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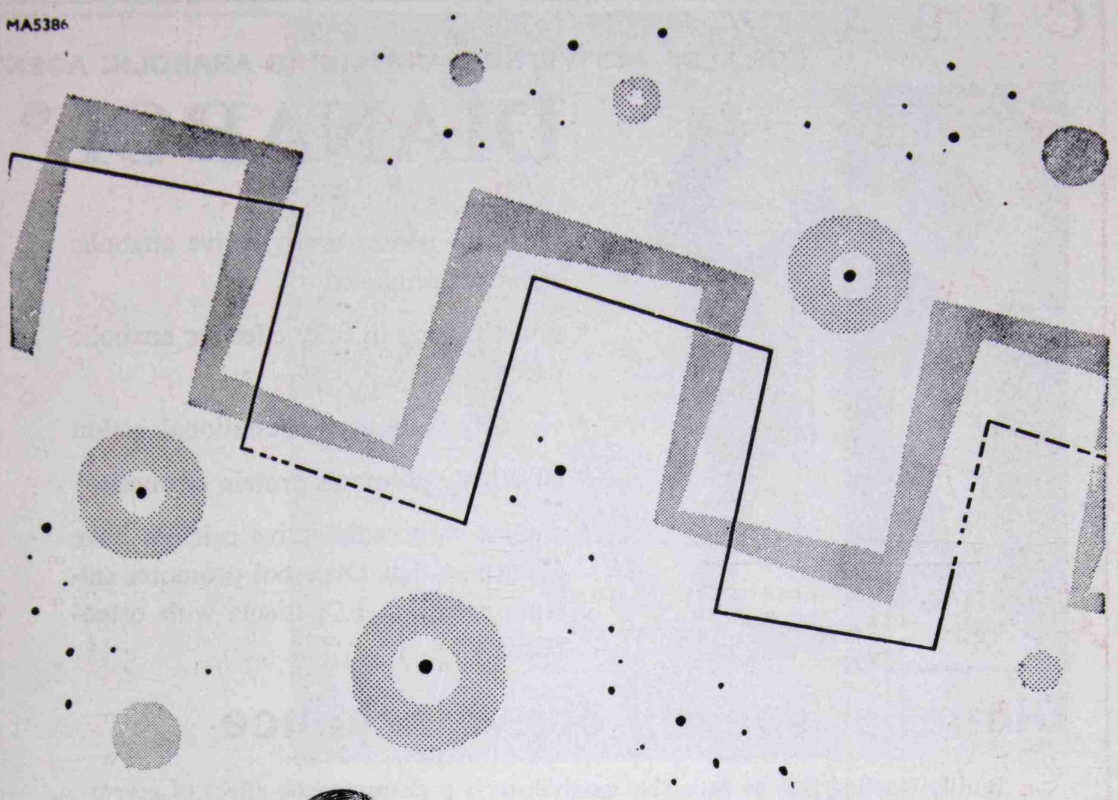

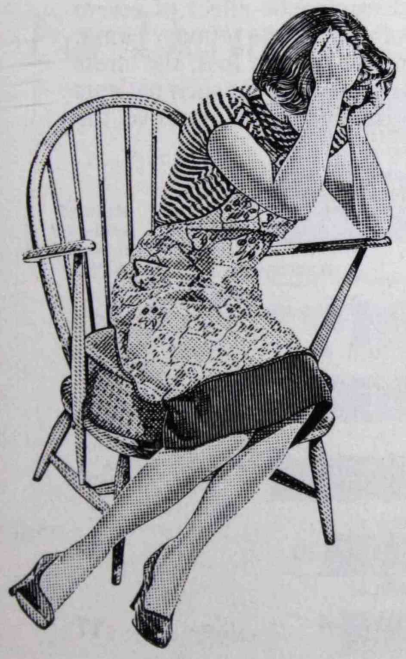

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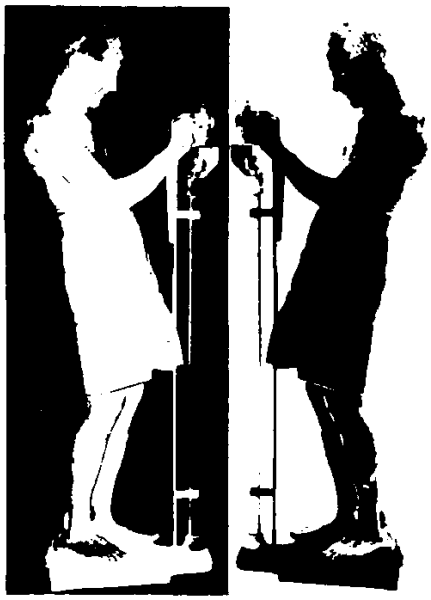

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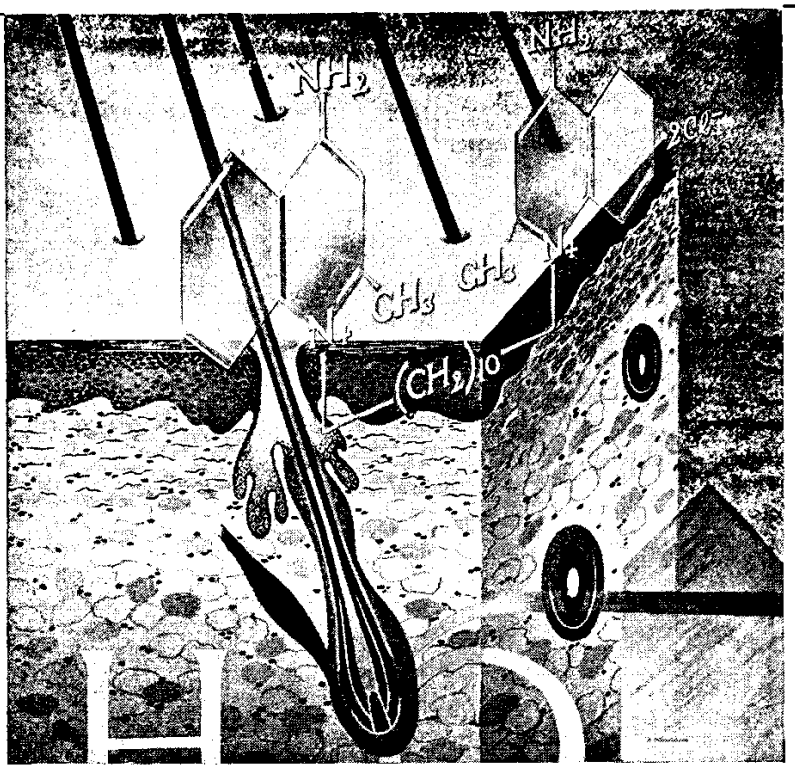

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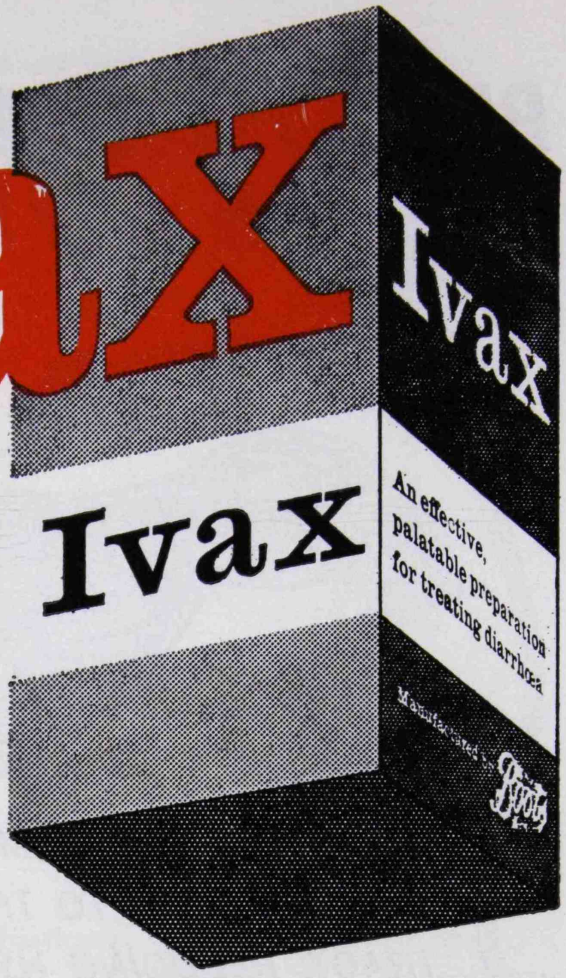

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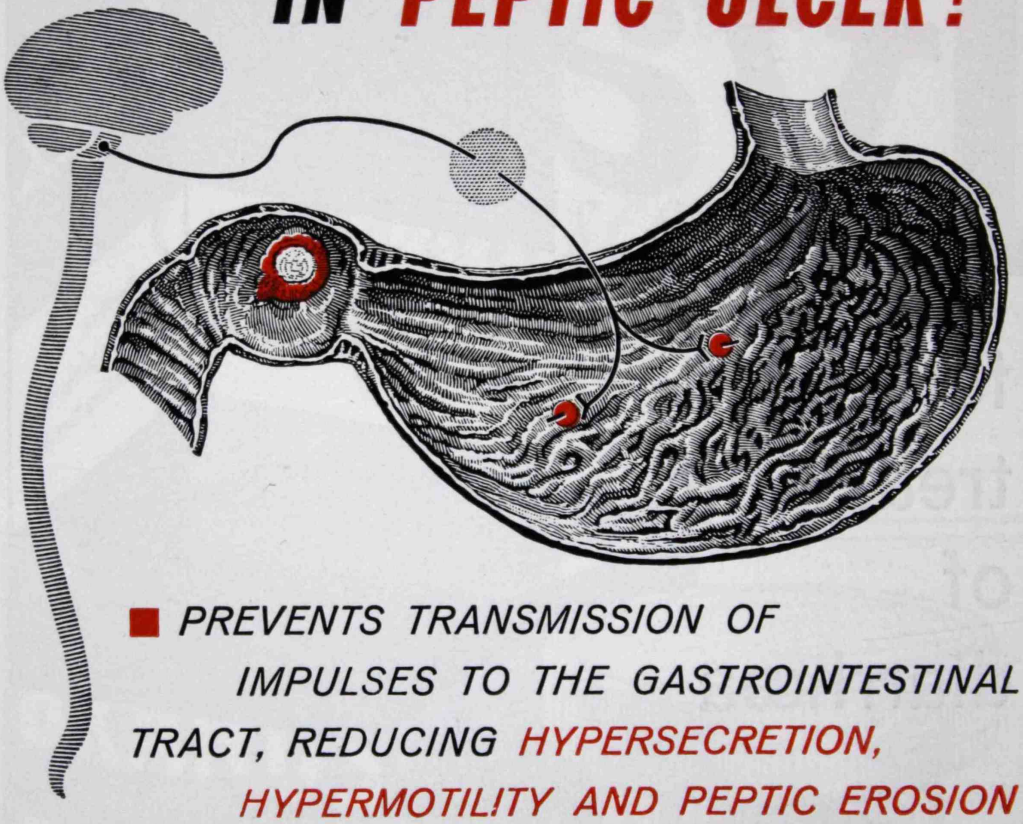

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ELIXIR

Journal of the Hong Kong University Medical Society

PRINCIPAL CONTENTS

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Number 2 1961

Editorial and Business Address:
The Department of Physiology, Hong Kong University.

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FACTS AND OPINION

The parking problem in the Queen Mary Hospital and Pathology building is at present almost completely solved. No more congestion or disorder of parking cars here and there up the hospital compound, all the students' private car now park neatly and orderly in the smooth and pitched space on the same level of the mortuary. Thanks to the decision of the Dean and the administration of the Queen Mary Hospital in the task. It may be a bit inconvenient to those who are accustoned to arrive at the lecture room one or two minutes after 8.30 a.m., and to those who are physically less bestowed. But isn't it a virtue to be punctual, and a necessity to keep the body of a "superhuman" such as a medical student as fit and strong as no other student can be?

* * *

There is nothing more discouraging than to witness the shrinkage of a truly magnificent magazine such as the Elixir which represents all medical students. As we are the finest among all university undergraduates, there is hardly any reason why we cannot realize the fact that it is OUR OWN magazine, and we have every right and duty to support and to perpetuate its full and ever-increasing value as the mouth and ear of the Medical Society, not mentioning it being the worthy outlet for the mental processes of each and every one of us. Of course the teaching staff and our senior colleagues will always help by contributing expert knowledge to enhance the high standard of the contents, but isn't it true that we also have our own role to play? In this issue the number of articles contributed by fellow students is obviously far from adequate, and it is earnestly hoped that in the next issue we will see more contributions from all medical students.

