# MICROSCOPIC VIEW OF LIFE AND DEATH

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# MICROSCOPIC VIEW OF LIFE AND DEATH

*Mr. Vice-Chancellor, Deans of Faculties, Distinguished Ladies and Gentlemen,*

My inaugural lecture makes use of the key words of its title "Microscopic view of life and death" which in other words portrays Pathology as the body's life guard. Simply defined, Pathology is the laboratory study of disease in living things including man, the lower animals and plants. Though often accepted as synonymous with human morbid anatomy and histology, the oldest branches of pathology, which also happen to be my own discipline, it included in the past the closely related disciplines of bacteriology, clinical pathology and chemical pathology which have now gained their independence and are rightly treated nowadays as separate subjects. Forensic pathology, most familiar to the public through the news-media implies the application of these various branches of pathology to the investigation of crime. This inaugural lecture is, however, concerned mainly with the medical aspects of pathology especially *Morbid Anatomy and Histopathology.*

The question should then be put; what are the functions and significance of pathology and how is pathology beneficial to mankind and other life? Medical Science must provide explanations for disease, find out causes, and show inter-connections of the phenomena about us. The empiricist sees the surface of things - he notes that certain observations go together. The rationalist tries to see below the surface and discern the hidden forces that bring about the phenomena. The scientist tries to answer the question why and how?, and in what way?, and the Pathologist tries to answer these questions in relation to disease. This, in fact, is what Morbid Anatomy with Histopathology sets out to do. There is no

doubt, therefore, that this is contrary to the wrong view and total misconception amongst the great majority of the public that a Pathologist is *Lakulaku* (a human butcher). Human pathology is the science in which other sciences are brought to focus on illness of man. It is the study of disease (dis-ease), the lack of that feeling of ease that prevails when all parts of our bodies are in correct working order. To the student of a health profession, it is the science that leads immediately and directly into the clinical arts, it is an orientation, a language course and the means of transition between subjects that serve as background, and those that are to be practised. To others it can be a fascinating insight into how the human body is injured and the limited but equally fascinating ways in which it can respond to injury.

The causes and treatment of disease, which seemed so simple some centuries back, are no longer simple. With advancing knowledge, the roots of illness are found to be many and far-reaching, penetrating into the physical and mental environment and the social fabric. The physician who wants to understand and treat disease finds himself drawn more and more into the peripheral "fields" and one of the most important of these fields is Histopathology. To exemplify this, a good physician who is confronted with a patient suffering from a chronic ulcer of the leg quickly sets out to find the cause by taking a small piece from the edge of this ulcer - this he sends to the pathologist who with the aid of his constant companion, a microscope examines the biopsy (literally "looking at living tissues") and pronounces the cause of this chronic ulcer. With this type of information, the physician becomes more confident in his choice of appropriate drugs for treating his patient's ulcer. This is an example of the various ways in which pathology helps to guard patients from their physicians.

The applications of pathology to clinical medicine fall into two classes. First there is the strictly utilitarian aid to diagnosis of individual cases as exemplified above. Tissues removed at operation are also examined to inform the surgeon whether an

excised tumour is benign (harmless) or malignant or of the nature of the pathological changes in some part of the body that he has explored and which perhaps disclosed puzzling appearances, or he may merely, but with propriety, wish to confirm the clinical diagnosis. In parenthesis, it may be noted that seemingly straightforward examples of the last class may sometimes provide histoiogical surprises. The physician may require the microscopic examination of a lymph node in that difficult group of diseases, often referred to as lymphomas, in which these structures undergo an unexplained enlargement. It is the pathologist's report that largely determines the line of treatment to be adopted and the prognosis in the individual case.

Apart from this day-to-day diagnostic service, pathology helps to lay the foundations of medical science and teaching and by research, it extends the boundaries of our knowledge of disease. Contrary to what might be anticipated, new diseases, and new dimensions of known diseases are still regularly being uncovered. Through careful correlation of the clinical and pathological features of obscure diseases, their nature can be disclosed and better methods of treatment planned. New treatments likewise produce at times surprising and unexpected effects upon the tissues, and these again call for study. In these broader aspects of pathology, post-mortem work plays the most important part. Not only does the pathologist gain the opportunity then of studying all the organs of the body and their varying response to the factor or factors responsible for death, but he may also learn to distinguish the different phases of any one disease by collecting and comparing his observations in a series of cases. Such data form the basis upon which rests the greater part of our knowledge of diseases as biological processes. A growing awareness of this amongst the public, and a more ready acceptance of post-mortem examination, would yield a proportionate dividend in terms of fundamental knowledge and hence, secondarily, in planning effective treatment.

Autopsy is not a new procedure. We are indebted to King and Mechan for tracing its roots far back into history, where, 3500 years ago, the knowledge of normal and abnormal anatomy derived from attempts to foretell the future by the examination of animal entrails, contributed, in an oblique way, to our knowledge of pathology. Somewhat later during the Talmudic period, the examination of slaughtered animals by Rabbis contributed additional background knowledge of normal and abnormal anatomy.

