources can be eschewable through human efforts, some cannot. The mannerism by which each can be attempted towards combating, varies. Nonetheless, a greater part of these can be curbed. For instance, the street traffic noises, railways, building construction noises, Industrial noises, etc. The mechanisms of how this can be actualised will come in the subsequent sub-headings.

Note is worth taken by the reader that in all these cases hitherto mentioned at the genesis of this intellectual discussion above, the noise reaches the ear of the involuntary listener almost invariably in the form of air-borne sound.

When trying to identify the numerous noise sources within a health building in the strictest sense of the word, the [illegible] corollary will always remain open-ended, even as a limitation as to the numerousity of the sources might not be reached. Thus mention will be made on the most striking and crucial sources that are within the author's reach. Besides, the identification process can be more effective when every unit is taken as an independent structure.

THE OUT-PATIENT DEPARTMENT: Voices of patients, footsteps, shifting of furnitures, air-conditioning if available, staircases if available, shared facilities such as toilets showers, water in pipes, sanitary noises such as flushing of toilets, ventilation shafts, ducts etc.

THE NURSING UNITS: Within the maternity section, babies outcries, mothers voices, instruction class noises, labour and delivery noises and as above in the out-patient department are all noise sources.

In the theatre, modern surgery has discovered the dangers of air pollution and water pollution about a century ago and as a result, has practised aseptic, anti-pollution technics since. However, in our pollution-aware age, surgery has fallen behind in its recognition of what has been called "The Third Pollution". This is noise defined as unwanted, obnoxious or harmful sound.

The noise from the waiting and reception, paper, rubber gloves, objects wheeled across the floor, various hand instruments and implements of metal and glass striking one another, and high-pitched compressed air-sounds. There are also ever present the banter and babble of those in the operating room, including voices of surgeon, anaesthesiologist, nurses and assistants are basically the sources of noise in the theatre complex. Included are some as mentioned in (b) above.

The surgical and medical wards have staff from the nurses' station and audible warming devices as their main sources of noise problems. Sluices, bathrooms, water-closets, courtyards, footsteps, day-spaces and other facilities constitute the sources of noise in the nursing wards in general.

THE ANCILLIARY SERVICES: It's no need re-echoing once more that almost all functions within this unit have "High Fire load" and are termed the "High Fire Risk" functions. May be because of their susceptibility to fire outbreak and high noise generating ever present potentials. The garage, workshop, kitchen, laundry, mortuary, central store, central sterile supply department, the maintenance unit as functional spaces have their activities all noise generating sources. It is worth taking note that once an attempt of solving noise problems is successful, the process has concurently solve the problem of fire outbreaks.

6.10.4. CONTROL:

The control of noise in any context within a building has to do with compromising acoustical building materials and considerations with economy. Broadly speaking, this can be approached following the below trichotomy. (1) Zoning (2) Reduction of noise at source and (3) Structural means.

Unlike lighting, the principles of Noise control are poorly understood.

Broadly, sound insulation between rooms depends upon the weight, the continuity and stiffness of the intervening partitions, but principally upon the first two of these factors. Sound insulation value rises with the weight of the intervening wall or walls and this is the principal determining factor. One can say, almost categorically, that it is almost impossible to make light weight walls give even a moderate degree of sound insulation.

By continuity (the 2nd factor) we mean, of course, the number of openings in the intervening walls. It is of little use to provide a heavy insulating wall and then pierce it with doors or windows. Noise takes the place of least resistance.

Insulation must not be confused with absorption. Sound insulation is the property of a mass which determines the amount of incident sound which passes through it, sound absorption is the property of a surface which determines what proportion of the incident sound is reflected from it. The former determines the effect of the sound in the rooms next to or some distance away from the noise, the latter determines the subjective effect of the incident noise only in the room in which it occurs. The effect of treating a noisy room with sound absorbing is marginal and indeed neglible so far as conditions in the adjoining rooms are concerned.

Sound insulation and absorption by structural means are expensive processes, and every attempt must be made to control noise by other means before resorting to them. The order of priority is as follows:-

1. PLANNING AGAINST NOISE: The placing of noisy departments away from those requiring quiet conditions and the same consideration for individual rooms within departments. Placing noisy areas next to those needing quietness is deliberately to increase difficulty of contr

The author consciously and conscientiously had taken care of this in his concept evolution and general site structure (zoning). This is clear even as the noisy ancillary services are sited at the noisiest area of the site while the Nursing units which don't tolerate noise, sited at the noiseless area. The out-patient department, in order to maintain its functional relationship is approached from the Sabon-Gari-Kwoi Main road.

The choice of site as a matter of fact was a conscious attempt to do away with noise discrepancy of some possible sites. The site is not within constant route of aircrafts, is not in close proximity with railway line or an industrial activity even as these are absent at Kwoi. The only noise possible source is the traffic noise from the main road (Sabon-Gari-Kwoi). This can however be trapped by planting trees along the fence in this direction as exhibited in my design.

2) REDUCTION OF NOISE AT SOURCE: It is better to elliminate or reduce noise at source than to attempt to prevent its spreading once it has occured. Numerous methods are employed including rubber tyres to trolleys, door closers resilent floor surfaces, silent flushing water-closets and many, many others- all cheap and simple to achieve.

3) NOISE REDUCTION BY STRUCTURAL MEANS: Only as a safeguard after [illegible] steps have been taken under headings (1) and (2) above.

a) Sound insulation: This means the use of heavy materials or expensive forms of construction.

b) Sound absorption: Useful only in reducing reverberation time, for example, in corridors and to give an air of subjective calm in occupied rooms.

It is particularly important and material to prevent spread of noise by reflection from hard surfaces along corridors and other circulation routes, thus localising noise nuisance.

Sound absorbing surfaces are difficult to clean and medical opinion is divided as to whether it is permissible in patient areas or not. However, a pedantic look at this will help solve the ambiguity to some degree.

Headings (2) and (3) will be digested so that a direction may be got as to the mechanisms of checking noise pollution.

This will be tackled as we will have a critical architectural look into building materials and finishes that could be sound absorbing, the type of treatment that should be accorded each part of the entire structure or complex in terms of floors, walls, ceilings or roofs, doors, windows, general services and a thorough study of the properties of these building materials.

As a matter of fact the critical space within the health building complex is the Nursing unit christened the 'High Life Risk' area. Thus emphasis will be laid on this unit as other units seem to be secondary in terms of noise dislikeness.

FLOORS: Floors of all public areas can be treated against noise when the following below are strictly obeyed to an optimum degree.

Using hard surface finishes in the out-patient department general waiting and treatment rooms e.g. terrazzo.

Rubber Lalex, based cement fleximar with marble chippings can be used in the consultation rooms.

Terrazzo with 1/8" bronze strips can be used in the X-ray and theatre. For the latter, the bronze will act as an earth wire against any electrical spark during operations.

Asphalite tiles can be used in the kitchen and semastic floor tiles for the wards.

Cushioned Linoleum can be used in floors to achieve a considerable degree of sound insulation.

Carpets with floor polishersin the public areas (general waiting, dayspaces, etc) can be used. Care should be taken here as this tend to store germs, so a hygienic attention should be given it when employed at any function - constant polishing.

Composition flooring in corridors.