EDITORIAL

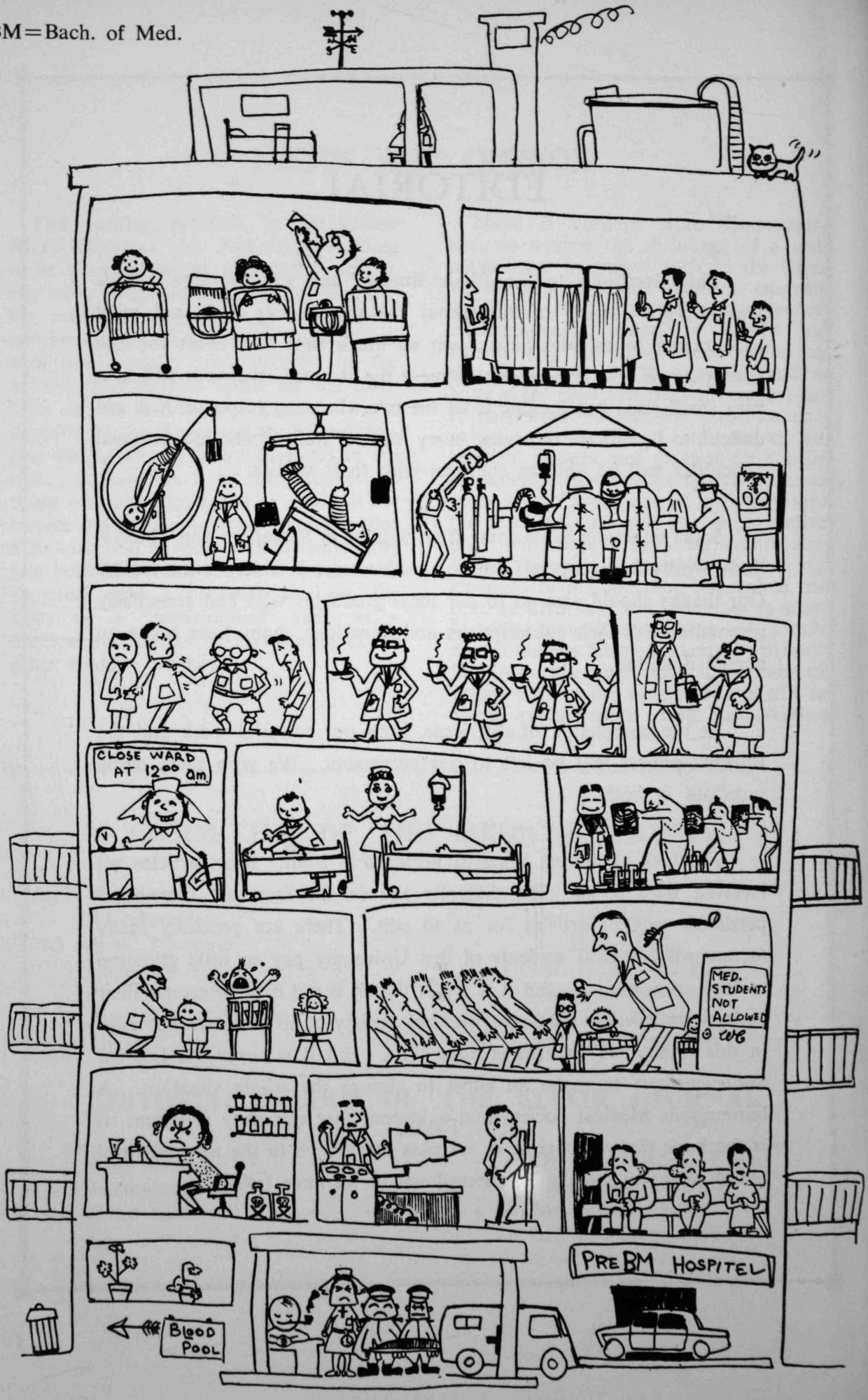
That donations to the Elixir Bursary and subscriptions to this journal kept coming in throughout the whole year is indeed most encouraging to us who have spent so much time and effort for this worthy cause. At the present moment the Bursary scheme is still in a very small scale but judging from the overwhelming response, it is not difficult to foresee the day when every medical student who has financial difficulties will be able to continue with their studies.

Some donations have come from alumni in Singapore and Malaya. Such loyalty and support from our predecessors is indeed encouraging. Our thanks should also go to our local graduates who had generously responded with their subscriptions and donations, many have made an annual donation.

At the completion of this issue, both our editorial work and the Bursary project will be left to our successors. We wish them many successes in both.

The task of editing is not a problem in itself. Most articles we received were good. The difficulty lies in the fact that there is a persistent lack of articles for us to edit. There are probably many factors why medical students of this University pay so little attention to their own journal. But it is a fact that it is not easy to arouse their enthusiasm towards either the Medical Society or to this journal. And in this respect we have done done little. But it is never too late for our successors to make an effort to change the whole situation. A harmonious Medical Society and a journal that can truly represent us is the hope that we cherish as we pass the job on to the next editorial board who will, no doubt, succeed where we have failed.

BM = Bach. of Med.



YELLOW JACK

Prof. R. KIRK

Yellow fever is one of the major epidemic killing diseases which have influenced the outcome of wars and the history of nations. Early medical observers of the modern period wrote extraordinarily vivid and graphic clinical descriptions of this disease which Sir Gilbert Blane called "the whirlwind of the human frame," but there is no reference to the condition in ancient medical literature, which is surprising. The disease in epidemic form is a very dramatic one and it is unlikely that it would have escaped the attention of the early medical writers, so it is possible that the condition did not exist in the ancient civilizations. Yellow fever was first recognized as a disease entity in America in the seventeenth century and for over two hundred years has been one of the great plagues of the world. The yellow fever of history had some notable epidemic features. It occurred in seasonal epidemics in large cities, spreading slowly along the lines of maritime commerce and the great navigable rivers. It very often broke out in ships at sea and took a heavy toll of sailor-men. Most of the old stories of plague stricken ships refer to outbreaks of yellow fever which has several times crossed and re-crossed the Atlantic.

"It's a cruel port is Santos and a hungry land
With rows of graves already dug in yonder strip of sand
'N' Dick is hollerin' up the hatch, 'e says 'e 's goin' blue
His pore teeth are chattering 'n' what's a man to do?
It's cruel when a fo'c's'le gets the fever!"

The tropical and sub-tropical regions of America were subject to devastating epidemics which swept repeatedly over the West Indies, Central America and the southern United States, decimating populations, paralyzing commerce and industry and keeping the people of these regions in a state of perpetual apprehension. Some of the epidemics were associated with an extreme degree of panic and terror. "Shot gun quarantines" were established round infected places, which were surrounded by men from neighbouring places armed with shot-guns and prepared to shoot people fleeing from the infected places in terror and possibly carrying the infection with them to other places. This extreme apprehension was probably due to ignorance about the cause, means of transmission and prevention of yellow fever, combined with the terrifying aspect of the disease in its severe forms.

Many people became involved in attempts to isolate the causal agent of yellow fever, including Pasteur himself. In 1881 Pasteur left Paris for Bordeaux on hearing that cases of yellow fever were arriving there from Senegal by ship, but when the vessel *Conde* arrived at Bordeaux he found that 18 persons had died on the voyage and the remainder were now convalescent. While waiting for the arrival of the *Richelieu* some ten days later, he wrote in a letter to Paris "God permit that in the body of one of these unfortunate victims of medical ignorance I may discover some specific microscopic being and . . . make that agent of death and disease its own vaccine." The *Richelieu* arrived in due course, but was free from fever. The last passenger had died during the voyage and his body had been thrown into the sea. So Pasteur left Bordeaux and returned to his laboratory in Paris. Various organisms alleged to be the specific agent of yellow fever were described by other observers, but the only one that received some credence for a few years was the *Bacillus icteroides* found in cases of yellow fever in 1897 by the Italian bacteriologist Guiseppe Sanarelli.

CARLOS FINLAY AND THE REED COMMISSION IN CUBA.

In 1900 yellow fever was prevalent in Cuba, then an American possession. A commission from the United States army, composed of Dr. Walter Reed as president with Drs. Carrol, Lazear, and Aramonte as members, was appointed to study yellow fever in Cuba. There was an epidemic raging in the town of Quemado and there they attempted to isolate the organism of yellow fever (the so-called *B. icteroides*) from the blood of patients and from the organs of people who had died of yellow fever. A thorough and painstaking investigation of 18 clinical cases and 11 autopsies yielded completely negative results. They concluded that *B. icteroides* when present was only a secondary invader belonging to the colon group and not causally related to yellow fever, and they failed to isolate any other causal organism.

Now there was a doctor in Cuba, named Carlos J. Finlay, the Cuban born son of a staid Scotsman and his French wife. Finlay was a good doctor who had lived with yellow fever for many years and studied it closely. In 1881 he put forward a theory that the disease was transmitted by mosquitoes, based on very sound evidence and close reasoning. Nobody took Finlay's views very seriously, but when the American commission drew a complete blank with their bacteriological investigations they decided it might be worth while discussing the matter with Finlay. Finlay received them cordially, placed his publications and experience at their disposal. He also gave them ova of the mosquito species with which he had worked and which he maintained was the vector. These hatched in water and from them emerged larvae which ultimately developed into the elegant black and silver mosquito we now call *Aedes aegypti*. Then things began to happen.

In September 1900 Reed and his colleagues reported three cases of yellow fever produced by the bites of mosquitoes that had previously fed on patients during attacks of clinical yellow fever. Further work established clearly that yellow fever was normally transmitted by the mosquito and that there was an interval of about 12 days between the infective feed and the ability to transmit yellow fever by the mosquito. It was shown also that yellow fever was not transmitted by contact, fomites, bedclothes, etc., but could be transmitted experimentally to human beings by inoculation of blood taken from yellow fever patients during the first two days of illness. This showed that the causal agent of yellow fever was present in the blood, but all attempts to isolate and identify it were unsuccessful.

These results were reported by Walter Reed at a conference. This was attended by many distinguished scientists and medical authorities who were inclined to be sceptical. They nodded their heads and stroked their beards, but pointed out that the conclusions were new and somewhat revolutionary, very interesting perhaps, but required to be viewed with caution until further evidence was forthcoming, etc., etc. Then an amusing incident occurred. Walter Reed, being rather a shy man, unaccustomed to public speaking, accidentally upset a glass jar containing living mosquitoes which escaped. This did more to convince the sceptics than any further evidence could have done. Fear, the oldest of all the devils, suddenly seized the audience. Caution was forgotten as the savants jammed in the doorways in a rush to escape from the lecture room, where the mosquitoes were now free and flying towards them. No doubt they felt a little foolish, but also mightily relieved, when they learned afterwards that the mosquitoes were not infected ones.

THE SANITATION OF HAVANA.

Although the causal agent of yellow fever had not been identified the results of the Reed commission pointed clearly to mosquito control as a practical method of reducing yellow fever incidence. This conclusion was accepted by the sanitary authorities in Cuba. In February 1901, the chief sanitary officer in Havana, Major William Crawford Gorgas of the United States Army, instituted a campaign against yellow fever, based on the eradication of mosquitoes, with dramatic success.

Yellow fever, which for one hundred and fifty years had been constantly present in Havana, was completely eradicated by September 1901 and has not subsequently reappeared. In addition to eliminating yellow fever, the anti-mosquito campaigns in Havana greatly reduced the incidence of malaria.

THE PANAMA CANAL.

The next episode was the construction of the Panama canal. The completion of the Suez Canal in 1869 and its subsequent success as a commercial enterprise turned men's attention to the American isthmus. The Panama Canal Company was organized in France in 1879, with Ferdinand de Lasseps, who had been responsible for the construction of the Suez canal as president. The next two years were devoted to surveys and examinations and preliminary work upon the canal. Work on the canal continued until 1889, the management being characterized by a degree of extravagance and corruption rarely equalled in the history of the world. The directors banqueted in Paris, while in Panama the company lost annually by death from yellow fever about one third of their white employees (Gorgas, 1915). In 1889 the company became bankrupt and was dissolved. A second Panama company organized in 1894 fared no better and was finally bought up by the United States government. Remembering the experience of Gorgas in the sanitation of Havana Surgeon General Sternberg recommended that Gorgas should be put in charge of a sanitary campaign in Panama to prepare for the building of the canal by the United States government. So Gorgas when to Panama in 1904 to launch his second great demonstration in the control of yellow fever by anti-mosquito campaigns. With the techniques previously used in Havana rapid results were obtained. Yellow fever declined rapidly during the autumn of 1905 and by November of that year the last case of yellow fever had occurred in Panama City. One further case occurred in Colon during 1906, but that, until many years later, proved to be the last known human infection in the isthmus of Panama. The Panama canal was opened for commercial shipping in 1914.

JUNGLE YELLOW FEVER.

The demonstration in Cuba that yellow fever was transmitted by the mosquito *Aedes aegypti* launched one of the most memorable campaigns in the history of preventative medicine. Its object was the complete eradication of yellow fever, first of all from the Americas, finally perhaps from the whole world. It was based on the belief that the virus of yellow fever occurred only in man and in the *Aedes aegypti* mosquito. There are no human carriers and the mosquito vector does not transmit the virus through the egg from one generation to another. Hence it was held that the virus could not maintain its existence except in the presence of active *Aedes* having access to a continuous supply of non-immune human beings such as was found only in large cities and places having a constant supply of non-immune travellers from outside. If by *Aedes* control the disease could be eradicated from such "endemic seed beds" it might be expected to disappear also from the surrounding tributary areas. Proof of this argument was apparently provided by the results of Gorgas in Havana and Panama, since the sanitation of these two cities was followed by the disappearance of yellow fever, not only from Havana and Panama but also from many other cities in the Gulf of Mexico and the Caribbean sea. Similar results followed the application of similar measures in other parts of the Americas, and it was only after 25 years had elapsed that events in Brazil during 1928 and 1929 showed that this sequence of events does not invariably occur. The unknown epidemiological factor which doomed to failure the attempt to eliminate yellow fever from the Americas by sanitation of the "endemic seed beds" of infection was "jungle yellow fever" transmitted in the absence of *Aedes aegypti* in rural and jungle areas where the population is low and its movements limited. The story is a long and fascinating one, but we know now that the historical epidemics of yellow fever were due to one particular epidemiological

type of the disease, the so-called urban type transmitted by the domestic mosquito, *Aedes aegypti* and essentially preventable. It originates from another type, the so-called jungle yellow fever, propagated in the forests of Africa and South America, in the absence of *Aedes aegypti* and often in the absence of man. In spite of these modern discoveries, the pioneer work of Finlay and the Reed Commission in Cuba and the epic campaigns of Gorgas in Havana and Panama had demonstrated clearly that *aegypti*-transmitted was essentially a controllable disease, and the world need never again know the fear of epidemic urban yellow fever which existed in the past.