In ancient Greece, the anatomy of living creatures formed an important part of natural science, but played only a small part in early Greek medical theory. The Greeks explained disease largely by tumours, and did not stress the solid organs, anatomic structure or changes therein. Until theories of disease took account of structural changes, the autopsy had little place in medicine.

Ancient Egyptian records demonstrate knowledge of anatomy, but bodily structures did not seem to have played a significant part in the perception of "medical diseases", which were believed due to magic and best treated by further magic. However, the Egyptians did not forbid the cutting of human bodies and permitted the practice of dissection in Alexandria. In the third century B.C. Erasistratus (310-325 B.C.) made observations about the effects of disease, noting that the liver of a man who died from dropsy was hard as stone, but in a man who died of snake bite the liver was soft.

Little information is available from the early middle ages, but for the later medical period scattered references show some interest in autopsies. Roger Bacon and Arnold of Villanova in the middle and late 13th Century recommended the study of the dead body, but did not mention any personal experience. A manuscript dated about 1290 contains two inserted leaves with eighty miniatures, one of which is apparently a picture of an autopsy. At this time, there were still strong religious and social objections to the autopsy.

Although in the early years of Christianity, there was no formal church prohibition, the general attitude of the church leaders was unfavourable. However, in 1410 Pope Alexander died suddenly and was autopsied. Pope Sixtus IV (1471-1484) issued a bill permitting studies of human bodies by students at Bologna and Padua.

In the late 15th Century, Antonio Benivieni, a successful physician of Florence, did much to promote the performance of autopsies and the knowledge of pathology. In one of the classics of medical history published posthumously in 1507, he recorded a number of his clinical experiences, many of which involved autopsies. In the 16th and 17th centuries, many autopsies were performed and recorded. One of the great medical compilations of the time is the *Sepulchretum* of Theophilus Bonetus (1620-1689) which was published in three folio volumes and included a collection of more than 3,000 autopsies.

In the 18th Century, medicine acquired more sophistication, pathology made considerable progress, and the autopsy continued to play a major role. With G.B. Morgagni (1682-1772), the science of pathology reached new heights. Morgagni gathered together masses of pathologic data and connected them with clinical observation in a way that brought new illumination into pathology. The clinical data formed the framework and the anatomic findings furnished the explanation. Morgagni was the high point of a tradition that had progressed steadily since the 16th Century.

In the latter 18th Century, new developments introduced additional changes into pathology and the conduct of autopsy. We can regard Xavier Bichat (1771-1802) as a turning point in medical history. In his short life, he exemplified the complete physician. In his own person, he centred all medical activities: anatomy, physiology and pathology on the one hand, and bedside-care on the other.

It was no accident that in the first third of the 19th Century, France was the medical centre of the world. "Hospital medicine" was the road to progress, achieved through large numbers of

patients carefully observed while alive and carefully autopsied when dead. The same clinician who observed them during life performed the autopsy. The correlation between clinical data and autopsy findings, carried out on a vast scale, yielded magnificent progress. Similar correlation in the latter part of the 19th Century made Vienna a medical "Mecca".

The correlation of the clinic and autopsy was the great contribution of the 18th Century, one that reached still greater height in the first half of the 19th Century. As early as 1844, an enlightened pathologist, J.H. Bennete, recognised the limitation of gross pathology, which he thought was no longer furnishing fact sufficiently novel and important enough to advance the study of pathology. Although, the first simple microscope was invented in the 17th century by Anthonio Luwenhoeke, while the first compound microscope was probably invented by Z. Jansen at the beginning of the 17th century, one of the reasons why detailed histological examination did not materialise until much later was due to lack of necessary stains which were only available as the chemical industry developed. Indeed, it was not generally used for research until the mid 19th century. Soon, however, the microscope and burgeoning chemical procedures restored the post mortem examination to its place of importance. Rokitansky who performed 30,000 autopsies and was probably the most capable gross pathologist in all medical history, was a late-comer to microscopy. Virchow, who was seventeen years younger, entered medicine at a more favourable time. He grew up with microscopy and contributed greatly to its development.

Early 20th century, medical progress depended largely on- the bedside and autopsy. Outstanding clinicians spent considerable time in the autopsy room and frequently were themselves competent pathologists. Sir William Osler epitomized the best of this era. It is pertinent to note that at a stage in the history of medicine new patterns for pathologists' remuneration were developing, frequently based on some type of quantitative relationship to clinical laboratory workload or income. Attempts to

develop arrangements for the performance of autopsies on a fee-for-service basis were generally strenuously opposed by hospital management, which preferred to use the subterfuge or extra payment otherwise. This perpetuation of the myth that autopsies are "free" has, I think, contributed to the down grading of the autopsy and its unfortunate separation from clinical medicine. If it is not paid for as a physician's service, one eventually may conclude that it is not a physician's service.