Flat reinforced concrete slab for higher floors spanning between bearing walls without beams and a flooting floor provided and isolated from the structural slab by a layer of glass silk is acoustically good. This construction can give a reduction of about 50dB(A).

Cork tile is a good material for floor-covering and is advocated for public areas and wards. This combines good noise-reducing qualities with a smooth, hard wearing, and pleasant looking surface, desired by hospital floors.

Any of the above listed floor finishes for sound absorption can help reduce noise to a considerable amount.

WALLS: Basically, materials for wall construction are: Reinforced concrete sandcrete blocks, alluminium glass and timber. Different treatments can be accorded this materials and they will effect sound absorption characteristics.

End walls of sandcrete blocks with a portion of 6'0"x4'0" faced with precast concrete slab with granite aggregates exposed can be of help in sound control.

Use of solid brick 9 inches on Reinforced concrete walls which will be load bearing walls can help.

Pairing of walls so that water-closets and the ducts housing their service pipes are boxed in between them can reduce services noise.

Four - inch clinker block partition can give a sound reduction of about 43-45 dB(A) in the wards.

Use of Reinforced concrete walls insulated against impact or solid-borne noise is yet another way out.

When using cross walls as partitions only formed of concrete blocks in two leaves completely enclosing central structural stanchions, noise reduction can be up to 52-55 dB(A).

In any case, care must be taken so that finishes and materials employed have hard surfaces that will constantly okay good and easy cleaning.

DOORS: Doors that can present good hygienic properties and synchronically are good sound controllers or absorpers are the ones needed here.

Swing doors with double leaves in wards which swing in both ways yet come to rest silently in a closed position are advocated. Though swing doors cannot fit tightly into their frames, and provide only a partial sound-barrier, they are still preferrable in very busy rooms, to doors which can be set wide open and so offer no barrier at all.

Doors with autometic closing devices are also advocated. These doors are free until they reach a point within few inches of the door-frame where an overhead mechanism takes charge and shuts it gently against a cushioned jamb. These doors cannot be slammed and are without latches.

Bi-parting doors sliding to one side in lifts are the best solution for noise control as special buffers can be incorporated to achieve the above.

WINDOWS: Window type still have a role to play in the bid of achieving a maximum sound controlled atmosphere in the wards and other places.

The alluminium louvres of silver anodised finish are good for this purpose.

Good also are clear sheet glass and flat asbestos sheets.

Adjustable alluminium louvres provided at 1'3" above the floor in wards, waiting rooms etc. are good too.

Double glazing could be responsible for reducing external noise.

Bed-curtain rail which has fibre runners which greatly reduce the noise made in drawing the curtains can be used.

CEILINGS: Ceiling is the trio's third party of floor and wall relationship until these trio's "brothers an' sisters" are treated without discrimination, the aim of achieving a sound controlled environment may be unreachable.

False ceilings of acoustic tiles are good sound absorbers.

Perforated gypsum plaster-board backed with glass silk is also good. This treatment can be designed to be effective over an appropriate range of frequencies and unlike some other forms of acoustic treatment, it is free from fire risk.

Ceiling-heating of the embedded-panel type is okay.

Perforated alluminium panels fixed onto a grid of heating pipes hung below a structural slab of high rise floors is advocated for this purpose. This ceiling is a proprietary product and provides heating as well as acoustic correction in all rooms and corridors.

Roofs could be of tiles on timber frames.

SERVICES: Services systems tend to pose many shortcomings in terms of noise control. A satisfactory system should be sought out for a catholic and cosmic adoption.

Flushing mechanism chose should be quieter.

Disposition of water-closets at some centres.

Backing of W.C compartments by deep cupboards and each is further cut off from the ward by a small lobby.

Shafts for service lifts if available should be surrounded by solid load-bearing walls.

Grouping the W.Cs and should be approachable from the circulation area instead of from the bed area.

W.Cs should be isolated by 4½ inch brick wall and the flushing values fixed to the wall between two W.Cs and the wall being isolated from the ward partition.

Ducting wiring and other services should be hidden by false ceiling of acoustic tiles and floor of cushioned linoleum.

Where air-conditioning system is present, the vents should be set below each window and in the ceilings all windows doubled glazed.

Telephones should be mutted at night and other systems of communication and supplemented with visual signals.

Eschewing the monoblock concept of planning is yet another step as services are complicated and can encourage unavoidable noise.

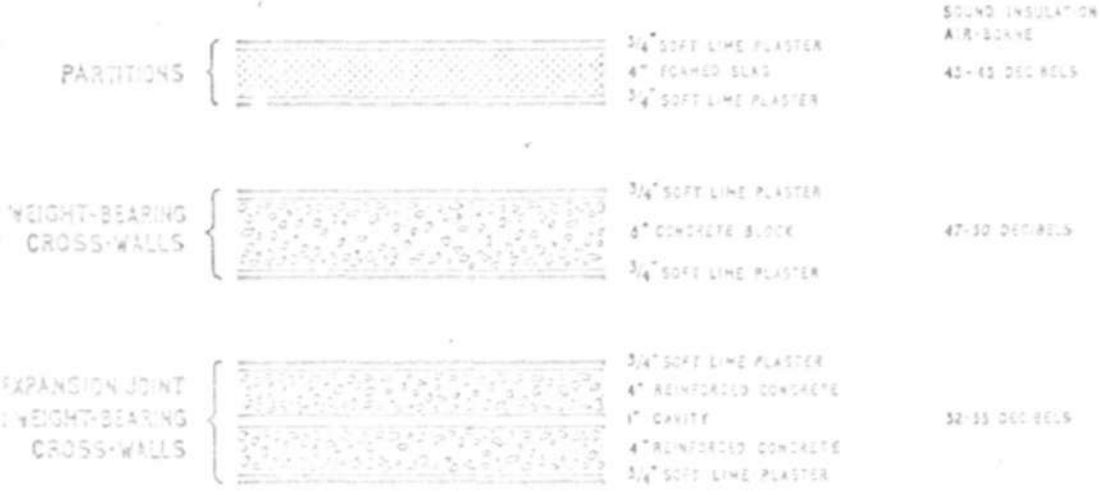
The author believes that by the time all the above catalogued proposals are strictly adopted, the wards, the public areas and all noise undeserving places within the health complex can be noiseless once and for all.

Two practical examples are viewed with enthusiasm and are discussed diagramatically as seen below in the respected trio's relationship of floor,wall, ceiling

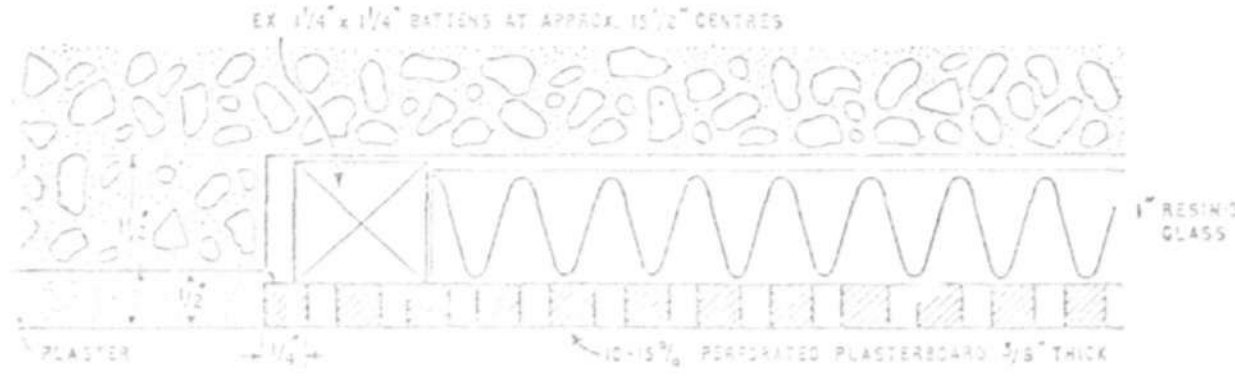
The advocation of the above does not necessarily mean that the author has adopted this in his wards design, since the above is for health buildings in generic terms. Availability of these materials and finishes is one problem, the economic viability of the users is yet another. However, a design has been presented which was only a pilot-study of a realistic situation. The time this will be adopted will however depend on economy and availability of materials.