MODERN RESEARCHES.

The modern period of yellow fever research which began in 1927 is separated by a quarter of a century from that heroic age of discovery in which Carlos Finlay (1881) announced his conviction that yellow fever is spread by the mosquito now known as *Aedes aegypti* and Walter Reed and his associates (1901) proved in Cuba that the disease is spread by *Aedes aegypti* only and not by filth, contact or contaminated articles.

The modern era began in West Africa when Stokes Bauer and Hudson (1928) showed that Asiatic monkeys (*Macaca mulatta*) could be infected with the virus of yellow fever. Hitherto no susceptible animal had been known and experiments had required human volunteers. The virus was obtained by Dr. A. F. Mahaffy from a West African named Asibi, who had only a mild infection with none of the classical signs and symptoms of yellow fever. Stokes was rather dissatisfied about this and said he would be more convinced if the virus had been obtained from a fatal case of typical yellow fever. Shortly afterwards Adrian Stokes himself provided the fatal case in which every feature corresponded with the classical descriptions of yellow fever. The Asibi virus, in a modified form known as 17D now furnishes the vaccine by which millions of people have been immunized against yellow fever.

The transmission of yellow fever to an animal other than man at once opened up new possibilities of research. A few years later Theiler (1930) showed that mice can be infected with the virus if inoculated intracerebrally and Sawyer and Lloyd (1931) developed a protection test technique which made possible the use of these animals for extensive surveys. New discoveries followed one another in rapid succession. A world-wide survey by means of the mouse protection test was initiated in 1931 (Sawyer, 1934) and has shown that yellow fever is apparently absent from most parts of the world and active only in two vast circumscribed areas in Africa and South America where it is maintained in forest and jungle country often in the absence of man and of the *Aedes aegypti* mosquito. The chief landmarks in the conquest of yellow fever are summarized by Dr. A. J. Warren as:

(1) The work of the Reed Commission in proving that yellow fever is carried by a mosquito and caused by a filterable virus,
(2) the discovery of susceptible animals,
(3) the development of the mouse protection test,
(4) the development of successful techniques for the eradication of the urban vector, *Aedes aegypti*,
(5) the discovery of the jungle cycle of yellow fever and its significance in the epidemiology of the disease,
(6) the development of a simple and practical method of immunization against yellow fever.

VACCINATION.

The vaccine used for immunization against yellow fever is a modification of the celebrated Asibi (West African) strain obtained by Dr. A. F. Mahaffy in 1927. The first step was the successful establishment of the virus in a culture medium containing embryo mouse tissue and normal monkey serum in Tyrode solution. After 18 subcultures in this medium the strain was transferred to a medium containing minced chick embryo tissue. With prolonged tissue culture in minced chick embryo the virus lost its

power of producing disease without losing its immunizing power. This vaccine now known as 17D was first used for human immunization by Theiler and Smith in 1937. Vaccine for human use is now prepared from developing chick embryos inoculated with tissue culture virus. Four days after inoculation with virus the embryos are pulped with distilled water in a mill and the filtered supernatant vaccine is packed in ampoules and dessicated in the frozen state. For use the vaccine is reconstituted by the addition of saline and injected subcutaneously. Millions of people have now been immunized against yellow fever by this vaccine, which is one of the best vaccines known to medical science, producing a solid and lasting immunity with no untoward reactions. The vision of Pasteur has become reality. The agent of death and disease has been modified to become its own vaccine.

THE POSSIBLE SPREAD OF YELLOW FEVER.

For years medical authorities have been concerned about the possible introduction of yellow fever into Asia, where, where vectors are abundant everywhere and the teeming populations are non-immune to yellow fever. Sir Patrick Manson (1903) pointed out in an address to the Epidemiological Society of London that if yellow fever spread to Asia from the making of the Panama Canal it be "a disaster of the first magnitude." The particular danger he envisaged diminished when Gorgas was able to eradicate yellow fever from Panama, but in 1914 Sir Malcolm Watson suggested the possibility of yellow fever crossing Africa to the East African coast from which the virus might readily be carried in ships to the Orient. The fact that this has not already happened in the past is one of the things about yellow fever we do not understand. Twenty years ago there was no evidence, from mouse protection test surveys or other methods that yellow fever in Africa had ever extended eastwards beyond the Sudan-Abyssinian border, but very soon immune donors were found in Eritrea, Abyssinia and Somalia right down to the East African coast. In 1959 an epidemic of yellow fever occurred in the Eastern Sudan (Haseeb et al, 1960) and this has apparently been followed by an extensive epidemic in Abyssinia with thousands of deaths. It is not easy to obtain precise information about happenings in that part of the world, or to form any conclusion whether this indicates a slow eastward spread of the infection or not.

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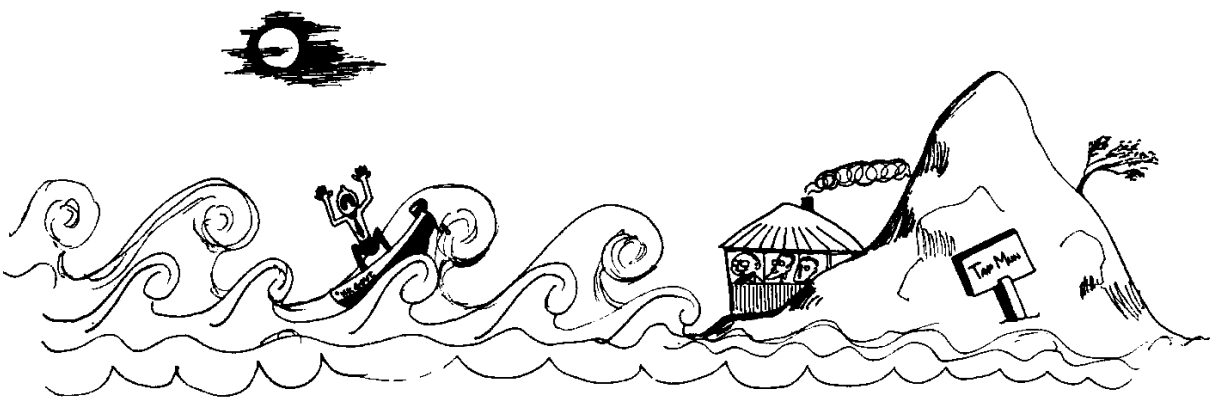

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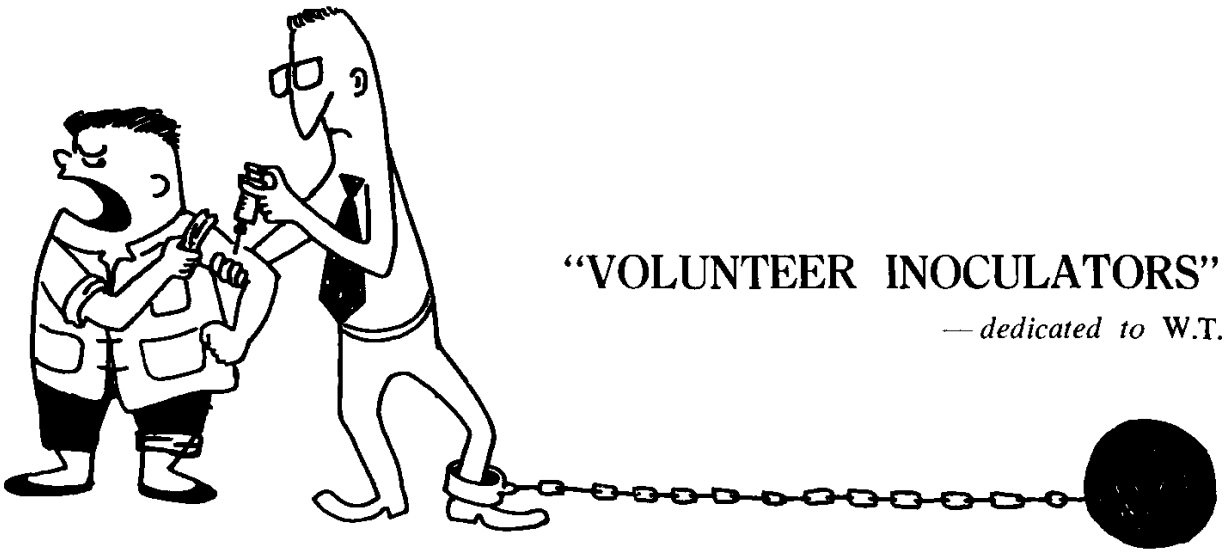


"VOLUNTEER INOCULATORS"

— dedicated to W.T.

The people of Hong Kong had been living in good health and enjoying peace and calmness, when cholera crept to the threshold of the Colony and alarm the population. We are not concerned here as to whence the infection came, but we were involved in an attempt to prevent its alighting and its spread. On 17th Aug., 1961, cholera saw Hong Kong with four reported cases and the next day, its arrival was officially proclaimed.

Even before the actual landing of the visitor, various measures had been adopted to prevent the infection and to limit its spread should the former fail. It is not for me here to relate the high efficiency and vigorous efforts of the Medical and Health Department and of other organizations concerned, for these will certainly have been appreciated by the general public and no doubt by lengthy reports from our honourable Prof. Teng. As for the enthusiastic response of the people, this must have been well known from newspapers. We are left, therefore, to have only to deal with what had been done to us and what we had done. Soon nearly two thirds of the population of the Colony had been inoculated and the situation was less tense than what it had been though the Government and its people were still on the alert. Thus this was the state of affair, when one Friday morning . . .

SPECIAL ASSEMBLY

25th Aug., 1961 was a day not unusual to any other days, yet we were told to assemble in the Lecture Room by eleven as we were pacing our ward-round with facies of embarrassment, being bombarded with questions. Blind guess and conjecture at once arose. Some said that the Professor of Medicine was going to give a lecture. Others said that there must have been some fault or other on the part of the students and that they were going to receive a good amount of scolding. Still others went so far as to assume an anaemic look so that the experienced surgical specialist would have at once proclaimed, "fifty percent!", had he chanced to meet one of these 'malnourished' medical students.

With one thousand are one doubts and their possible answers in our minds, we seated ourselves in the Lecture Room, each trying to occupy what he regarded as the 'best' and 'safest' position, to await, as it was, the entry of Autocracy.

A sudden diminution of noise in the room heralded the appearance of the Professor, followed by Dr. Wong with a tray of kidney-dishes, cotton wool, alcohol and syringes with needles. Even at this moment, none of us had been clever enough to make out the purpose of the assembly, not till the Professor spoke. He told us that we had been

asked to be inoculators for people living in the New Territories. This announcement was followed by a vivid demonstration as to the methods of manipulating the syringes, of drawing vaccine and of performing the injection by the Professor himself with a specialty clerk as an assistant, and not quite a guinea pig. I have often regretted to have attended to the words and manoeuvre of the Professor wholeheartedly and not diverged a bit of my attention to the expression of that specialty clerk as the former cleaned his arm with alcohol and waved about the syringe not more than two milimetres from the surface of his skin. To make sure that we knew what to do, another specialty clerk was 'invited' to repeat the demonstration. I reckoned that the two clerks must have been in very good friendly terms or else their enmity had vanished in the presence of the Professor, at least for the time being, as no actual injection, expected to be 'intraosseous', had been done. The Professor was considerate enough to conclude the meeting by asking if anybody for any reason could not volunteer himself for the benefit of others. This was, on the part of the Professor, undoubtedly quite democratic. From the point of view of a student, however, it was certainly superfluous. As a result of course, we were all generous and eager to offer ourselves at the service of others. With a smile of satisfaction, the Professor quitted the room and our destiny was stamped.

NORTH KOWLOON MAGISTRACY, FIRST DAY

On the fourth floor of the Building of North Kowloon Magistracy, the first 'volunteer' made his appearance at five past eight the next morning (Saturday). Since then, 'volunteers' presented themselves successively until twenty-five past eight, all were present, ready to be despatched. Many of them still had sleepy eyes and yawning was not infrequent. Those living on the Island had to get up before seven or even earlier. It was to their understanding that they had missed an opportunity of taking the cases assigned to them in the medical wards and a ward-round in the surgical unit, all because they had been told to assemble in this building to report to a Dr. A, attended by a Mr. Nobody who has been well known by those taking or having taken Preventive Medicine.

Nine o'clock, even with our sleepy eyes we could see that it was nine. Yet nothing happened; neither Dr. A nor Mr. Nobody made his appearance and we were left to ourselves not knowing where and whom to report to. At a quarter to ten, something happened. A hideous looking English gentleman, presumably Dr. A's superior, poked out his head and growled that we were too noisy. Dr. A at once told Mr. Nobody who for the first time appeared, to order our silence and send us downstairs outside in the open parking ground to

wait for his arrangement. It was then raining. My dear young men, we must not put the blame on Dr. A . . . he might have been a man bestowed with myopia but not with spectacles. Why on earth did God make that chemical entity consisting of two atoms of hydrogen and one of oxygen transparent? On the other hand, it might as well have been that colouring the compound as from God's will could not have altered Dr. A's decision, as he might have been

given no other choice which might possess of a chance to satisfy his noble superior.