Mr. Vice-Chancellor, Ladies and Genlemen, may I say at this stage that despite the foregoing historical exploration, I am quite aware that inaugural lectures are not biographies. I also appreciate the fact that to be called upon to give this year's inaugural lecture on behalf of the Faculty of Medicine affords me an opportunity to share with the University community the exciting moments in my work and results. However, I will consider it a great disservice to my predecessors if I fail to acknowledge their efforts to establish and build up the department of Pathology of this University to its present stage.

Indeed, this is an auspicious day for my department and Basil George Tonge Elmes, the first Professor and Head of the Department of Pathology, who had served with the Nigerian Government since 1927 was appointed Professor of Pathology from 1955 to 1958. He brought Pathology to the University of Ibadan and did a great deal to ensure its growth before he left. He was succeeded by another distinguished Scientist who has made significant contributions to our verifiable knowledge of health and disease in the tropics; I am referring to Professor George Millar Edington - a great exempler of the art of tropical pathology who used discriminating judgement wisely and well in applying the knowledge available to him in a way that would promote the welfare of humanity. This is a man who should be included in the list of great inspirers and practitioners of medicine in its various ramifications. If Hippocrates who set standards of medical practice for the Ancient Greek world which are still applicable, is labelled

the "Father of Medicine", if Karl Rokitansky (1804-1878) is revered as the father of "Anatomical Pathology" and if Rudolf Ludwig Kar Virchow (1821-1902) is named the founder of Cellular Pathology, George Edington should be christened the "father and founder of tropical pathology or of pathology in the tropics". George Edington was the second professor and head of the Department from 1958 to 1971. He acted briefly as the Vice-Chancellor of this great University before he left to join the Ahmadu Bello University, Zaria, and later to University of Maiduguri where he is now the Provost of the Medical School to continue his pioneering work in tropical pathology. As one of his major contributions to pathology in this University, he founded the first Cancer Registry in Ibadan - this I hope to discuss later on. On the whole, his contribution to pathology in Ibadan is embodied in his book "Pathology in the Tropics". He was succeeded by another equally eminent scholar, Professor Akinwole Olufemi Williams to whom goes the honour of being the first Nigerian occupant of the chair. This is the youngman who internationalised pathology in Ibadan. It is his forte and as attestation to this, he gave the 1977 Vanderbault lecture.

From the foregoing list of experts in the field of pathology in Ibadan including a host of others who worked with them, it is obvious that I am not moving into a void but onto a stage where others have previously performed and are still performing but a relatively unknown stage. I am, I suppose, to make it known to the University and the world. Consequently today, almost thirty years after the establishment of this department, I find my humble self standing before you as a torch-bearer to deliver the first inaugural lecture from the Department of Pathology and indeed to the best of my knowledge, the first lecture from the entire section of Laboratory Medicine, of the Faculty of Medicine of this University. As far as I know, this also happens to be the first inaugural lecture from an occupant of the academic chair of Human Pathology in the history of this University and in fact of the country. My reiteration of these "firsts" rather than being considered pedantic should

enlist your sympathy for my unique and difficult position of having to present a talk on this rather fascinating subject of which the majority of our populace is, however, totally ignorant.

For this reason and with your permission Sir, Mr. Vice-Chancellor, I would digress for a while to draw my audience into the beauty of the subject of Pathology, utilizing part of my work on the - immunopathology of amoebiasis as a convenient gateway.

As long as man has lived on earth, sickness has plagued him. Disease is associated with life, and man everywhere endeavours to deal with it as best he can. Studies on paleopathology have shown not only the antiquity of disease, but also its occurrence in the same basic biologic forms, such as infection and infestation, disturbance of development and metabolism, traumatism and neoplasia. For example, schistosomiasis prevalent in Egypt today has been found in the kidneys of Egyptians who lived 3,000 years ago, and tuberculosis of the spine has been diagnosed in the skeletal remains of pre Columbian Indians. But while these basic types have not changed, the incidence and prevalence of illness involving such processes have varied from time to time and place to place. Our illnesses and accidents reflect the world in which we live, what we do in it and with it. The occurrence of a disease in a given population and at a particular time exhibits characteristic pattern defined by causation, morbidity, and mortality as related to age, sex, social class, occupation, mode of life, and more generally to the culture and psychology of society. The pattern of disease which occurs in any group of people is not a matter of chance. Broadly speaking, it is associated with the level of social and technical development of the population and is significantly related to the values prevailing in the group. It is an expression of interaction with the environment in its various facets. In so far, then, as disease arises from, or affects the social conditions or relations under which men live, it is a social phenomenon and is completely comprehensible only within a biosocial context. It is in these terms and context that I would like to approach and illustrate