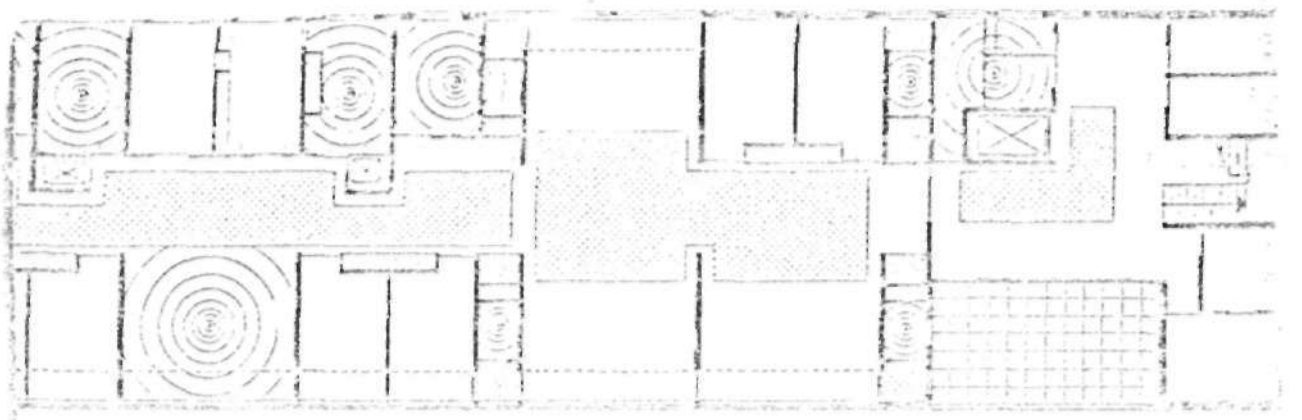
Control of sound in the experimental ward unit at Larkfield Hospital. Detail of floating floor



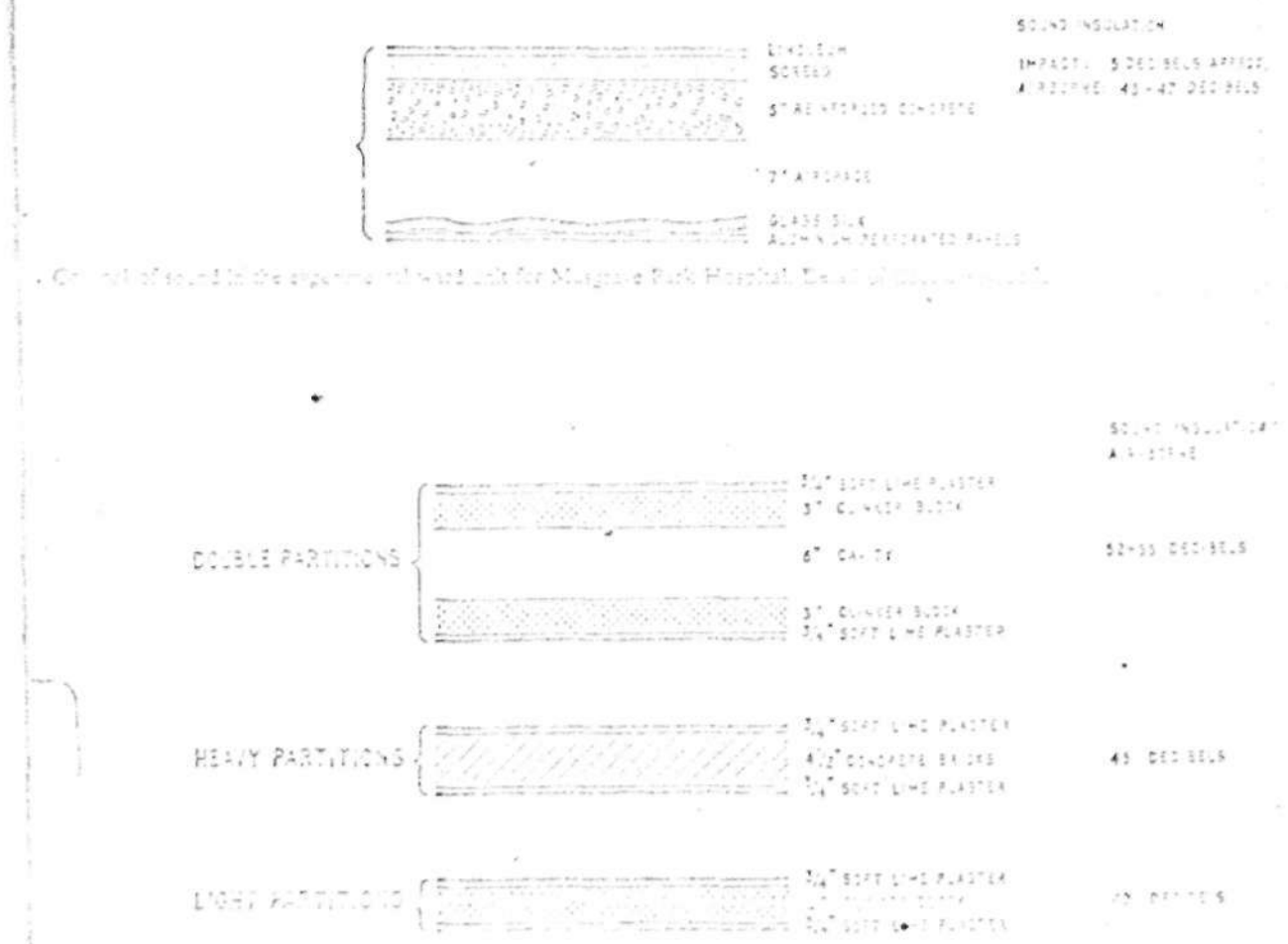
Control of sound in the experimental ward unit at Larkfield Hospital. Details of wall construction



Control of sound in the experimental ward unit at Larkfield Hospital. Detail showing how sound-absorbing panels are



al. Sources of noise and positions of sound-absorbing panels in ceilings



Control of sound in the experimental ward unit for Musgrave Park Hospital. Details of wall construction

6.10.5. CONCLUSION:

Sound is controlled by minimising noise at its source, by isolating or muffling structure-borne reverberations caused by impact, by providing sound-reducing walls and floors between the sources of noise and the patients (the heavier the structural elements the greater their sound reduction properties), and by applying absorbents to surfaces in areas where noise is likely to occur.