There we stood, fully exposed to the relentless waterfall from the sky, sharing umbrellas and even raincoats. At a quarter past ten an announcement was made that all specialty clerks were needed for that day and that five volunteers were invited for the next day (Sunday). For these two days, senior clerks were not going to take any part. Alas, senior clerks, foresaking their beds early in the morning, hurrying all the way long with eyes half open and heads still heavy with sleepiness, growled at upstairs and soaked downstairs, presented themselves with such loyalty and obedience just to hear the announcement of this ingenious arrangement! The time and energy of medical students are nothing compared with those of the officials responsible for the scheme. I am sure Prof. T must have been fully aware of this point. Injustice and dissatisfaction made our feeble voices united to become a roar which turned Mr. Nobody's face pale, rendering his mouth half open and his eyes gorgling, not knowing what to say or do but standing aghast. A negotiation was made with Prof. T on the telephone who urged us to try our best to co-operate and promised to apologize for any misunderstanding between those big chaps up in the office and us medical students down under the rain. This was a sugared pill as will be seen later. Finally, at eleven, an agreement was arrived at. Some of the students would go to Tsun-wan, while the remainder to a centre at Farm Road. I must here admit my ignorance as to the experience of those going to Tsun-wan, except that they had been treated with dishes of chicken which no doubt were baits to hook some of our colleagues at a later date. However, I do know that some of our colleagues had been sent away from the centre at Farm Road basing on the fact that the centre was having enough hands, and hence their offer to help was quite unnecessary and this implies, of course, that they were simply crowding up the place. I do know the feeling of these fellows as they quitted the centre and dare not ask them, but personally, I shall not hesitate to offer them my deepest sympathy. Thus our report to Dr. A was over with most of us not even getting a glimpse of him.

THE DRUG BENEATH THE COVER OF SUGAR

The rest of the day was calm until evening, when the door bell rang. A letter in official envelop was delivered from Prof. T. The contents said nothing about the day's chaos and 'misunderstanding', as it had been called. Rather, we were warned that being assigned inoculators had been made part of the programme of our training and that the Professor himself could see no reason for non-attendance. What a menace to those who have still an examination in Preventive Medicine in front of them! Whatever the reaction to the letter, however, it did work its purpose, and indeed worked very efficiently. The result was that full attendance was achieved and the service changed from voluntary to compulsory.

NORTH KOWLOON MAGISTRACY, THIRD DAY

9.00 a.m., Monday, 28th Aug., 1961, eleven days after the landing of cholera, when two thirds of the population of the Colony had been inoculated, a group of medical students made their appearance on the fourth floor of the Magistracy, being 'volunteers' for inoculation work in the New Territories. This time Dr. A appeared shortly and the whole scheme was left in the hands of Mr. Nobody. As one of our colleagues has always been in good subordination to the latter, it is only natural for him to take over the situation and make arrangements before setting out. It was not long before he was seen squeezing this way and that, waving a piece of paper in his hand. On that sheet, there were three columns headed by the words: Tsun-wan, Tai-po, and Un-long respectively. As Tsun-wan is the closest to town, the most extensively developed during recent years, and above all, dishes of chicken were ready for consumption as was known from pioneers on Saturday, it is not surprising

to find his name topping the column under Tsun-wan followed by that of his close friend, perhaps his only true friend in the class. The fact that it was expected that each group should consist of no more than ten persons implies difficulty and disfavour for his voracity if too many people signed under that same column. In order that his desire was in no way affected adversely, he began to persuade people to sign under the other two columns by assuring them that every place was the same, that there were already too many people going to Tsun-wan, that it did not seem worthwhile to sit idle in Tsun-wan as most of the people there had been inoculated, and even that his name was going to be shifted to the other columns when asked why with such drawbacks about Tsun-wan he still placed his name in its column. This last statement was confirmed on the contrary when he was seen slipped stealthily into the van to Tsun-wan. From this, we must certainly admire the wit and wile of our distinguished colleague, while retaining our constant doubt as to how with the exhaustion of his amount of capability he managed to get a bit more than a distinction in his first examination. No doubt, a person of his type of personality can become great in a sense that as a politician, he can be quite a liar or perhaps traitor; as a business man, he can be the most successful crook or swindler; and as a doctor, if he chances to be one, he can be the most remarkable hypocrite. The justification of applying this to our colleague has still to wait, but one thing that has been well known is that as a student, as he is now, he has already shown fascinating skill in flattery to those above him and in treachery to those with him. Though it may be true that such vile means may pave an easy way for one to success, yet success obtained in this way is not likely to be maintained for any length of time. Now that we had been, in a sense, betrayed by our respectable colleague, we could but climb up the van destined to the place under the name of which we had signed ours.

NORTH KOWLOON MAGISTRACY, FIFTH DAY

Two days later, another hero appeared at the same stage where our distinguished colleague previously referred to had given his performance. The exceptional quiet in the building reminded us of that day's being a Public Holiday. Neither Mr. Nobody nor his subordinate, our admirable colleague, was present. It is easy to understand that as long as Mr. Nobody was not in charge, the

presence of our honourable colleague would not favour him a bit, even if he subjected himself under the errand of Dr. A. On the other hand, his absence was unlikely to be detected; he might be marked present on the role-call which was to be kept for Prof. T's reference and information, or else his name could be filled in the signing sheet later, not necessarily by himself. Our colleague is clever indeed! As a result, Dr. A had to take over and proved himself a worthy match for the preceding. A short piece of speech was delivered in a soft voice of a queer tone, with hands clasped like a worshipping Buddhist, "Gentlemen, it is very kind of you . . .". I am very sorry not to be able to remember the exact wording that followed, but the idea was that if reasonable claims were made, refund for expenses for the manoeuvre might be obtained. This statement served its ends, for we became less grudging and more willing to lift our legs as we climbed up the vans. Perhaps Dr. A said this just to soothe out feelings, make us think less of its being a holiday, and most important of all, work more efficiently, the fact is that up to this very moment claims for refund have not been answered either positively or on the contrary. Yet Dr. A might not have made the empty promise at all, had he fully realized the situation. First, we had to go whether we were willing or reluctant; whether it was a holiday or a working day, as it had been made part of our training programme. Secondly, it was quite unnecessary to attempt to raise our efficiency, because the number of people coming for inoculation did not necessitate a high efficiency output.

OUR WORK

The result of our work depends on the appropriateness of measures and scheme adopted by the authority concerned and also on the response of the people in the particular locality where we placed our feet. On the whole, while I am in no position to criticise any scheme and measure designed, our success as inoculators has not been conspicuous. Generally speaking, most

people easily accessible had been inoculated, while those in more remote spots might not find interest to do so. At Tsun-wan, even with the attraction of noodle-packets, the number of people came for injection amounted to no more than forty eight, including young and old, whereas those for noodles more than two hundred. The supply of syringes and needles as well as other appliance was not always ideal. Most of the needles were of large size and, unfortunate for both us and those injected, blunt, while most of the syringes had a maximum capacity of only two cubic centimetres. No means of sterilization was provided, or only very occasionally and inadequately. Vaccine, alcohol and cotton wool, however, were supplied in large quantity, a sharp contrast to the limited number of those coming for injection.

All sorts of environmental conditions were encountered: villages, country-side, mountain-slope and woods; in cottages, farm-house, food-stores, and even out in the open air when rain became a constant threat. Different kinds of people were met with: some stepped forward bravely and confidently with sleeves up; some refused to be inoculated simply for fear of the needle; others urged and even forced their youngs to receive the injection with themselves shrinking away from the syringe; many an old country folk claimed their exemption based on their age. The latter group never dreamt that *vibrio cholerae* knows no age group and indeed bears no mercy on the old or the young. One of our colleagues set up his 'consulting table' with his stethoscope on it at the vicinity of a bus stop. It was only after everything was ready that he realized that his neighbour happened to be a herbalist. One may readily imagine the awkwardness of the situation and how they eyed each other and with what feeling. Indeed it seemed a wrong time for the confluence of Western and Eastern medicine. Two students went to Sha-tau-kok and injected two persons. They are the only two among us having a chance to stare face to face with soldiers on the other side of the boundary. It is difficult to guess the feeling of these soldiers as they watched people being injected, because their country had put up a firm denial as to the presence of an epidemic of cholera.

"The whole bunch of you are lazy!", remarked a celebrated surgical specialist one morning during a ward-round, throwing down the history-book and creating a loud explosive noise that called upon every patient as well as the nursing staff to concentrate on a group of students with pale faces and drooping heads. Some months had lapsed before the statement was verified as two students stood beside a stream watching a duck swimming, appreciating the grace of her style. The job which should be done by these two listless chaps had been done by a nurse who was living in the vicinity, otherwise the duck could probably not have attracted their attention or at least they could not have afforded to let their attention be attracted. The music of "Swan Lake" rang in their ears as their imagination flew in the air. You may think they were rascals, idling there while others were walking, climbing, sweating yet soaked with rain, and busily injecting, when compared with another colleague, however, they were merely miniature devils, Satan himself was this our dear young man who managed to pass the whole day without a single touch on the syringe!

As a medical student, even if you do not become a famous physician or a celebrated surgeon, at least you have acquired the spirit of patience and of endurance through several years' training. This spirit finds its application not only in dealing with one's girl friends but also in ordinary daily life as well as in our service in the New Territories. Many of our colleagues were sent down to remote villages. The journeys took from quarter of an hour to several hours mostly on foot and the number of injections done varied from a few to several tens. The latter must be concedingly regarded as

being satisfactory. The record, however, was achieved and maintained by one classmate of ours, who has the broadest outline among us both from antero-posterior and from lateral profile. He climbed up a mountain, not a hill, mind you, and did inject one person. Then he climbed all the way down again, getting home when everybody was about to bed. In our opinion, he should have been awarded a Medal of Zeal or something of that sort. In reality, however, I wonder if he had been offered a word of thanks.

Being able to work under all environmental conditions is not the gem of the ability of medical students, the main issue here is the capability to adapt to environment. This must of necessity be so because our course of study has a multiplicity of aspects and accordingly our environment is also multifariously variable. Such capacity had been demonstrated when a group of six was sent to Tap-mun where they were welcomed by a thunder-storm. One of them managed to get back, soaking wet from hair to toe. It is simply a mystification that he did not get a cold. The other five stayed at Tap-mun for the night. Their families became alarmed and rang up various places to look for them. I can hardly imagine how the person responsible got through the night and how he was being incriminated, blamed and cursed. Yet he should have felt relieved and contented when the five returned the next morning, for had they really disappeared for some reason or other, what the outcome would have been is difficult to anticipate.

Little can be said about our technique of performing the injection. But I did witness a lady who had been pricked thrice before obtaining the inoculation. The first time the needle did not go in. The second time the needle was in all right, but as the injection was begun, the syringe became detached from the needle. It was only at the third prick that the inoculation was completed. It might well be that the skin of the arm of this lady was peculiarly tough, or that the needle was specially blunt or that the needle did not fit the syringe at all and it was only with special technique that the injection could have been done. Whatever the excuse, the lady eyed the blushed young man with a mixture of astonishment and discontentment, coloured by a trace of sympathy, and it presents no difficulty in imagining the impression retained by this lady of the young 'doctor' who was kind enough to offer her protection against cholera gratis. Haematomata had been uneasily confessed and intradermal accumulation of vaccine complained as the person injected screamed with pain and noticed a raised, blanched area, firm in consistency, on the skin around the point of insertion of the needle. Another thing is that as things were being packed by the close of the day, not infrequently quite a number of needles were found to be hooked or crooked. All that I can say is that it is difficult to access the time of acquirement of these deformities.

AFTERMATH

Seven days lapsed and this portion of training came to an end. The course entailed deprivation of our ward-rounds and case-taking, increase in our expenditure of both money and energy. It is not for me to access and comment on the result, but it is easy to see that while they had tried their best to satisfy their supervisor, the students themselves were not satisfied. The impression was that they had not been treated duly as students, but rather as one who came to beg for work and pay however meagre it might be. The all-important promise of refund was in Utopia. It seems no longer a fallacy that creditability ranks low in people of some position. I have chanced to meet Mr. Nobody. He looked just as complacent and euphoric as usual, with a poorly concealed grin of triumph. The whole story was completed when a letter was received by everyone of us from the Director of the Medical and Health Services expressing thanks for our effort from the Governor, our Chancellor, and from the Director himself. As for how the Professor of Medicine reacted to the scene on the first day at North Kowloon Magistracy is still a mystery.

ORTHOPÆDIC SURGERY AND EVERYDAY LIFE

AN INAUGURAL LECTURE FROM THE CHAIR OF ORTHOPÆDIC SURGERY

by Professor A. R. HODGSON, M.B., CH.B., F.R.C.S. (Edin.), F.A.C.S.

The elimination of the dead languages from much of modern education is an excuse to recall the origin of the word *Orthopædic*. Nicholas Andry, who was Professor of Medicine at the Royal College in Paris, published a book in 1741 entitled *Orthopædics or the Art of Preventing and Correcting in Children the Deformities of the Body*. He states that he coined the word from two Greek words, *orthos* signifying straight, without deformity, and *paidion* which signifies a child. That adults were excluded from this newly-born specialty of medicine is due perhaps to the fact that methods of treatment then available were only effective in growing children, for the emphasis was more upon prevention than correction. On page seventy-three, he shows us the proper way to sit and the improper way to sit — how many of us sit properly? He recommends walking with a book on the head to improve gait and posture — anyone who has seen the beautiful gait of the races who carry goods on their heads will appreciate this point.