the subject of the immunopathology of amoebiasis

It is true that the standard measures of disease are those related to the extent and causes of death at various ages and to the incidence and prevalence of known diagnosed diseases but amoebiasis has other additional and perhaps perculiar but fascinating factors. Amoebiasis is an important public health problem in NIgeria as in many other parts of the world. From a global point of view, it is probably the most common cause of liver abscess. It exemplifies a disease of protean manifestation which presents many perplexing problems. Among the interesting problems posed by amoebic infection are its differential severity, differences in the pathogenicity of different strains of the infective agents, *Entamoeba histolytica* and its recently observed severity and fatal outcome in pregnancy. The susceptibility to severe forms of infections by patients previously given immunosuppressive therapy and the prevalence of a carrier state in the disease are some of its other noteworthy peculiarities. The search for some solutions to these intriguing problems posed by a disease known to be caused by a micro-organism of the size measuring 15 to 25 microns forms the basis of my work. The obvious temptation of equating the prevalence of disease with its morbidity is one of the most important factors that has clouded the real issue but efforts were made to resist such temptation in this work.

From our general observation in the department of pathology over the years, it would appear that when amoebiasis occurs in women of child bearing age, it is usually much more severe, and indeed it kills more of this group of patients than the general population. This, to me was very exciting because, here is a disease in which the product of the infecting organism would remain dormant without giving rise of symptoms in most people and then kills others very easily simply because they are pregnant. This is in fact very intriguing in the sense that one would like to know the cause of this selective action of the causative organism of this disease. It was, therefore, decided to examine the various aspects of the disease including its causative agent, in order to

prove the hypothesis resulting from our various observations.

Even though a comparative study is indicated, it became necessary to rule out the possibility that this peculiar aspect of the disease might be part of its universal nature with its wide organ involvement. Its widespread nature becomes obvious from the fact that the organism when swallowed does not start its evil effect until it gets to the terminal portion of the small intestines and it induces its most harmful effect on the commencement of the large intestines from where the disease now spreads to the various parts of the body including particularly liver, lungs, skin and brain. This pattern of behaviour of the disease raises another vital curiousity, particularly the frequency with which such a vital organ as the liver is involved. Following on these various observation, further problems emerged. First, why has the organism chosen the site of commencement of its deleterious action in the large-intestine. Secondly, why and by what mechanism has it become a great killer in pregnant women? As in any scientific discipline one needs to postulate some hypothesis which can be subjected to scientific tests.

The first and in general terms, Mr. Vice-Chancellor, the most obvious theory which can be advanced to explain the phenomenon of differential severity and selectivity of infection by amoebae is that some species (strains) of the organism are virulent while others are not. This was the hypothesis which Brumpt favoured, and postulated the existence of virulent and non-virulent species (strains). Thus in 1928, Brumpt described *Entamoeba dysenteriae* (the form causing amoebic dysentery), *Entamoeba dispar* and other non-pathogenic species. Maleney, Fry and Leathers in 1939 demonstrated marked differences in the pathogenicity of different strains of *E. histolytica* for kittens and concluded that the differences were intrinsic in the amoebae. All the foregoing evidence notwithstanding, I strongly believe that this differential severity of amoebiasis may have an immunological basis. It is also believed that this same mechanism may be involved in most of the above-mentioned peculiarities of the disease with particular

reference to the carrier state in the disease. This view is in accordance with the suggestion that the immune response of the host may exert selective pressure on "fitness" for survival of many parasitic species as postulated by Dineen in 1963. It is possible, therefore, that the peculiar behaviour of the disease is brought about by conditions which either increase the level of commensal infection, or produce factors which convert the commensal amoebae to pathogenic organisms or do both.

An attempt to test these various hypotheses and perhaps highlight our associated impressions, prompted a research into the various aspects of the disease ranging from the possible mechanism of the carrier state to the role of immune response as well as to its specific attack on pregnant women. Although the work describes the rationale, methods and experimental studies, I shall limit this aspect of my lecture to the demonstration of the results of the different areas of the work without going through the technical details. Purely from the point of view of putting the observation of the differential severity of amoebiasis in pregnancy to the test, a retrospective study of all necropsies performed in our University College Hospital Department of Pathology over the ten year period 1958 to 1967 inclusive was undertaken. This involved a review of seven thousand, nine hundred and twenty-two post-mortem protocols and clinical case notes. As a result of this analysis, it was shown that of the 7,922 post-mortem examinations performed during the period reviewed, neither gastrointestinal diseases nor amoebiasis were considered as cause of death in one thousand, seven hundred and forty-three (1743) still-births. In the remaining six thousand, one hundred and seventy-nine necropsies, gastro-intestinal disease (including amoebiasis) was considered the cause of death in eight hundred and sixteen (816) instances (11.4 percent), and amoebiasis in 135 (1.9 per cent) cases.