Measures that should be taken to reduce noise at source include doors which close silently, fibre runners to bed-curtains, and cork floor-finish. Heavy load-bearing structural walls minimise structure reverberation, provide 47-50dB(A), reduction in air-borne sound between the wards, and isolate W.Cs and service ducts. A floating floor, laid over the concrete slab spanning between cross-walls, gives a reduction of 50dB(A) between stores. Perforated plaster-board backed with glass silk is applied to ceilings over the open circulation spaces. A reinforced-concrete frame is to be used, and non-load-bearing cross walls, consisting of two leaves of concrete blocks, which separate the wards, will also enclose the structural columns and muffle structure-borne noise. These partitions give a reduction of 52-55dB(A) between rooms, and the floor construction gives a reduction of 45-47dB(A) between floors. Perforated alluminium panels, backed by glass silk (part of a proprietary system of combined ceiling-heating and acoustic control) will provide absorption over the whole ceiling area.

Lastly, if money were no object every room in the hospital could be sound-proofed, but it is difficult to achieve control by this means within the limits of reasonable economy.

There is still a lack of precise information about noise in hospitals, in particular about its loudness and pitch in different areas, and its toleration by different classes of patients.

BIBLIOGRAPHY

1. Anthony, C. and Phillip, G. (1981). Design for Health Care. Butterworths Design Series.

2. Alan, E.(1970). Materials. Mitchell's Building Construction.

3. David, M.E. (1975). Concepts in thermal Comfort.

4. Dudge, F.W. (1960). Hospitals, Clinics and Health Centres. An Architectural Record Book.

5. Geoffrey, C. (1955). Studies in the Function and Design of Hospitals Nuffield Provincial Hospitals Truss.

6. Neufert, E. (1981). Neufert's Architect Data. New International Edition (Low Priced).

7. Paul, P. (Ed) (1984). Longman Dictionary of Contemporary English Low Priced Edition.

8. Derek, J.C.(Ed) (1982. Noise in the Design of Buildings and Services. London Construction Press.

9. Aitken, R.J. (1982). Quantitative Noise Analysis in a Modern Hospital. Arch Environ Health 37(6): 361-4.

10. Topt, M.n. (1983). Noise Pollution in the Hospital. 309(1):53-4

11. Paragay, D.A. (1981). Noise Levels in Hospital Laboratories. Are they a Problem and can they be reduced?. 14(3):157-8

12. Jeffries, M. (1966). Noise Control: Three Approaches. Hosp Top 44:65-6.

13. Schandinischky, L.H. (1976). Sound, Man, and Building. Architectural Press.

14. Edward, D.M. (Ed) (1973). Building For Health Welfare and Religion. Ninth Edition.

15. Bogdan, M.K. Kay.H.E. and Duano, L.S. (1981. Health System Support For Primary Health Care. A Study based on the technical discussions held during the 34th World Health Assembly.

16. Mohammed, S. (1984). Multi-Purpose Hall for Kaduna (Mogadishu.) Unpublished M.Sc. Thesis. Ahmadu Bello University, Zaria, Nigeria.

17. Hamza, S. (1983). Wudil Rural Hospital. Unpublished M.Sc. Thesis. Ahmadu Bello University, Zaria, Nigeria.

18. Joseph, K. (1981). Rural Health Centre (Prototype) for Benue State. Unpublished M.Sc. Thesis. Ahmadu Bello University, Zaria, Nigeria.

19. The Nuffield Foundation Division for Architectural Studies in association with the Ministry of Health, London (Ed) 1960.

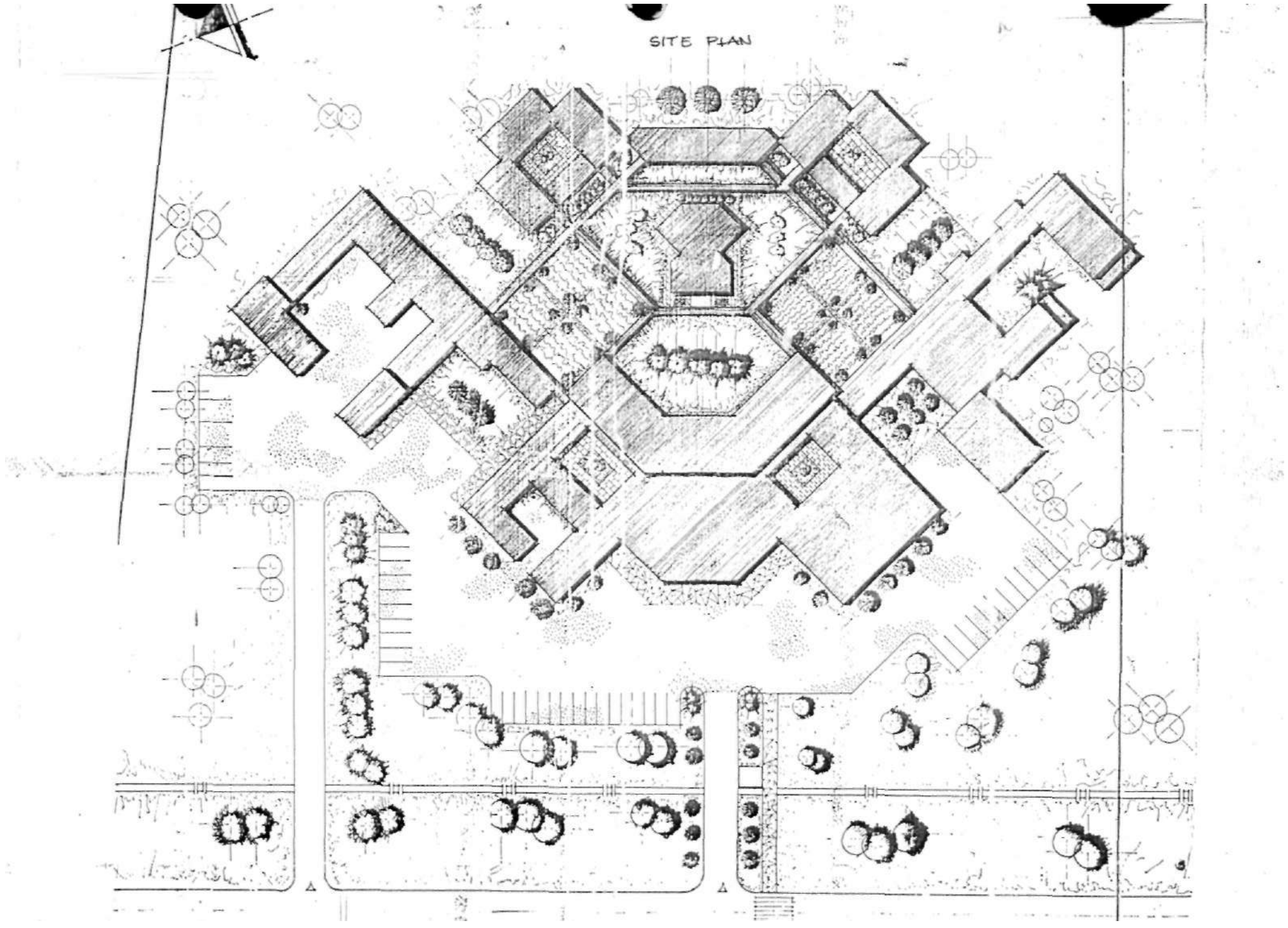
Summary of lectures on Hospital given at a study course for Architects at Worcester College, Oxford. Pp.21-121.