It is the ordinary fare of everyday life with which we are concerned. No rich food, nothing spectacular; but I wish to take up a few of the problems of everyday life that concern the orthopædic surgeon. Although not spectacular, they have great importance by their very frequency and by their results.

However, it is with the body and its function in everyday life that we are concerned, and some knowledge of some of the things that we should avoid in everyday life. Let us start with some of the effects of clothing and footwear, and enunciate the principle that body form is influenced by:

(*i*) internal forces — that is, the use of an organ produces hypertrophy and dis-use atrophy of that organ. A good example in Hong Kong is the rickshaw coolies' calves.

(*ii*) external forces — examples of this are the wasp waist of Victorian days and the narrow, pointed shoes which women wear in the present day.

The importance of suitable footwear in young growing children has only been appreciated by the public and shoe manufacturers over the past twenty years. This battle has been won in Great Britain largely by the co-operation of orthopædic surgeons with children's shoe manufacturers, and the battle has been won for the feet of the future. The battle has still to be won in adult shoes, especially those used by women. The slide I show came from London, and displays the ultimate result in a woman who has been pushing a broad foot into a shoe too narrow and too short for her. Four years ago, Dr. Lam and I did a comparison of foot forms in the shod and unshod Chinese foot. I will show you a slide from our article to show that deformity and stiffness of the foot go together and produce symptoms, while motion and lack of deformity go together and are symptom-free. The most graphic example of this is, of course, the Chinese bound foot. This is not only deformed and stiff, but produces symptoms and is of poor function. We have a problem here of education and perhaps, indeed, legislation; the public must be taught to choose and wear well-designed shoes which will not constrict the feet. In recent years, a universal sock has appeared for men which is elastic and

which constricts the foot slightly, and time alone will tell whether this will have any material effect upon foot form in the future.

Let us leave the foot for the present and turn to consideration of the low back, for this portion of human anatomy is a very weak link. It is here that most change in the form and function of the skeleton has occurred with man's change from a quadruped to a biped; for man is the only biped who can extend the thighs upon the trunk. This area of the body is in a state of change, and this is mirrored in the great variations found in the anatomy of this part. Perhaps one may describe it as a balancing feat, where the head and neck, and the upper arms and thorax are balanced upon pelvis and lower limbs, through five lumbar vertebræ; this balancing feat is made possible by the muscular supports around the spine, those of the abdominal wall, and those embracing the spine. Low back pain has been called a disease of the chairborne, for these people tend to exercise too little and perhaps eat too much, so the balance of support of the muscles is destroyed. This is not helped by many of the chairs in use today, designed by carpenters whose interest is wholly in the technique of manufacture, and who have no knowledge of the workings of the backs of those who have to sit in them. A very good example is the standard University chair, which fits where it touches, and it touches but seldom; to sit back on it, is not comfortable. Perhaps the most august chair in the University, the Chancellor's ceremonial chair, a masterpiece of the chair-maker's art, is another example. During Congregations, its occupant is obviously not in sympathy with it.

Seats in cars and seats in aeroplanes still leave a great deal to be desired. The ideal seat should be adjustable for the length of the lower and upper leg, have adjustable contour to the back, and be adjustable for inclination. It is only in this way that a chair can be adjusted to fit different individuals.

From chair to bed. The Chinese have many habits which could well be adopted by other races, and one is to sleep upon hard, wooden boards. Mattress manufacturers have made a variety of soft mattresses of spring or rubber, usually advertised and named in an attractive fashion, but which are, from the point of view of the low back, unsatisfactory. They are unsatisfactory from two points of view, firstly if they are too springy the patient is unable to relax the muscles controlling the lumbar spine for, as he moves in his sleep, they must be on guard — these patients wake up with back pain which may or may not wear off during the day. The other type of bed which should be avoided is the 'sagger', the bed which sags in the middle and which doubles up and strains the lumbar spine in consequence. Many back pains are produced and more are perpetuated by bad beds.

From the bedroom to the kitchen. In recent years, there has been more awareness of the importance of avoiding forward flexion strains by the housewife. This has been achieved by raising the level of ovens and cupboards to permit the housewife to work happily in the upright position. In addition, mechanization in the kitchen has taken a great deal of the drudgery and, consequently, fatigue out of the housewife's daily routine. The use of a stool in the kitchen has relieved the feet and prevented a good deal of foot strain.

The office. When one works for long hours seated at a desk, it is well to pay particular attention to the relative height of the chair and the desk. It is also useful to have part of the desk sloping up in front of you so that you may read sitting in the upright position, for it is all forms of flexion of the spine that should be avoided; the spine is weak in flexion and in this position it may become easily strained either by sudden movements or by sitting in the flexed position over a long period of time. Also in the office, it is useful to get up from the desk periodically and stretch one's back to avoid fixed deformities in the flexion position, which can give rise to permanent kyphosis.

Motorcars and cycles produce a rising injury and death rate in our modern world. Much valuable research has

been done over the past ten years to make these vehicles safer for the occupants. Crash helmets and transverse crash bars have done a great deal to lower the incidence of head injuries and fractures of the tibia and fibula in motorcyclists, and in some countries they have been made compulsory legally. In motorcars, seat belts and crash helmets have lowered the incidence of serious trauma, and no letter example could be found than the accident in the recent production car race at Macau, when two cars collided at a speed of over 90 miles per hour down the straight, and crashed. Both drivers sustained no more than a few abrasions, and one of the drivers was able to race in the next race.

> Man made himself out of an ape, partly by becoming an engineer. The danger now is that the process may be reversed, and engineers will make apes of us all . . . (E. A. Hooton).

An investigation has been made in the United States, of the general bio-mechanical considerations of motorcar injuries and every possible avenue of the problem of car injuries. We have not time to go into this in detail, but I should like to draw attention to a few aspects of this problem. The frequency of injury to gross body areas can be seen on the slide I show now. It will be noted that the head is injured in 70.9% of cases while the lower extremity in 33.6% of cases. It will be seen how important it is to protect the head and the lower limbs whenever possible in motor car accidents. Here too we see one of the common causes of severe accidents in motorcars, that is door failure and ejection of the passenger through the door. The importance of the seat belt cannot better be emphasized than this and perhaps also this next slide may show how the seat belt keeps the driver safely anchored. This was taken during a stockcar race; it can be seen that the driver's car is disintegrating round him but the driver is still held safely in a reasonable position. Perhaps it is enough to say that there is much that remains to be done to make motorcars and motorcycles safe for the individuals of the future.

There is a further source of accidents, and that is in industry. Recently, Hong Kong has become partly industrialized, and more and more accidents of various types reach our hospitals from the factories. The care here must be firstly towards education of the worker to the dangers of his machine; secondly, to the protection of the worker from the moving parts of a machine wherever possible, so that he is unable, if he is tired and becomes careless, to get caught up in it. All circular saws, plastic presses, etc., should have safety guards on them.

The future of space travel will subject the human frame to forces of which we are still not fully aware. Here there is a tremendous future, the full extent of which our minds cannot yet conceive. And so it will go on in the future, the human being exposed to more and different forces and traumata, all of which will engage the mind of the orthopædic surgeon, especially towards their prevention wherever possible.

The floor-show before the Occasion . . .

Guests of Distinction . . .

MEDICAL BALL

Date: 30th May, 1961

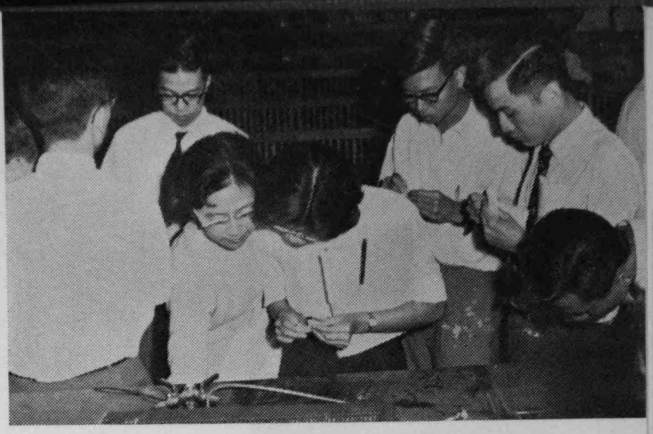
Place: Paramount Restaurant

Remarks: Full House

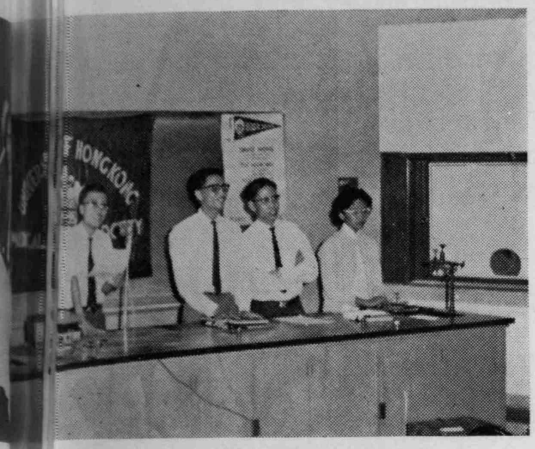
Ready to give away the prizes

The ever-winning physician . . .

RAPHS *(Cont'd. on p. 69)*



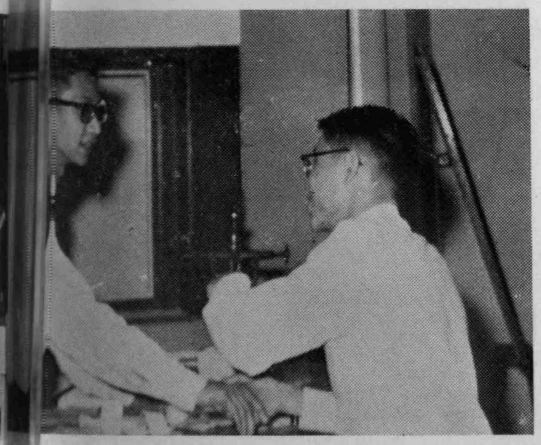
The choice . . . The spirit . . .



The outgoing . . .

GENERAL ELECTION

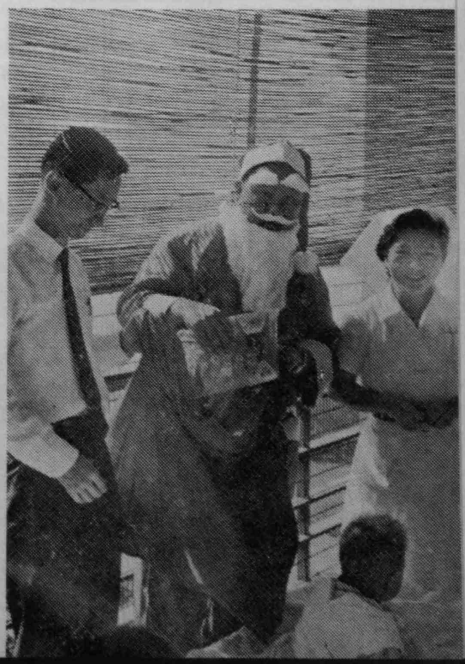
Date: 26th October, 1961
Place: Chemistry Building
Remarks: Attendance excellent



The change-over, not reluctantly . . .

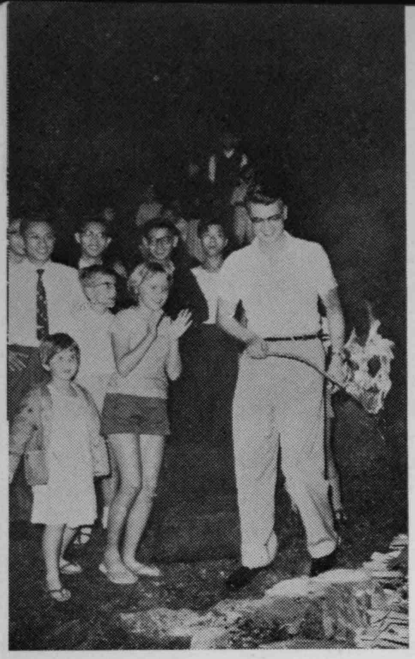
CHRISTMAS GIFTS
To sick children

Date: 24th December, 1961
Place: QMH and Sandy Bay
Remarks: Everybody Happy



Santa in QMH

Santa in Sandy Bay



The warmth

Here we go, Cats! (Nope! Me

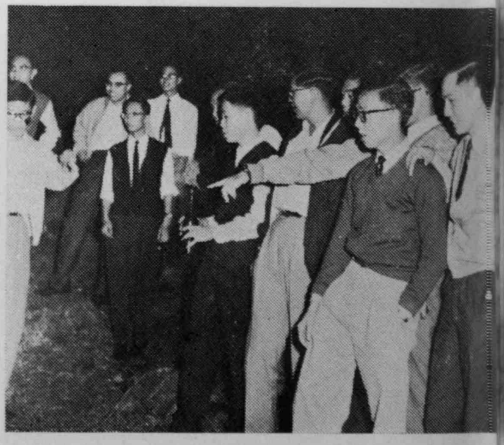
THE MEDICAL BARBECUE

Date: 30th November, 1961

Place: Lily Pond

Remarks: Tender Fire
Tender Music
Tender Stomachs

The fire



Onlookers

Chow-chow time

Chatting time

MEDICAL SOCIETY ANNUAL REPORT 1960—1961

The Medical Society has again passed through a year of success. Although we cannot say that we have done anything great, we dare say that we have done our best to foster into members the spirit that the Society belongs to them. The support shown by members of different classes is most heartening and stimulating.