Taking all forms of acute colitis occurring in adults into consideration, the single highest occurrence was in females with amoebiasis in the 25 to 34 years age group, which accounted for 14

per cent of all cases of amoebiasis in both sexes. The comparative study shows that the frequency of amoebiasis in females at all ages was 42.9 per cent. The comparable figures for typhoid and miscellaneous enterocolitis were 42 and 52 per cent respectively. When cases of enterocolitis occurring in females between the ages of 15 to 34 years were analysed, of the 25 females dying from amoebiasis, 17 were pregnant - a frequency of 68 per cent. Even when the child bearing age is extended to 44 years, the frequency of deaths due to amoebiasis (54.8 per cent) is still very much higher than in the other two conditions, namely typhoid (16.7) and miscellaneous enterocolitis (9.6) per cent respectively. The difference is statistically significant (P 0.001). Amoebiasis was, therefore, found to be a more frequent cause of death in pregnancy and the puerperium when compared with typhoid enterocolitis (P 0.5) as opposed to its occurrence in non-pregnant females in the same age group. It may, however, be noted that age specific incidence for pregnancy was not available for the period of this review.

In search for the mechanism for the carrier state which is another interesting and peculiar aspect of amoebiasis, a co-proparasitological school survey was instituted in Ibadan. This study involved the examination of stools and blood specimens from a total number of one thousand, two hundred and ninety-one healthy looking individuals composed of one thousand and eighty-six (1,086) primary school children, sixty-six (66) food sellers to these children, forty-eight (48) of their parents and ninety-one (91) teachers. All the specimens collected here were studied with a view to confirming or otherwise whether the transmission of the cysts of the amoebae which constitute the carrier state in the disease necessarily or solely involved social contacts within various groups of people.

To our great surprise and contrary to our expectations, the statistical analysis of the results of this school survey shows that the carrier state of the infecting organisms in the school children

has no significant correlation with similar states in their corresponding parents, school teachers or food-handlers. At this stage, therefore, in order to explain our dilemma of this disease one had to resort to the hypothesis of the possibility of immune reaction as an explanation for the various problems posed by amoebiasis. As Harvey remarked in "De Motu Cordis" and I quote "Studious good and honest men do not think it degrading to alter their view if truth and a public demonstration so persuade them, or regard it as dishonest to desert errors" I would like the early progenitors who postulated and believed that the carrier state in amoebiasis lay in the transmission of the cysts of the organisms by social contacts to drop this idea in the light of our present findings.

findings.

There is a tendency in today's medicine to implicate immunologic mechanism in most disorders of both known and unknown aetiology, amoebiasis is no exception. When the disease is seen superficially, there may be good reasons to suspect that pathological immune reactions participate in its pathogenesis. The clinical and pathological features of the disease seem to provide us with some circumstantial evidence in favour of an immunological concept. Some of us are well familiar with this evidence which includes such factors as moderately raised gamma ( ) globulins, a high frequency of extra-colonic manifestations - many suspected of originating from hypersensitivity reaction -; the histologic picture with lytic necrosis and moderate infiltration of cellular elements which are commonly believed to be immunologically competent. However, the mere presence of such reactions in the course of a particular disease will by no means justify the conclusion that these reactions are also responsible for the specific tissue damage of the disease. They may equally well be the effect of the physical presence of the causative agent of the disease.

It is our hope that a better knowledge of the immunochemical nature of the antigen will give a clue to the origin of the immune process. For this reason, an extensive study of this aspect was

included in our work, the results of which can only be graphically illustrated here as time will not permit any detailed description.

When clinical data are compared with results of experimental investigations, it seems likely that a variety of immune reactions contribute to the tissue damage in amoebiasis. If there exists such a thing as a common inducer to all these contributing mechanisms - by definition it should be termed AETIOLOGY – it may be adequate at this stage, Mr. Vice-Chancellor to summarise this aspect of our exploration by a sentence only too familiar to students of this subject - the immunopathological aetiology of amoebiasis still remains obscure. We are, therefore, now left with the more social aspect of the disease and one would like to know why the agent of the disease is carried by some individuals without giving rise to symptoms and why it has become a killer in others particularly pregnant women.

As seen from the result of our School Survey, it was impossible to explain the carrier-state in amoebiasis from simple physical or social contacts within various groups of people, consequently we had to resort to immunological processes again to explain these interesting aspects of the disease. In defending this thesis of an immune response; from the immunochemical study of the antigenic components of the infecting agent, we had to employ the concept of antigenic disparity postulated for the metazoan endoparasite to explain the phenomenon of carrier state in the disease. In this phenomenon Dineen postulated that the immune response is likely to favour the survival of only those variants of the metazoan parasites which display a sufficiently reduced antigenic disparity with the host. Despite the fact that *E. histolytica* is extracorporeal and intraluminal in its host, if the analogy with the metazoan endoparasite can be accepted then the immunological selection stated above can be used to explain the occurrence of carrier state in amoebiasis. In the same vein, this phenomenon in amoebia infestation can be considered as an index of "change of tolerance" between the parasite or its products and the host,