20. Umar, S. (1983). Health for all by the year 2000 A.D. Paper presented at the third graduation ceremony of the Borno State of Nigeria on "Health" held at Maiduguri. New Nigerian Newspapers of Monday the 14th March, 1983.

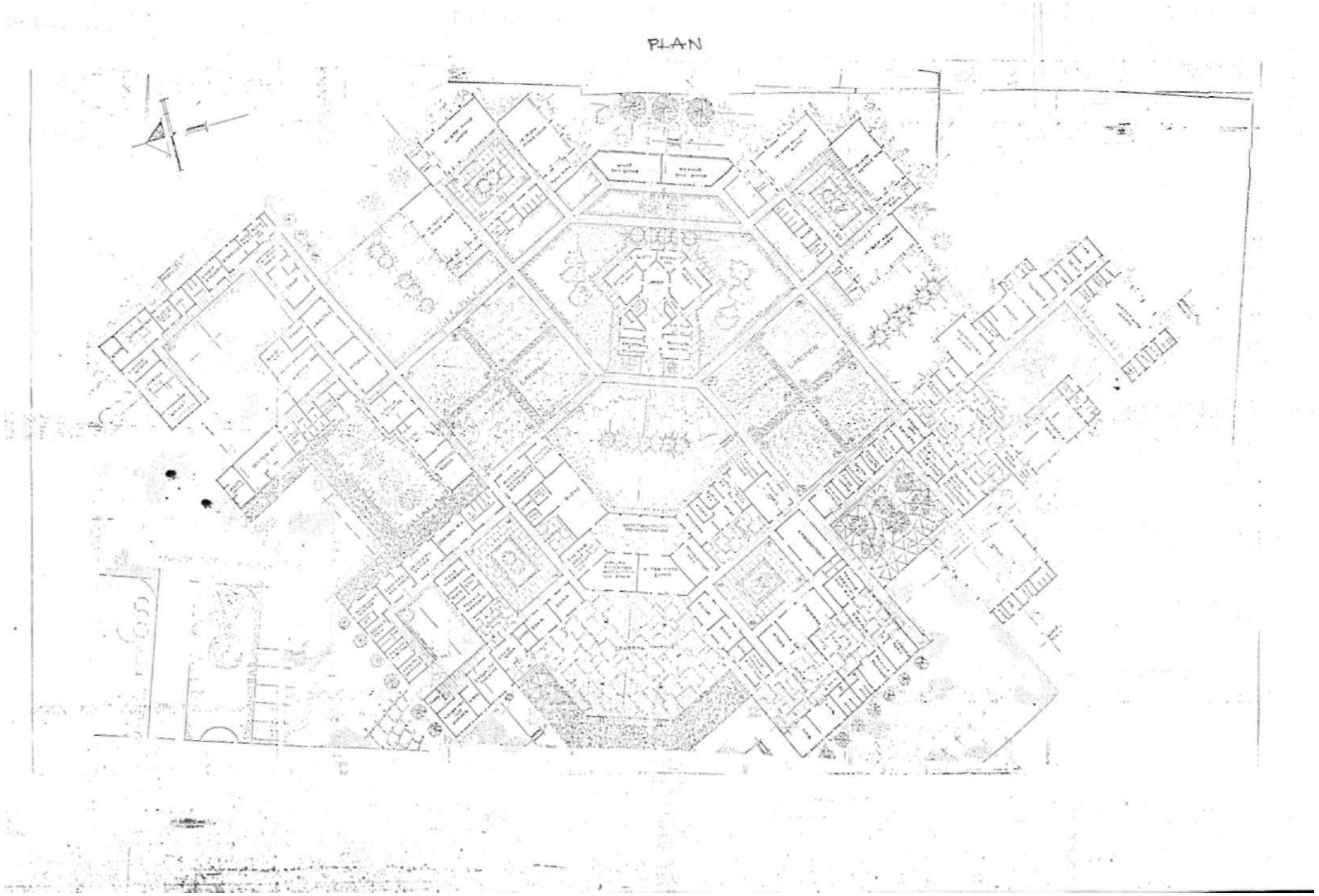
21. World Health Forum.
An International Journal of Health Development 1985, Vol.6 No.1 and Vol.5, No.4.

22. World Health Forum,
An International Journal of Health Development 1982, Vol.3, No.4

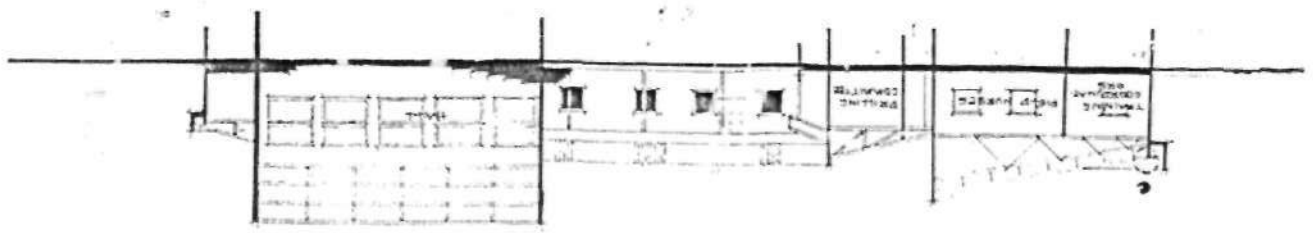
23. Ugwu, D.C. (1981). What is Health? Paper presented at the occassion of the World Health Day (stand and daily newspaper of Tuesday the 14th April, 1981 on 'Health held in Lagos.