Below is the record of some of the year's event:

SOCIAL FUNCTIONS

1. *Barbecue*

The first function of the session, the Barbecue, took place on 15th December, 1960, at the Lily Pond in the University compound. The path leading up to the spot and the pond itself were ornamented with lit candles and colourful electric bulbs. More than two hundred youngsters gathered around the blazing fire, their happy voices carried away in the cold crisp evening air. The climax of the evening came with the display of fireworks which broke the usual stillness of the quiet spot.

2. *The Annual Ball*

The highlights of the year occurred on the 30th May, 1961 when we Medicos gathered to have our Annual Dinner Dance in the Paramount Restaurant. This year we managed to reach the 100-couple line. For the first time the Society set foot on the printing of programmes for the night to act as Souvenirs. From the money we obtained through advertisements we managed to secure an adequate fund (although tickets were sold at a loss) for the manufacture of souvenirs to representatives in all fields and to leave a wide surplus to strengthen the financial condition of the coming year. This we aimed to stimulate interest and support from members.

3. *The Medical night*

A second climax was reached when against our tradition the Society held the Mednite in conjunction with a Freshmen Welcome Party on the 6th October, 1961 at Lady Ho Tung Hall. As usual performances are provided by different classes. For the first time in history we put forth the Medical Band — a well composed quintet, which won most of the applause of the Nite. Dr. Franklin Li was our quest artist and gave a most impressive performance on the piano. The night ended with the distribution of souvenirs by Mr. Chew Wei and finally "chow". Beer was undoubtedly not adequate for circulation. We would like to take the opportunity here to thank the Warden of Lady Ho Tung Hall for the kind permission to use the Hall dining-room and to apologise to the lady hostel members for any inconvenience we had caused.

ACADEMIC AND CULTURAL FUNCTIONS AND ASPECTS

1. *Presidential Address*

The Presidential Address was given by Dr. Chew Wei on "*Milestones in Obstetrics*" on the 20th April, 1961, at the Chemistry Lecture Theatre. Just before the talk refreshments were served and a group photo was taken. The talk was most informative and interesting, well illustrated with slides which were collected under the painstaking effort of the President himself.

2. *Film Shows*

During the second term, a series of film shows were held biweekly in the physiology lecture theatre, which was overflowed every time with inquisitive and eager students of all classes. The films were mainly on topics of academic interest and proved to be of interest to

many. The committee would like to apologise to those who could not secure seats and had to sit on the ground.

3. *Question Papers*

The matter of printing question papers of past degree examinations for members were decided upon during the first committee meeting. After great efforts we managed to get permission from the Dean and the Senate to print the papers. Thanks to the effort of the chairman no charge was made on the typing of the stencils, and the copies were sold at a very cheap price of 20¢ per degree examination just to cover the cost of the printing papers. The question papers showed great popularity and almost 200 sets were sold.

OTHERS

1. *The printing of Christmas cards*

Because of the low price and the beautiful design, Christmas cards this year were very popular and the sale-mark rose above the level of four thousand.

2. *Key-holders*

This was decided upon at the first committee meeting. To celebrate the Golden Jubilee of the University and to make the object personal the words "Golden Jubilee" and the owner's name were engraved on each key-holder. These have gained great popularity and over 200 were sold.

CHRISTMAS GIFT TO SICK CHILDREN

On the 24th December, 1960, the sick children in the wards of Queen Mary Hospital and Sandy Bay Children Convalescent Home had a visit from the Santa Claus of the Medical Society, who brought with him toys and biscuits for every one. A group of Medical students who went along witnessed how the happy young faces lit up with pleasure. *Jingle Bell* rang loud in every ward and the children echoed.

A sum totalling over $1,000 was in our hands for this purpose, both from collections made this year and from that left over from past years. Besides the sum used in the buying of toys and biscuits, the remaining amount were decided by the committee to be donated to the Sandy Bay Children Convalescent Home for the making of permanent toys. Medical students will witness their completion soon.

ELIXIR

A few word of thanks and appreciation must be said of the competent Elixir Editorial Board this year. Their good effort not only made the publication of the Journal possible but they also printed for all members beautiful calendars of both new and lunar months. Those who are occupied with gynaecology and obstetrics are undoubtedly greatly benefited. An Associated Member Drive was also initiated, as a result the number of associated members was increased many fold. The Elixir Bursary Grant, the greatest achievement of the Society, is being still perpetuated and with the popularity of the magazine and the increase in associated members we may soon witness the possibility of a second Bursary.

CONCLUSION

The success of the year was, of course, not be sheer chance. The advice of the President and Vice-president and the stimulating support of the members all have contributed to the happy ending of the Session. We take great pleasure to record this.

Signed ROSALINE NG,
(*Honorary Secretary*)

THE

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QUOTABLE QUOTES

"The patient is the most important person in the hospital."
In great contrast to the above,
"The medical student is the least important".

* * *

An "easy" diagnosis:
"Lumps and bumps here, there, and everywhere — CARCINOMA!"

* * *

There are three types of "Broken hearts"; the first two are invariably fatal, but the last is recoverable: —

1. *a broken heart may result from the rupture of an infarct in the myocardium,*
2. *a broken heart may be due to rupture of an area of fatty infiltration in the myocardium,*
3. *a broken heart with no organic lesion, is due to gross emotional upheaval by the fair sex.*

* * *

The sufferer of cystitis is said to be fair, fat and forty.

* * *

My dear young man!
Ah, don't be silly!

* * *

Jump into the deep, blue sea!

* * *

Almost not very uncommon, and fairly not infrequent . .

* * *

Like this!
Like that!
咁呀!

* * *

— M.G. —

PATHOGENESIS OF NEOPLASMS

Introduction

Since the classical description by Pott (1775) of scrotal carcinomas among chimney-sweeps a new era of cancer study has begun. Not until 1914, however, after the successful experiment by Yamagawa and Ichikawa in producing carcinoma in rabbits' ears subsequent to prolonged local application of tar, that the new trend of cancer research becomes fully established. In the past fifty years the direction of cancer research has been mainly concentrated in finding the nature and mode of development of neoplasms of various origin. Though it is still not without regret to say that up to the present time no simple and clear-cut conclusion of carcinogenesis has been reached inspite of the incessant endeavours of thousands of ingenious and brilliant brains and hands, much have been obtained from observations and experiments performed by diverse workers concerned in this vast, barren field.

Properties of Tumour Cells

A new growth, as we all know, develops from the inco-ordinated cellular proliferation of pre-existing differentiated or un-differentiated tissues. The power of proliferation of the normal tissue cells is so much exaggerated, the limits of multiplication so surpassed, the cellular architecture so distorted, that it may be extremely difficult to appreciate the link between the original normal tissue cells and the resultant uncontrolled growth. The mainstays of this change, nevertheless, have been concisely summarized by Cowdry (1940), who pointed out that the following changes should have taken place in a normal cell before it becomes neoplastic:

1. Losing or lack of polarity,
2. Wide variation of nuclear and cytoplasmic structures,
3. Decrease in structural differentiation and specific functional activity,
4. Decrease in organismal control over cell division, which autonomy is increased,
5. Decrease in dependence on oxygen supply,
6. Increase in transplantability into other individual of the same species,
7. Increase in invasiveness and ability to outlive cells of the invaded tissue.

How these changes are brought about is still the centre question of paramount importance in the field of cancer studies. The mechanism involved though by no means entirely or clearly understood, may be explained to a limited extent, however superficially, on theoretical and experimental grounds.

Stages of Pathogenesis of neoplasms

Very arbitrarily the pathogenesis of neoplasms from normal tissues may be considered to take place in three artificially divided and indistinct stages:

1. Inherent or intrinsice liability of particular cells to neoplastic changes,
2. Initiation of the neoplastic change,
3. Promotion or acceleration of the neoplastic change.

These three stages are obviously not sharply demarcated from one another in a truly consecutive manner, and gradual merging and overlap into one another is the rule rather than exception.

It is important to be cognisant with the fact that tumour growths, just like normal tissues, have a cellular basis, the cells being derived from their respective normal counterparts, but with in addition exaggerated power of proliferation and very much increased autonomy of growth. It is equally or even more important to know that normal cells by themselves already have diverse potentialities in development and differentiation. The extent of these potentialities,

on the other hand, varies with the different embryonic origin of the tissues. The mesenchymal tissue, for instance, is most plastic and viable among all normal tissues, whilst nervous tissues, destined to be highly specialized cells for highly specialized functions, are incapable of transforming into other forms. Not only the potentialities of growth and differentiation of various tissues differ, but even in the same type of tissue the particular potentiality of differentiation may again vary with the site where the tissues are located. In this respect, therefore, the stratified squamous epithelium over the skin is capable of keratinisation, but that lining the mucous membranes cannot.

These variations in potentiality due to difference in embryonic origin and location are by no means lost in tumour growths. On the contrary, the pattern of difference is sometimes even more obvious. A few examples may clarify this point. Tumours derived from chromaffin tissues, i.e. phaeochromocytomas have structural and functional identity irrespective of the site of the original tissue mass, be it the suprarenal medulla or aberrent chromaffin tissues; but it is known that phaeochromocytomas seldom arise from the sympathetic chain, whilst ganglioneuromas may occur in both locations. The fact that these two types of tissues have a common embryonic origin from the neural crest obviously cannot account for this discrepancy, which is not grossly evident though physiologically recognizable in normal tissues. Leiomyomas, on the other hand, is common in the uterus, less so from the smooth muscle layers in the intestine, and most uncommonly from the ureter or the tunica media of arteries. Lipomas, common as they are in subcutaneous tissues, are very rare indeed in the fatty marrow spaces of bones. All these unexplained behaviours of tumour cells which can be found in many other examples, may be attributed to the inherent structural and physiological make-up of the neoplastic cell and its normal predecessor. It may well be in this unexplained behaviour of cells that lies the solution to the enigma of pathogenesis of neoplasms, yet despite innumerable efforts this varied and unpredictable 'neoplastic inherency' remains a mystery to oncologists and histopathologists. The recognition of the existence of such an entity, though a somewhat puzzling one, may nevertheless be of indispensible help in the understanding of the pathogenesis of tumours, both malignant and benign.

It is also very important to realize that more often than not both the parenchymatous and the stromal tissues of an organ are involved in neoplastic changes, though not necessarily involved to the same extent, in the development of a tumour from a particular organ. The stromal tissue, though being ontogenetically much less mature than the neighbouring parenchymatous tissue, is by no means the more commonly involved component of the organ in question. Thus a 'pure' adenoma of an endocrine gland may consist of nearly completely neoplastic parenchymatous cells capable of secretory function and only very scarce fibrous stromal cells, whilst a fibroadenoma of the breast may contain approximately equal amounts of neoplastic epithelial cells and fibrous stromal tissue, and a scirrhous carcinoma of the stomach is made out of predominently neoplastic fibrous cells but very scarce epithelial cells. Why should there be such proportional difference in the tendency to be neoplastic in apparently the same type of stromal tissue in various forms of tumours of the same organ or of organs of different parenchymatous make-up is another puzzling question that requires an answer. The timely and rational answer, if found, may be most enlightening in another aspect of histopathology in oncology.

Cancer Susceptibility and Carcinogens

At this juncture, besides the understanding of an intrinsic or inherent tendency of cells to become neoplastic, it may be added the concept of susceptibility of cells to neoplastic changes which is commonly believed rather than proven. This implies that the cells in question may in themselves have no intrinsic tendency to become neoplastic, but have an unusual type of response

towards 'extrinsic' stimuli which tend to induce neoplastic changes in the cells. These stimuli are collectively called *carcinogens* in the broadest sense of the word. Why certain cells have such excessive response to the effect of carcinogens is again another enigma remains to be solved. The solution to this problem may well be more rewarding in the study of carcinogenesis than what the explanation to the inherent neoplastic tendency of certain cells can offer, though obtaining informations for both problems is perpetually the ideal goal for oncologists.

Action of Carcinogens

As listed above the development of a tumour growth implies the transformation into a neoplastic tissue cell from a normal tissue cell which has or has no inherent tendency to become neoplastic, via tow apparently essential stages: the stage of initiation and the stage of promotion. It is at these two stages that the cancer susceptibility functions and causes the 'normal' tissue cells to become neoplastic. And the susceptibility of the tissue cells in each stage differs. Some types of tissue cells respond to the initiating carcinogens much more intensely than the promoting carcinogens, whilst in other types of tissue cells the reverse is true.

The situations can be clearly examplified in the case of keloids, which are scars on the skin secondary to previous physical injury, with exuberant amount of fibrous tissue as its chief histological constitution. In some people these keloids may remain unchanged, manifest as a mass of elevated vascular fibrous tissue all through the years without any subsequent neoplastic change. In others the keloid may be necrosed and broken down or be absorbed, leaving only a minimal scar or just a patch of erythema with somewhat increased pigmentation at the site of injury. Again in others, a minority though, the keloid may change into a fibroma in the matter of a few years, and rarely even fibrosarcomas may result.