thereby rendering the former less antigenically foreign to its host. In such circumstance, the host fails to recognize the prasite 'as foreign' following possibly a long and perhaps 'intimate association' and, therefore, fails to produce antibody to an agent (namely *E. histolytica* or its product) which is no longer foreign to it. Thus the weak antigen - antibody reaction detected in the course of my study in the case of intestinal amoebiasis may be due to a successful host parasite relationship of the infecting agent whereby the organism has possibly shared many antigenic determinants with its host. If this is accepted, such 'molecular mimicry' between *E. histolytica* and its host may have resulted in a successful tissue graft that does not stimulate a rejection response on the part of the host. In short, this agrees with the original immunological concept proposed by Burnet and Medewar - that self does not reject self. This may, therefore, give rise to the continued co-existence of the infecting agent or its products, with the host which constitutes the carrier-state in amoebic infestation. All the the foregoings are indeed attractive possible speculations to explain the carrier-state in amoebiasis. One cannot, however, under-estimate the importance of the absence of other conditions favourable for the invasion of host tissue by the organism, which may be a more plausible explanation.

Prior to our study, it has often been said that the agent of our famous disease has been blamed for practically every clinical syndrome except pregnancy, it is, therefore, pertinent that probably for the first time the said exception, namely, pregnancy has been the centre of attraction in this thesis. This inclusion should not be strange if we remember that pathology consists of both Science and Art but it is also a social institution subject to the stresses in our economic and political life.

It is, however, obvious from my findings in this study that at least in this area, the association of fatal amoebic colitis with pregnancy and the puerperium is not fortuitous but that pregnancy predisposes to severe amoebic colitis. One of the interesting points

that emerge from these findings is the mechanism by which pregnant and puerperal women in this area are predisposed to fatal amoebic colitis.

It is well known that pregnancy modifies the course of various infections. For example, Bruce-Chwatt, (1952) has shown that adult indigenous Africans in this area have a high degree of immunity to malarial infection, but there is temporary loss of this immunity during pregnancy. This has also been my findings in relation to amoebic infections during pregnancy because it was discovered that as a measure of the immune mechanism the immunoglobulin class which was found to be reactive in amoebiasis showed a great derangement in pregnancy when compared with its production in the other groups of amoebiasis patients. This led to the suggestion that the subnormal response of pregnant women, and those in early puerperium, when exposed to agents of amoebic infections, is a factor in the severity of the disease during these states.

Mr. Vice-Chancellor Sir, it is true that the mechanism which determines this greater risk in amoebic infections in pregnancy, which to our knowledge has not hitherto been recorded in any part of the world prior to our study is not known, it is gratifying to note that there has been a tremendous decline in both the morbidity and mortality of pregnant patients with amoebiasis since our findings. This decline is particularly due to early and effective eradication by treatment of the agents of amoebic infection or its product, the cyst, during pregnancy before infectivity is established.

The ultimate aim of any medical service is to reduce mortality and morbidity. Preventive and curative measures in any community are essential towards achieving this goal. The emphasis which must be placed on one or the other must depend on the pattern of diseases at that particular time in the community and the processes by which these diseases are brought about. This has exactly been my approach to this important disease. It is hoped that from such selected specific health indices followed over a period of time, the

effect of the services in promoting change and better health standards will be determined. I have not doubt in my mind that my work on amoebiasis, as well as, having achieved its set objectives also exemplified one of the tremendous functions and advantages of pathology both in the application of experimental, as well as, autopsy pathology. I cannot, therefore, help in this lecture on the microscopic view of life and death, but draw the attention of my audience to the importance of pathology and especially autopsy in our modern community. In doing this and with your permission, Mr. Vice-Chancellor, I would like to present a brief perspective on autopsy.

At this stage, one can only draw attention to the fact that autopsy has a great benefit to the clinicians, to the family of the deceased, contributes to hospitals, contributes to medical education, and greatly to the future practice of medicine in this country. Now we must ponder the inevitable fact - proven over and over - that the autopsy is one of the clinicians most readily available and most reliable teachers. The clinician needs autopsy to confirm, clarify and correct diagnoses. He needs it to guide him in the discovery of new diseases - the detection of new patterns of old diseases - and for the better understanding of the mechanisms inherent in all diseases. The autopsy provides facts and accurate, unbiased data upon which our medical statistics should be founded. Probability is so important in diagnosis. There is no disputing the fact that the clinician needs the autopsy as a basic clinical teaching tool. But, it can only be effective if it is available. One can only summarise and say that for some family members of the deceased, clearly defined benefits derived from the autopsy of a relative.