SITE PLAN

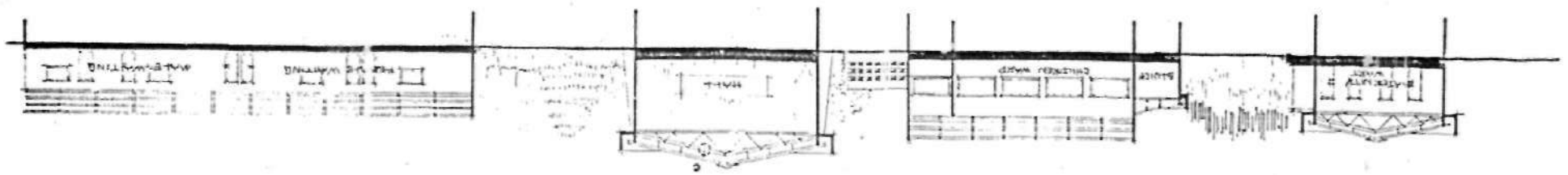
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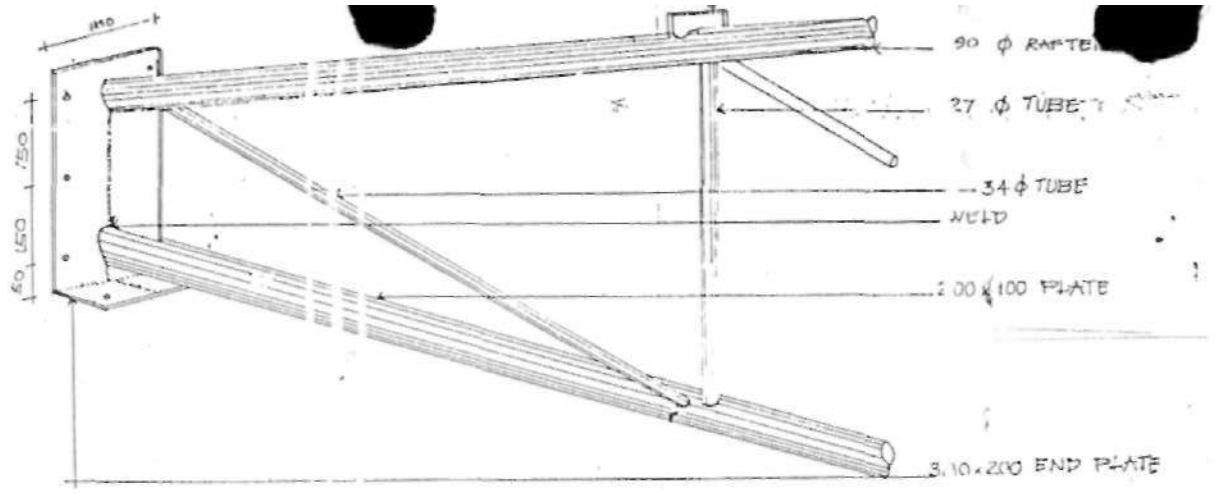


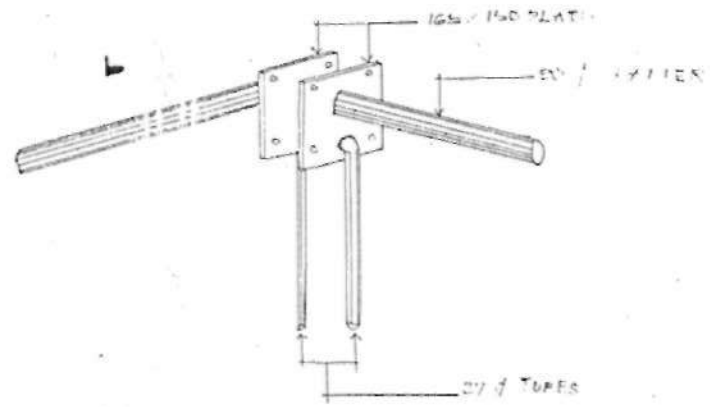
SECTION Y-Y

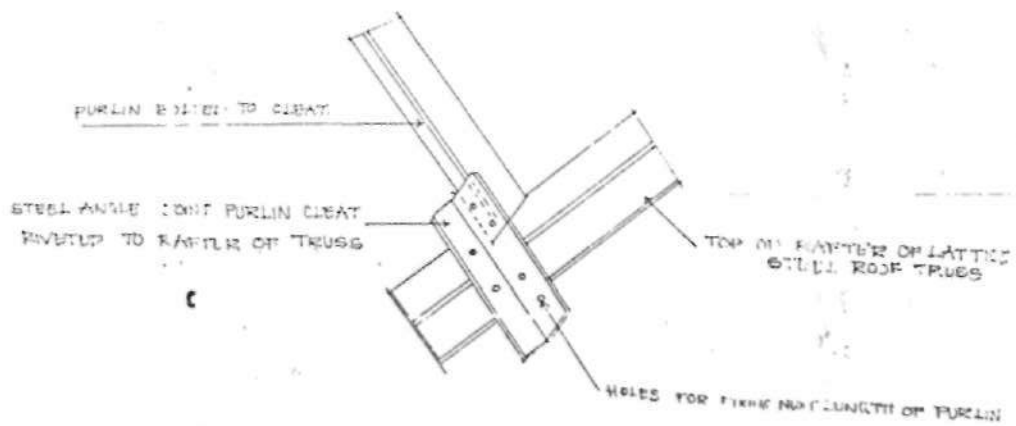


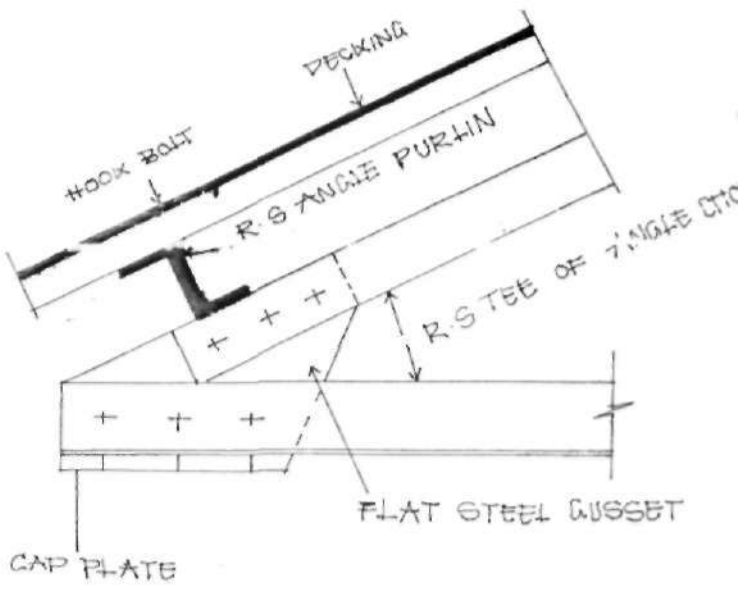
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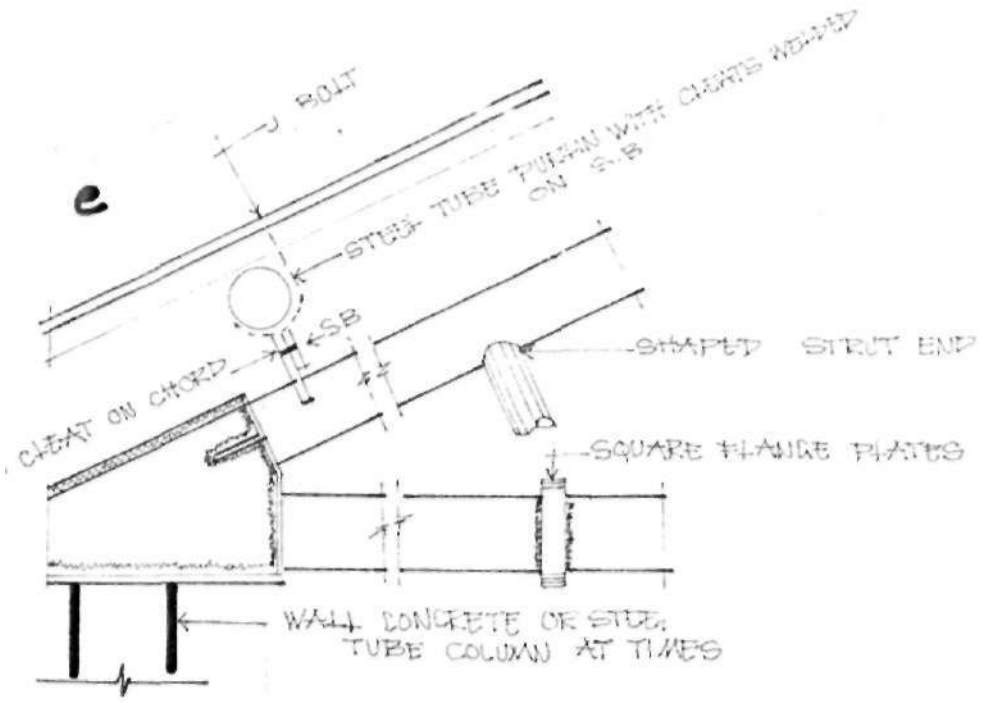