In this case the exuberant growth of fibrous tissue subsequent to the physical injury may be spoken as an *Initiating* process, which stimulates the proliferative power of susceptible fibroblasts beyond a critical state. Later on the growth of this exuberant mass of cells, though the initiating factor has long been removed, continue to proliferate as a result of some unknown or non-specific external factors, such as repeated subclinical injury and trauma or exposure to irradiations of some sort, until a stage which does not differ from that found in a tumour growth is reached. The latter part may be denoted as the process of *Promotion*, which is usually caused by a multitude of ill-defined factors. Different types of tumours of the breast, especially the fibroadenomas, may pursue a similar mode of pathogenesis but, owing to the diversity of the cell susceptibility and varied promoting factors, these fibroadenomas, developed possibly after the occurrence of chronic mastitis, may take the form of either an intra-acinar or a periductal type, or as a large fungating and infected giant fibroadenoma. Hence the end result again is different though the initiating factor is unitarian from the start.

Precancerous States

Many disease conditions of the body not uncommonly progress to tumour development, after a lapse of latency from the onset. Hence conditions like leukoplakia of the tongue, intestinal polyposis, and adenomatous hyperplasia in glandular structures, especially in the so-called nodular goitres of the thyroid gland. The exact relationship of these conditions to the development of a true neoplasm is still not clear, and is described hereafter mainly on statistical grounds. However in some of the conditions the occurrence of such neoplastic changes can hardly be said to be merely co-incidental, and hence possibly a causal relationship between these conditions and subsequent neoplastic changes does exist. Histopathological studies on the so-called melanin pigment patches of the skin and mucous membranes have revealed certain definite cytoplasmic and

nuclear changes that conform to a certain degree the criteria of neoplastic changes described by Cowdry — the hyperchromicity of the cells; the coarser and more abundant melanin pigment granules; and the variation in size of these pigment-containing cells as contrast to the normal melanin-containing cells in the stratum germinativum of stratified squamous epithelium. More commonly the so-called precancerous states may not be manifest otherwise except by a process of hyperplasia of the component cells of the involved tissue, as shown in the case of keloids and leukoplakia. Tumours of the secreting organs, especially the well-differentiated adenomas of endocrine glands, are very often preceded by hyperplasia of the secretory elements. The relationship between the adenomatous hyperplasia of the biliary tract epithelium in *Clonorchis sinensis* infestation to primary carcinoma of the liver has been extensively investigated.

Predisposing Factors in Carcinogenesis

1. AGE

The preponderance of certain types of tumours in various age groups requires special investigation and explanation. This may be related to the following factors:

(a) The presence of cells in sufficient number possessed of malignant potentialities,
(b) The direction and extent of their exposure to carcinogens and whether the exposure is continuous or interrupted,
(c) The ability of the living tissue to quickly dispose of chemical carcinogens by excretion, or by changing them into innocuous substances,
(d) Hormonal imbalance especially in middle life,
(e) Hereditary resistence to the neoplastic change.

Hence in the younger age group, the specific neoplastic change may be closely related to the supervening neoplastic transformation capacity of the particular tissue cells, most marked in the so-called cell-rests or persistent embryonic tissues, and manifest as retinoblastomas or nephroblastomas which are seen only in infancy or early childhood. In the older age group, on the other hand, the part played by the persistent embryonic tissues with high neoplastic potentialities may be insignificant, and other factors, such as hormonal imbalance in middle life, chronic irritation, and degeneration of the hypothetical 'control system', may be mainly responsible. The change in the internal environment so induced may be irreversible and accumulation of chemical carcinogens may be the immediate contributing factor . For these reasons it would not be surprising that carcinoma of the prostrate or of the skin are uncommon among the younger age group.

2. SEX

The influence of sexual difference on the incidence of tumours in the general population has been extensively studied. Tumours of the sexual organs may develop under the preponderate influence, direct or indirect, of the sexual hormones, with or without the effect of factors involved in causing a difference in age incidence. In tumours of other organs, however, it is most likely that all the mentioned factors act *in toto*. which are in turn determined by the habits of living in the two sexes. That females are more prone to thyroid carcinomas and adenomas of the adrenal cortex, and males are more likely to develop tumours of the kidneys and lymph nodes (Hodgkin's disease), may not be related to the occupation and living habits of the individual, but the difference in incidence of tumours of the lips, esophagus and lungs definitely is.

3. HEREDITY

Some forms of tumours are noted to have a high tendency to run in families, especially intestinal polyposis, carcinoma of the stomach, carcinoma of the breast, retinoblastoma and other embryonic tumours. The development of similar cancers at about the same time and in approximately the same location in identical twins is also a truly remarkable phenomenon, though this is indeed very rare. Very often it is not the actual

cancerous or precancerous protoplasm of the above-mentioned conditions that is passed on to some of the embryos through the substance of the egg or sperm, but it may be instances of hereditary susceptibility to unknown carcinogens which are responsible for the development of these cancers. Some rare but congenitally acquired malignancies, on the other hand, must be distinguished from the truely inherited tumours that run in families. These tumours are possibly the result of abnormal placental conditions, or due to actions of chemical or physical carcinogens generated in the embryo. Penetration of carcinogens from the maternal circulation or direct haematogenous spread of maternal malignancy may also lead to tumours acquired *in utero* which are not true embroyonic or inherited tumours.

The genes in the chronosomes or in the cytoplasm are probably the vehicle responsible for the carriage of the inherited susceptibility to carcinogens that are the true cause of these familial or 'inherited' tumours, though modifications by environmental and nutritive factors are always indispensible for the changes to be obvious.

4. Racial difference

The racial difference in cancer incidence may not be related directly to the race itself, but is in fact dependent on the habits and customs of the race in particular. These habits and customs involve the dietary and religious aspects. In Bantus, the incidence of liver carcinoma is high, which may be related to the special form of cooking oil that is used exclusively among this people, and which has certain carcinogenic effects, directly or indirectly leading to neoplastic changes in the liver parenchyma. In the Jews the incidence of penile carcinoma is surprisingly low, which is most probably the result of the practice of circumcision in early boyhood, hence collection under the prepuce of smegma which has carcinogenic properties, is prevented. The reverse of this, that penile carcinomas are common in phimotics, may further justify this postulation.

5. Mechanical trauma

That an episode of a single trauma may induce development of certain types of tumours requires evidences that the tissue involved is normal in its strictest sense prior to the trauma. To obtain these evidences is often difficult or even impossible. Cancers developed after surgical or thermal trauma, with an intervening keloid formation, have been discussed, but the occurrence of such examples is negligible. Alternatively repeated trauma may play a part in the production of certain tumours such as osteosarcoma, though the exact mechanisms involved therin is again difficult to evaluate.

Single trauma, on the other hand, may be an adjuvant cause in producing neoplasia in 'instable' or susceptible cells. This is the phenomenon of *Co-carcinogenesis.*

6. Parasitic infestations

In this classification is included infestations by both spirochaetes and metazoa. The role of virus infection in carcinogenesis will be dealt with separately (*infra*). The parasites produce neoplasms indirectly by first inducing the development of a precancerous hyperplasia of the tissue in question. The production of squamous cell carcinomas of the tongue subsequent to leukoplakia induced by *Treponema pallidum* and liver carcinomas from *Clonorchis sinensis* infestation have been mentioned. Another example of this type of carcinogenesis is the development of bladder carcinoma after infestation with *Schistosoma haematobium* in certain parts of the world. The exact relation between the parasite and the tissue neoplasia is still not clear, though it has been hypothesized that the changes may be due either to a change in the environment for the tissue cells by the excretion or secretions of the parasite, or to a change in the internal environment of the tissue cells due to the presence of the parasites themselves, or to a combination of both. The mechanisms in action remain to be elucidated.

More Immediate Casual Factors

It has been extensively investigated that certain agents other than those discussed above bear a much closer relationship to the process of carcinogenesis, and it is possible that these may well be the true cause of the neoplastic change. After incessant research and experiments there are three large groups of agents which may be incriminated as being the most probable causes. The tissue cells affected by these agents may or may not be 'normal' from the start, and the stage of their differentiation may do nothing more than causing a minor modification to the resultant picture. The agents are:

(a) Viruses
(b) Irradiations
(c) Chemicals.

1. VIRUSES

Pathologically virus infections are characterized by a latent period between the time of invasion and the onset of symptoms, followed by either hyperplasia or necrosis of the affected tissue cells. That viruses may cause tumour formation has been derived from animal experiments in which certain types of animal tumours have been found to be associated with a filtrable agent. This filtrable agent can be isolated from the tumours cellular cytoplasm, and reintroduction of the isolate viruses into normal animals may start off a new neoplastic change in the cells of the new host. These animal tumour include the famous Rous' sarcoma in birds, Bittner's milk factor in mice, and hepatoma in rats. The viruses isolated from these tumours have been carefully studied with the electronic microscope and their sensitivity to some special antibiotics produced from certain strains of *Streptomyces* has also been duly investigated. Cultivation of these viruses has also been attempted.

In human tumours, notably carcinoma of the breast, leukaemia and Hodgkin's disease, viruses have been suspected to be the causative agent. However, as the experimental results are as yet far from complete, a definite conclusion cannot be drawn and it is still possible that the viruses claimed to have been isolated experimentally may be some peculiar form of cytoplasmic content probably some form of nucleoprotein molecule from the tumour cells, and not true virus particles. In spite of this doubt, since viruses can produce the phenomenon of hyperplasia in infected cells, it seems possible that viruses may be truly carcinogenic and produce tumour growths as a result of an uncontrolled extension and exaggeration of the hyperplastic reaction. The establishment of a more rational virus hypothesis requires a better understanding of the biochemistry of the virus constitution, the structure and the mode of production of protein molecules, particularly the link between the virus and the phenomenon of hyperplasia.

2. IRRADIATIONS

Cytological studies have shown that irradiations, especially those having ionizing properties, are capable of producing mutation of genes and disturbance of cytoplasmic constitution. The effect of these ionizing irradiations, whether it be sun rays, electromagnetic waves, high speed particles, or radioactive isotopes, thus not only include necrosis of the affected cells, as seen in irradiation dermatitis, but include also its proliferative aspect and results in hyperplasia or even carcinogenesis.

The relation of irradiations to carcinogenesis was first noticed in the high incidence of bronchogenic carcinoma in miners working in the iron mines in Schneiberg, the ores wherefrom have high concentration of radium. Degeneration of the contained radium leads to the formation of radon, a radioactive gas. Inhalation of this gas is directly related to the carcinomatous change in the bronchial mucosa. Another example of malignancy induced by radioactive substances is the production of osteogenic sarcoma in workers working with liminous paint that contains zinc sulphide and radioactive thorium. Usually these workers lick the point of the brushes used for painting dials of clocks or watches, and ingest the thorium adherent to the brush. The ingested thorium is concentrated in the epiphyseal ends of the

long tones, where later osteogenic sarcoma might develop. The increased incidence of leukaemia in children since the routine application of rontgenorgraphic examination antenatum in pregnant women may also be ascribed to the effect of the X-ray on foetal haematopoietic tissues. The postulate may also apply in the high incidence of this disease in early workers dealing with rontgen rays without adequate protection.

Even the sun rays can be carcinogenic too. Northern Europians, such as Scandinavians, who are fair skinned and accustomed to a cool weather and hence usually wrapped up with clothes, rarely expose themselves under a hot summer sun for prolonged periods. But should he stay exposed to a Mediterranean sun for, say a sunny summer, with every afternoon spent on the beach, he would not only be sunburnt and the exposed parts become inflamed, but the susceptible individuals the inflamed areas, after a period of latency, becomes neoplastic. Epitheliomas and carcinomas would then be formed on the skin. It is also very common for farmers, who have to work for prolonged periods under the sun in the fields, to develop rodent ulcers on the face, the part of the body receiving the highest dose of sun-ray irradiation.

3. Chemical substances

The most extensively investigated carcinogens are those with a chemical nature. In fact the study of carcinogenesis started with special attention to chemical carcinogens, and it was by the application of these carcinogens that successful experimentation of artificially induced cancers was achieved. In 1914, Yamagiwa and Ichikawa first succeeded in the artificial production of squamous cell carcinoma on rabbit ears by prolonged application of tar. Later Kennaway et al. used various forms of polyclyclic hydrocarbons extracted from crude tar as well as active substances from heated animal and plant tissue and applied these to experimental animals, which subsequently developed cancers in various parts of the body. By further chemical analysis these carcinogenic polycyclic hydrocarbons were found to be derivatives from either benzanthracene, cholanthrene, or benzpyrene. In the meantime German workers found that certain dyes when applied to rats may produce neoplasms in the liver, and the active substance isolated from these dyes, naphthalamine, may be responsible for the high incidence of bladder carcinoma in workers in airline dye factories.

Since the discovery of these carcinogenic hydrocarbons, many other allied substances have also been found to be carcinogenic, the basic structure of these substances containing a benzene ring or a phenanthrene radical. Thereafter it has been suspected that intrinsic secretions in the human body, such as bile acids and the sex hormones, which also contain the phenanthrene radical in the cyclopentanophenanthrene nucleus, may also have carcinogenic properties. And they really have. The female sex hormone, oestrogen, has been noted to be of importance in the development of carcinomas of the breast and of the uterus in middle-aged women. The bile acids, though normally innocuous to the mucosa of the gall bladder, may be so modified when they are found in gallstones and are capable of inducing neoplastic changes in the gall bladder mucosa. It has also been found that under suitable conditions desoxycholic acid by itself is capable of inducing tumour formation experimentally. The development of liver carcinomas subsequent to cirrhosis in Bantus who consume a special kind of cooking oil which deprives the body of choline points to the possibility that the cholic acids unesterified by choline may be closely related to the pathogenesis of such liver carcinomas. Carcinoma of the stomach has also been suspected to have been the result of constant insult by carcinogens from cooked organic food stuffs, as evidenced by the rarity of such carcinomas in persons used to raw food, and that such carcinomas are unusual among wild canivorous animals.