To briefly mention the contributions of the autopsy to medical education. The education of a physician is a continuum. It begins when he enters medical school as a student. It continues through his house-staff training period into his years of practice. It terminates only when his practice ceases and for some, only with

their deaths. The autopsy has and continues to play a role throughout this entire span. If the goal of medical education is the transmission of knowledge, then throughout the medical student's school years, the autopsy serves an irreplaceable role. There is no substitute for the autopsy for the education of medical students. And yet Professors of Pathology have had but little success in securing from their Deans and hospital administration necessary support to truly develop this educational resource. Most autopsy rooms suffer markedly by comparison with all other teaching laboratories in almost every medical school I have ever visited but one, and that one is not my own. Not only is the autopsy room the very first place a student can see and feel disease and be exposed to the elation of a diagnostic coup, to the problems of uncertainty and the unknown that remains medical practice but it serves this function constantly and continuously throughout his medical school career.

Mr. Vice-Chancellor Sir, with due respect, I have to say that I owe no apology for dwelling so much on the autopsy aspect of pathology because I realize that this being the most nauseating part of medicine to the layman, I believe it requires such a drastic treatment to bring the truth and beauty of pathology home to my audience.

Now Mr. Vice-Chancellor, having considered the various objectives of the autopsy as they are presently perceived, there should be no harm in again summarising this aspect of our talk and say that the autopsy has different significance for different people depending on their relationship to the patient and their role in medical care. Somewhat like the six blind men reaching out to feel the elephant, one's reaction is apt to depend upon one's position in relation to the whole. For the family of the deceased, the purpose of the autopsy is to determine why death occurred, to learn whether everything was done that could have been done, and what the likelihood is that other members of the family may be affected. For the laymen unrelated to the dead person, the autopsy's

purpose is to establish the cause of death in cases where death is unexplained or is poorly understood by the medical term. For the law enforcement officials, the autopsy must clarify the circumstances of violent and unexplained deaths, and help assure that crime is punished and the innocents go free. For primary care physicians and non-surgical consultants the autopsy provides a final determination of the diagnosis, an explanation of doubtful observation and an evaluation of treatment. For the medical staff of a hospital, for the hospital administrator and for governmental agencies monitoring health care, the autopsy provides a quality control mechanism, a final yardstick by which the care of a dying patient can be measured. For the research, the autopsy is often a source of new ideas as to the cause of disease, to be developed further by the experimentalist; it may also provide an evaluation of new procedures and new therapeutic agents and an explanation of untoward reactions with the hope that they can be prevented in the future.

For all members of the medical team, the autopsy provides a learning experience, for the medical student, a first understanding of the effects of disease, and for student house staff and attending physician alike, the meaning of certain observations unexplained during life, such as heart murmurs, a shadow in a chest X-ray, or an elevated calcium level. In addition, society in general would benefit if autopsies could be used to compare the incidences of particular diseases in different geographic areas to survey the changing status of health and disease in the populace. Finally for the surgical specialists, the autopsy, provides information on such matters as why a post-operative death occurred, the condition of future lines, and the completeness of removal of a cancer.

At this stage, may I draw your attention to the fact that of all the words in the doctors vocabulary, there is probably none which frightens people more than the word cancer. It is hard to mention the word without arousing emotions of fear, horror, despair, even guilt. Indeed, but for the diffuse nature of my discipline and the title of this lecture, I struggle very hard to be silent on this matter. This

is because I know that as a topic of conversation, the subject is still virtually taboo. However, I raise no apology for mentioning the word because we now know that thousands of people are permanently cured for cancer each year, and research into the disease is approaching the dawn of a new era of hope. At long last, cancer, an evil which has affected man and beast since the beginning of evolution, is beginning to succumb to the medical war being waged against it. Real and significant progress is being made both in the further understanding of the disease process and in the development of methods of prevention, treatment and cure. A few scientists and doctors believe there is no room for optimism. Their caution is understandable as raising false hopes can be cruel and counter-productive. But there are many more who visualise major advances in the field of cancer research in the next ten years - perhaps sooner - which promise to cut dramatically the death rate from the disease and relegate cancer from its present position as second in the list of most common killers.

In Britain, 30,000 people are cured of cancer each year. In America, the number is estimated at 220,000. The American cancer society claims that there are probably 1,500,000 people in America who have been cured of cancer. Many more are able to avoid the disease either by choosing to spurn known causes like cigarettes or simply because they now live in an environment made safer by the removal of known cancerous agents. To come nearer home, in the University College Hospital, Ibadan, choriocarcinoma is a very common form of cancer which can develop in women following certain complications of pregnancy. Not long ago, chorio-carcinoma was inevitably a killer, but today and happily too, cures are being achieved in 80 per cent of women with this disease. It is in fact becoming a pathological curiosity to see such a wild histological appearance of choriocarcinoma. The same remark goes for another common form of childhood cancer Burkitt's lymphoma. This cancer which occurs mainly in Africa, Nigeria inclusive, has shown itself very amenable to cure with relatively

simple drugs. Now hundreds of children in Nigeria are alive and well having been completely cured of their cancer which often causes gross facial distortion in the children it affects. Indeed, the picture is even more hopeful than these figures show. The knowledge now exists to cut the incidence of cancer by half. But having the know-how is useless unless it is acted upon.