90 ϕ RAFTER
27 ϕ TUBE
34 ϕ TUBE
WELD
100 x 100 PLATE
150
150
50
3.10 x 200 END PLATE


165 x 150 PLATE
ϕ RAFTER
27 ϕ TUBES

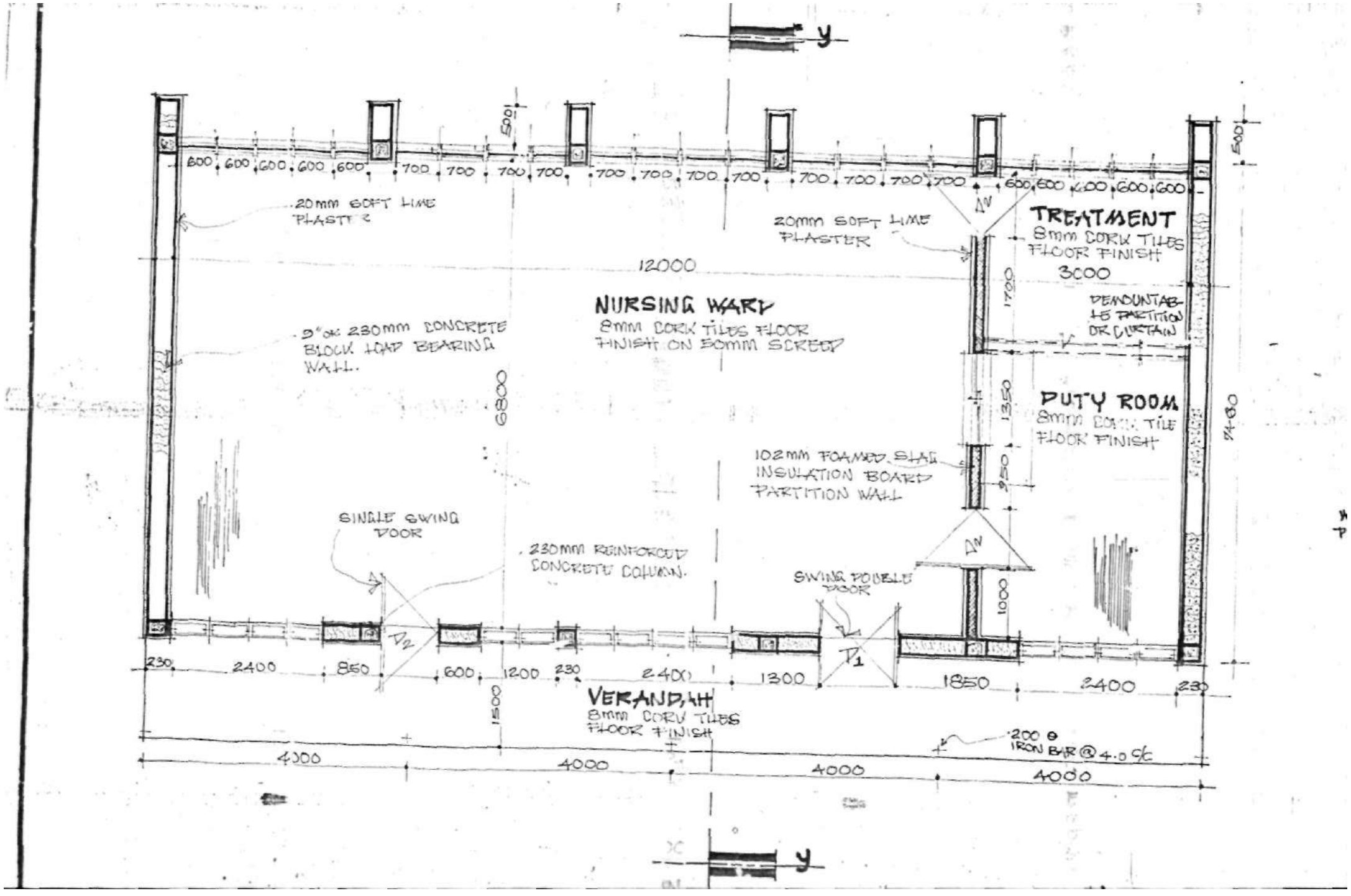

PURLIN BOLTED TO CLEAT
STEEL ANGLE JOINT PURLIN CLEAT
RIVETED TO RAFTER OF TRUSS
TOP OF RAFTER OF LATTICE
STEEL ROOF TRUSS
HOLES FOR FIXING MAT. TO UNDERSIDE OF PURLIN

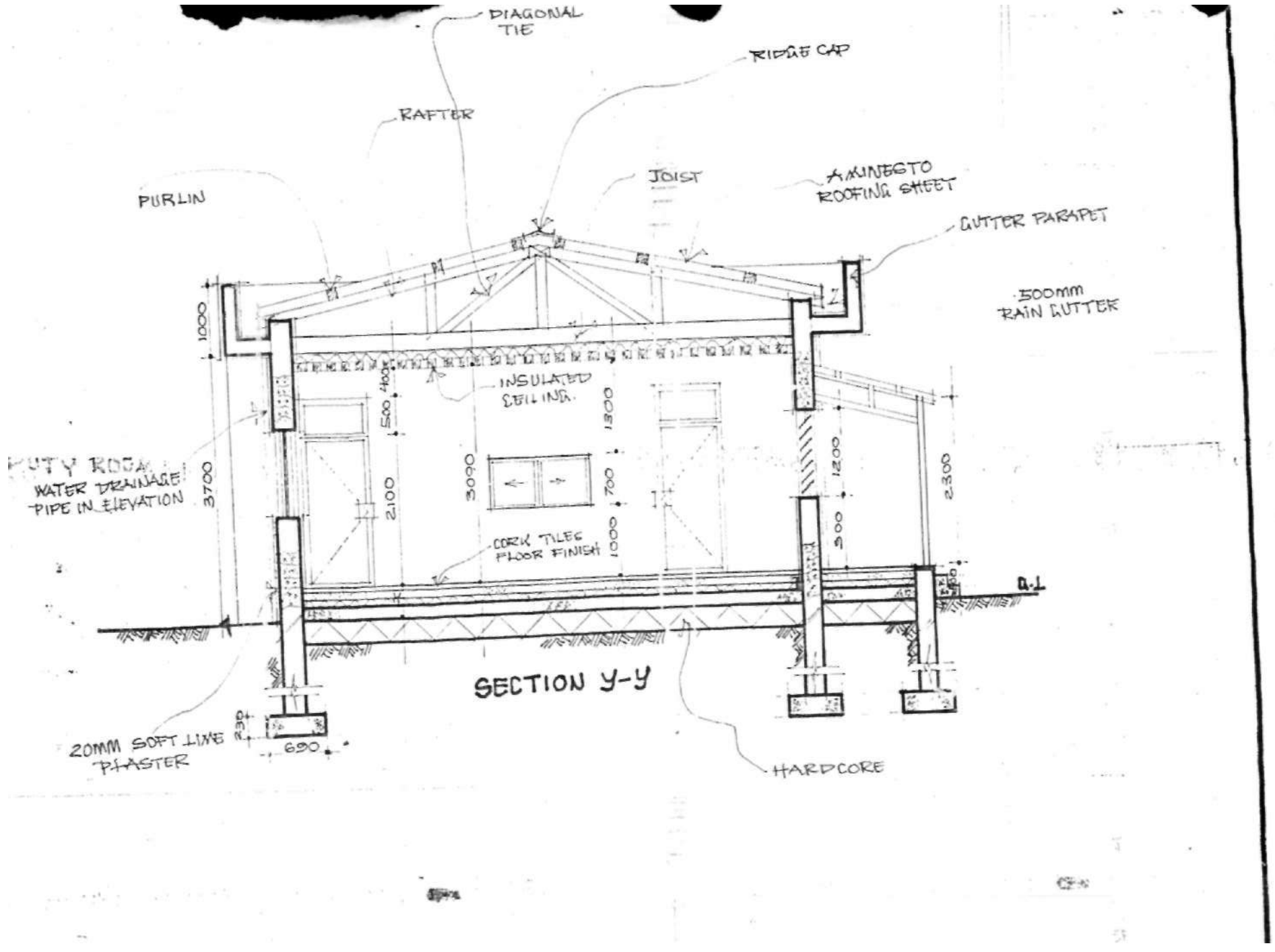


ROLLED STEEL TRUSS AND PURL



STEEL TUBE TRUSS AND PURLIN


y
600 600 600 600 600 700 700 700 700 700 700 700 700 700 700 700 700 600 600 600 600 600
500
20mm SOFT LIME PLASTER
20mm SOFT LIME PLASTER
12000
TREATMENT
8mm CORK TILES FLOOR FINISH
3000
DEMOUNTABLE PARTITION OR CURTAIN
NURSING WARD
8mm CORK TILES FLOOR FINISH ON 50mm SCREED
9" or 230mm CONCRETE BLOCK LOAD BEARING WALL.
6800
1350
950
PUTY ROOM
8mm CORK TILE FLOOR FINISH
4800
102mm FOAMED SLAB INSULATION BOARD PARTITION WALL
SINGLE SWING DOOR
230mm REINFORCED CONCRETE COLUMN.
SWING DOUBLE DOOR
1000
D2
D1
230 2400 850 600 1200 230 2400 1300 1850 2400 230
1500
VERANDAH
8mm CORK TILES FLOOR FINISH
200 ø IRON BAR @ 4.0 c/c
4000 4000 4000 4000
y

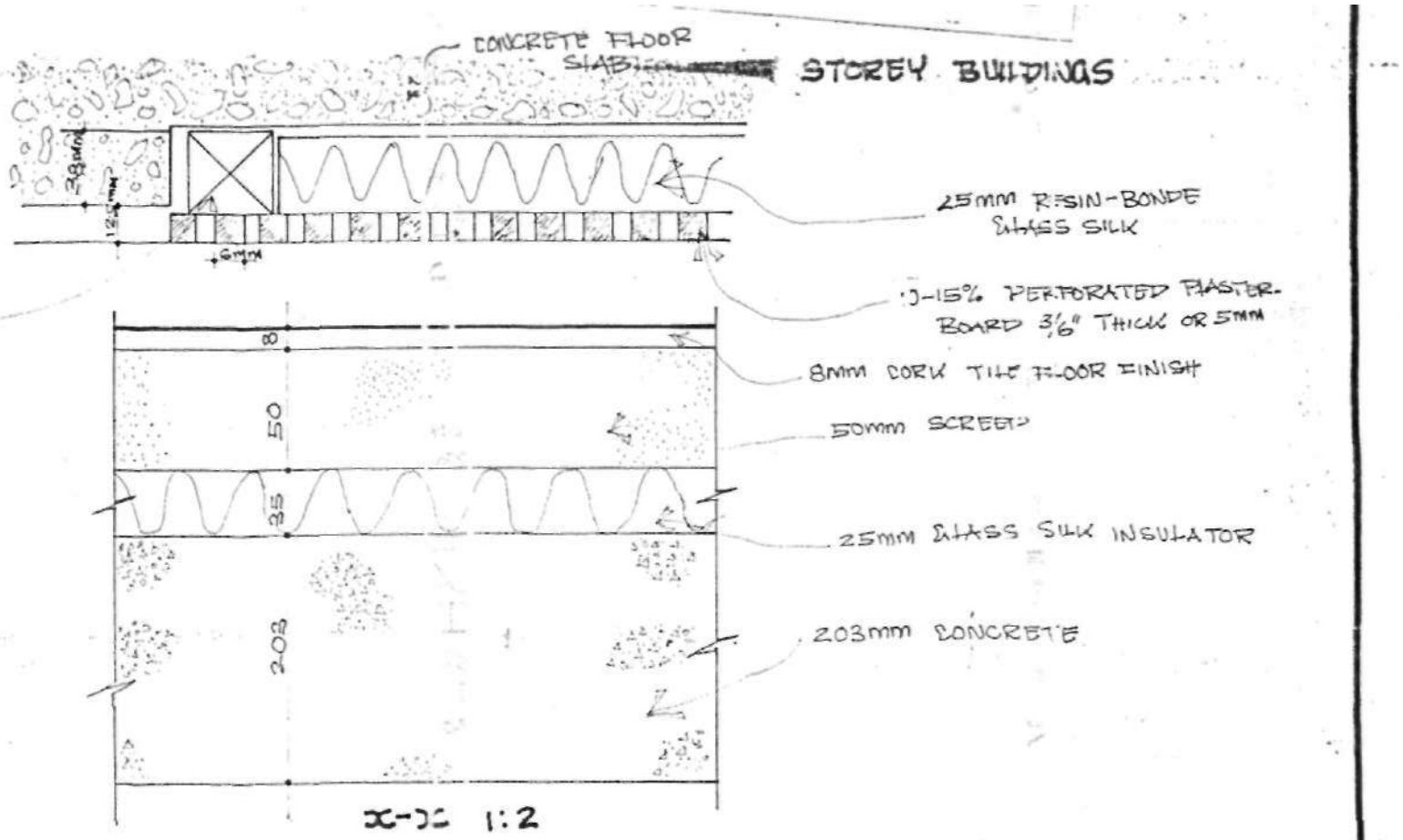

DIAGONAL TIE
RIDGE CAP
RAFTER
PURLIN
JOIST
ALUMINIUM ROOFING SHEET
GUTTER PARAPET
500mm RAIN GUTTER
INSULATED CEILING
CORK TILES FLOOR FINISH
PUTY ROOF WATER DRAINAGE PIPE IN ELEVATION
20MM SOFT LIME PLASTER
HARDCORE
SECTION Y-Y

...NE PLASTER

...RETE WALL

...LASS SILK WOOL

STOREY BUILDINGS



X-X 1:2