If this reduction is to be achieved, it means that smokers must end their addiction to cigarettes; it means punctilious attention by everyone to early signs and symptoms - and to get across the importance of this would mean a massive educational programme; it means changing ill-founded beliefs and prejudices, not only amongst the public but also amongst doctors themselves. It means constant vigilance. Though this may take years to achieve, attitudes are already changing and there is no doubt that scientists and doctors are already heartened by the progress they are making.

With social advancement, human attitudes to life are changing and disease disability and discomfort are less tolerable and less acceptable. Mankind is now more expectant and demanding that in a world of scientific and technical miracles, death and disease should be controlled. It is, therefore, gratifying to note that tremendous effort is being made in the right direction towards the conquest of such a deadly disease as cancer. The need for control of disease may, perhaps, be still better appreciated by a brief statistical illustration. Today, there are approximately sixty (60) million deaths each year in the world. One half of these ($30 \times 10^6$) are new born babies, infants and toddlers, chiefly in Africa, Asia and Latin America. One quarter ($15 \times 10^6$) are caused by infections such as malaria, gastro-intestinal infections such as dysentery, amoebiasis, typhoid, cholera, tuberculosis, small pox and pneumonia. One sixth ($10 \times 10^6$) are caused by cancer and cardiovascular diseases.

These facts speak for the tremendous challenge still facing the provision of medical care throughout the world. They also point to the fact that the control of a single disease no matter how deadly is not the answer to everything. This is so because it would appear that cancer is now more of a killer in the developed than in the

developing countries of the world. The need for such control led to the establishment of Cancer Registry in our Department of Pathology by Professor Edington in 1961. This was of great assistance to many research workers and indeed cancer registration has now become part and parcel of pathology.

Mr. Vice-Chancellor Sir, Deans of faculties, distinguished ladies and gentlemen, this is the end of my story from the Department of Pathology, a department which appears distant from the layman and hospital patients because the pathologist is a Consultant to the Consultants who answer many clinical problems. Thus the Orthopaedic Surgeon will ask the question - Shall I or shall not amputate this leg?, and the pathologist will answer no because Mr. Surgeon, you are only dealing with a treatable condition or sometimes answers in the affirmative; because you have a deadly condition - Kaposi's or Osteogenic Sarcoma on hand. The physician will ask whether or not to abandon the management of an enlarged liver as a hopeless case. The pathologist will then say carry on with a simple therapy because your patient only has histoplasmosis, a fungal infection. On other occasions, the pathologist will advise the physician to give only palliative treatment because the cause of his patient's liver enlargement is due to cirrhosis or cancer of the liver. The Obstetrician and Gynaecologist would like to know from the pathologist whether his patient can ever be pregnant. He sends scrapings to the Pathologist who then pronounces the verdict that your patient is still ovulating and, therefore, hopeful of pregnancy in the near future.

These examples which clearly confirm that the pathologist occupies a unique role as a universalist in terms of cause and effect of disease on the biological organism can go on ad-infinitum, but we shall probably never solve all the mysteries of the universe. And it is also most unlikely that we shall ever solve all the mysteries of that incredibly complex organism, the human body. The universe within the human cell, like the universe of the Cosmos, has mysteries locked within it that are infinite. But the clinicians'

curiousity should be no less infinite. If we stop questioning we stop finding. It is as simple as that.

Finally, in view of what appears to be a gradual but persistent decline in the relative importance of the discipline of pathology, it is appropriate, indeed imperative that we ask ourselves what the future of pathology is, or preferably, what it should be. Since none of us possesses the long range vision to forecast medical or other events accurately, what I have said so far deals with possibilities - political, social and economic possibilities, and the ways in which they might affect the future practice of pathology, and hence of medicine in this country. Because our society is bound to move on to a steady course towards a national health service of some type, the entire medical profession will soon be faced with virtually insatiable demands for medical services but will have only two finite resources - human and financial.

As part of our preparation for the former anticipation, therefore, I would ask for a better recognition of pathology and pathologists, as well as, for the establishment of an Institute of Pathology in the Medical Faculty of this University in no distant date. This request is based on the concept that every man takes limits of his own vision for the limits of the world. If we limit our vision of pathology to its present form, it will surely continue its decline; if we open our vision of pathology to its almost boundless potential, it will assume its rightful place in the spectrum of medical care. The choice is ours. I am optimistic that Nigerians will choose wisely.

Ladies and Gentlemen, I will now end in the words of that great philosopher, Aristotle, who said "The search for truth is in one way hard and in another easy. For it is evident that no one can master it fully nor miss it wholly. But each adds a little to our knowledge of Nature".