Certain substances when given together with carcinogens will enhance the effects of the latter. This is the phenomenon of chemical co-carcinogenesis. These substances include the solvents in which the carcinogenic hydrocarbons are dis-

solved before application, as well as other aliphatic substances, such as croton oil. How these substances act in the process of carcinogenesis remains to be elucidated.

Statistically it has been more than the pathologists' interest that cigarette smoking is associated with a high incidence of bronchogenic carcinomas, whilst pipe or cigar smoking is much less so. The true relation existing in this respect may be more clearer when more complete and revealing reports of experimental carcinogenesis using the tar condensed from cigarettes can be at hand. Not only polycyclic hydrocarbons and other organic substances are more likely to be capable of producing tumours, but in organic substances like compounds containing heavy metals or some of the non-metals are also well known for their carcinogenic property. These substances usually affect the mucosa of the upper respiratory tract and produce bronchogenic carcinoma. This is found in many cases with pneumoconiosis due to inhalation of silica dust or asbesto fibrils. Direct contact, if prolonged or in sensitive subjects, with fumes from fluorescent lamps containing beryllium, or with drugs containing arsenic, will first result in a special form of contact dermatitis, later terminating in carcinoma. Thorodrast, a radio-opaque medium containing iodine and used in radiographic studies, may cause sarcomatous changes in the reticuloendothelial system. Many other similar examples can be sited in the discussion of occupational hazards encountered in various trades related to inorganic chemicals, though the exact link between the chemical and the cancer itself remains little more than circumstantial or statistical evidences.

Embryonic Tumours

Another interesting yet again incompletely understood aspect of carcinogenesis is the pathogenesis of embryonic tumours. Two different types of such tumours are broadly recognized: teratomas and non-differentiated embryonic tumours of the viscera.

Teratomas are true tumours, composed of multiple tissues of kinds foreign to the part in which it arises. They usually arise in the foetus *in utero*, and may present as localized masses in the newborn child as such throughout subsequent years, or it may remain small and inconspicuous during early childhood and adolescence, but grows rapidly and becomes symptomatic in nearly or late adulthood. They are not the direct result of carcinogens in the usual sense, but for some reasons unexplained, a mass a pluripotential tissue in the embryo becomes released from the influence of the primary organizer and undergoes chaotic and uncontrolled differentiation under the effects of then existing substances described secondary or tertiary organizers. If anything should be incriminated as being the responsible carcinogen, it is the environmental and nutritive factors which cause the release phenomenon must be investigated into. A fruitful conclusion in studies in this respect, unfortunately, has not yet been reached.

Embryonic tumours of viscera are a similar manifestation of some disturbances in certain mechanisms that change the environmental and nutritive conditions of the differentiating tissue cells in the embryo, leading to the diversion of these cells from their predetermined fate of normal differentiation, but the proliferative power of the immature tissue cells is so retained that, provided nutrition is adequate, a tumour like nephroblastoma, retinoblastoma, or hepatoblastoma will be formed. As in the case of teratomas, there is not true carcinogen responsible for the oncogenesis, but the cause of alteration of the embryonic internal environment and nutritive status of the tissue cells in particular should be thoroughly studied.

Conclusion

In this article the author has been able only to touch the topic of carcinogenesis very superficially. It is possible that some of the hypotheses or theories discussed may be already obsolete and erroneous from the start. Certain hypotheses, such as Cohnheim's cell-rest hypothesis, Virchow's chronic irritation hypothesis, Handley's lymph-stasis

hypothesis, as well as theories concerning the role played by changes in chromosomes or so-called plasma genes in the cytoplasm, are not discussed. The author believes that these ingenious interpretations by devoted workers are best not handled by an inexperienced and narrow-minded apprentice in this field, in order that misunderstanding and confusion may be duly avoided.

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TIT-BITS

In the surgical O.P.D., an enthusiastic young man was engaged full-heartedly for the first time in the examination of a young female who had been diagnosed by a G. P. to have a fibroadenoma.

F.R.C.S.: What have you found, "doctor"?

J.C.: So far n.a.d., Sir.

F.R.C.S.: But I have seen you examining her for quite some time. Have you examined the normal side yet?

J.C.: Yes, That's what I'm still doing, Sir.

* * *

Being asked what situs inversus is, an absent-minded senior clerk dared the answer: The condition in which the terminals of the G.I. tract are reversed.

* * *

A dazed female first year, at the height of her emotions, broke the quietude of the dissection room, exclaimed that she found an uterus in a male cadavar.

The Parkinsonic, though smiling vegetarian, wheeled towards her, and, with his arm round the poor girl's shoulder, said softly, "Alarm not, my child; it is just a case of Turner's syndrome."

"But all these days I felt that he is so completely masculine," said the blushing young lass.

* * *

Two nurses were walking out of the O.T. after a full morning's orthopaedic operation.

"I just don't understand," said the pink one," a small man like Dr. X would take up a strenuous career as an orthopaedic surgeon".

"He has no choice," said the blue one, "he has to take up muscle exercises and a M.O. post at the same time as his wife is getting fat at an unexpectedly fast rate."

* * *

A specialty clerk attended the Gynaecology O.P.D. for the very first time, and found himself confronted with a shy young woman complaining of some discomfort in the lower abdomen.

"Have you had any children, madam?"

"4, doctor".

"Do you mind if I examine your . . ., that is, e-er, . . ."

"Don't waste time in small talks, "interrupted the impatient nurse, "you have two fingers, use them!"

* * *

"The whole bunch of you are lazy!" exploded a first class surgeon in the midst of a ward round. "I don't want to see this ever happen again."

One of the listless surgical clerks responded: "Me too, Sir".

* * *

Jack and Jill went up the hill, and fetch a pail of water . . . with a Jacques' catheter.

* * *

Dreams are never too wild, but the autonomic system may be.

BIOCHEMISTRY—AN ENQUIRY INTO THE NATURE OF LIFE

AN INAUGURAL LECTURE FROM THE CHAIR OF BIOCHEMISTRY

by Professor E. O'FARRELL WALSH, B.SC., PH.D.(Lond.), F.P.S., F.R.I.C.

delivered on 18th October, 1961

Before enlarging upon the thesis of my talk this afternoon, it is my pleasure to thank the Senate for its invitation to deliver an Inaugural Lecture.

I am most sensible of the honour conveyed by that invitation, for it is indeed a privilege to be granted the opportunity in this Jubilee Year of presenting the first Inaugural Lecture in Biochemistry. This year, biochemists in Britain are celebrating another Golden Jubilee, for in that same year that the University of Hong Kong came officially into being, the Biochemical Society was founded in London. This year also is the centenary of the birth of the late Sir Frederick Gowland Hopkins, that great and most beloved of biochemists who founded the School of Biochemistry in Cambridge and who, almost fifty years ago, became its first professor.

Encouraged, though humbled by the omen of this circumstance, I venture to address you now; to present some thoughts and comments on the significance rather than on the detail of this young branch of science which is called biochemistry.

Biochemistry is the offspring of chemistry and biology. The study of the chemistry of biological material and the concomitant advance in purely chemical knowledge was a necessary prelude to the study of living organisms as dynamic chemical systems. An equally necessary prelude was the study of the forms and functions of living organisms as such and in relation to one another. From such study, there emerged the concept of evolution, which is as fundamental to our understanding of biochemistry today as a knowledge of chemistry and physics.

Inheriting from and respecting the disciplines of both its parents, biochemistry has grown and developed as an independent discipline, but in so developing it has brought its parents closer together for it offers a common interest for their mutual and better understanding. In this, biochemistry, while still in the full bloom and vigour of youth, has helped to recapture the old spirit of the natural philosophers, those early scientists of a seemingly more leisured age, when the *"solid ground of Nature"*, was free to all who would explore, unrestricted by the territorial claims of the specialist and the professional.

The earliest opportunities to correlate biological with chemical phenomena arose from a comparison of respiration with combustion. Air necessary to maintain life was also necessary for combustion. In the eighth century it was known in China that this property of the atmosphere resided in a component of air which could also be obtained by heating certain minerals, such as saltpetre and pyrolusite. In the seventeenth century, a young English physician, John Mayow, demonstrated that a small animal, confined in a jar, consumed only a part of the air and that this same vital component of air was also consumed by a burning candle. He demonstrated experimentally that air depleted by respiration would not support combustion and that air depleted by combustion would not support respiration. In the following century it was found that plants in the dark behaved like animals in this respect,

but that plants in the light restored to depleted air the ability to support either combustion or respiration.

Interpretation of these findings in chemical terms was delayed by allegiance to the phlogiston theory: it awaited the genius of Lavoisier. Lavoisier, the first to comprehend the true nature of combustion, also conducted qualitative and quantitative experiments on human respiration. His results led him to suggest that, as the heat of a burning candle resulted from oxidation of the carbon and hydrogen of the tallow, so body heat resulted from the oxidation of the carbon and hydrogen of ingested food. So strong was the analogy between respiration and combustion that Lavoisier, nearly two centuries ago, came to the conclusion, "*La vie est une manifestation chimique*".

Before Lavoisier's time there was no clear distinction between quality and substance. With the new understanding of combustion and respiration, chemistry underwent a revolutionary change and for the first time it acquired a purely material basis. The chemistry of principles, fluxes, spirits, and essences came to an end. The new chemistry sought to explain the properties of matter in terms of the behaviour of material substances. Phlogiston was recognized as a figment of the imagination and caloric, or heat, was no longer classed as one of the chemical elements.

But in expressing the view that life was a chemical phenomenon Lavoisier was somewhat in advance of his time. Very little was really known about the chemistry of living organisms and, later, in the early 19th century when organic chemistry was born, the complexity of living matter presented a problem too formidable to encourage attempts to explain it in chemical terms. Though chemistry was well established on a purely material basis, biology had yet to achieve its emancipation from mystery. With regard to living things, therefore, the old concepts persisted. The substance of living organisms was generally regarded as something fundamentally different from the substance of inanimate matter. The properties of living matter were attributed not to the chemical properties of its material components but to an intrinsic principle or spirit, as elusive as phlogiston and commonly known as the *vital force*.

When, in the early nineteenth century the new chemistry ventured upon the analysis of biological material and organic chemistry was born, there was widespread belief that the newly discovered organic compounds would never be synthesised in the laboratory and independently of the agency of living organisms. Wöhler's synthesis of urea, Ladenburg's resolution of synthetic coiine into optically active isomers, and Alfred Werner's synthesis of an entirely inorganic, optically active metal complex were triumphs of experimental science, which rendered untenable the view that the magic of life resided in the element carbon and that optical activity was exclusively a biological phenomenon dependent upon this magic.

The concept that carbon, or any other element, possessed extra-chemical qualities thus perished in the fire of chemical progress, but phoenix-like, there arose from the ashes the myth of a super molecule to challenge the science of the twentieth century. It remained for the newly emerging science of biochemistry to take up this challenge. And foremost in the ranks of this new discipline was Hopkins.

The vague concept of a protoplasmic complex wherein the molecules of food and oxygen were supposed to lose their chemical identity and to participate in mysterious super-chemical events was challenged by Hopkins at every opportunity. Hopkins urged and experimental evidence confirmed that the chemical reactions which occurred in living cells were ordinary chemical processes involving ordinary chemical substances. He repeatedly emphasised the need not merely to isolate and identify these substances but to follow the course of their reactions in the living cell. He emphasised that the living cell was not merely something in which chemical reactions occurred but was itself a product of such reactions. With characteristic elegance of phrase, he described

the living cell as *a polyhasic system of dynamic chemical equilibria*. With the recognition of the living cell as such, biochemistry in the early years of the present century became established on a sound material basis and, as organic chemistry had done a century before, it began that amazing progress which has continued to this day.

I will not now attempt to review the history of this last half century's progress, but merely attempt to emphasize certain generalities that have emerged.

One such generality is that the chemistry of vital processes is fundamentally the same in all known living organisms. There are differences, of course, and these differences become manifest in the variety of form and function with which we are all familiar. But, in general, the same chemical substances are used in the same sequences and cycles of chemical reactions, which are exploited for analogous purposes in the cells of organs as different from one another as the leaves of tree, the liver or brain of a man, and the mycelium of a fungus.

The chemistry of respiration, for example, is essentially the same in the animal as in the plant. In general terms, respiration is a chemical process in which the energy potential of an oxidisable food is made available by oxidation. An organic food, such as a molecule of glucose, is broken down in stages and ultimately oxidised to carbon dioxide and water. Lavoisier's conception of respiration is in essence correct, but as we now know, the free energy of such oxidation is not simply dissipated as heat as when the sugar is burnt in air.

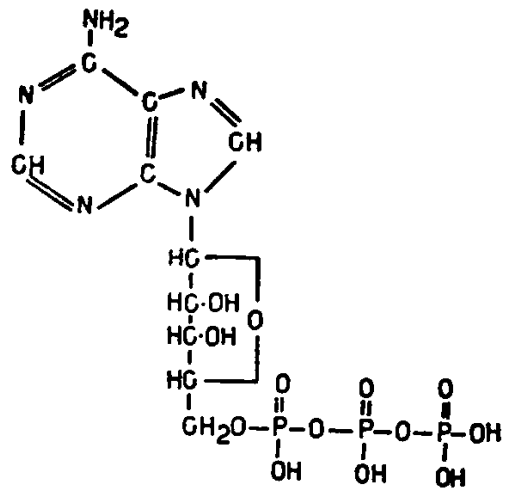
The sugar, which may have been stored in the cell in the form of starch or glycogen, is converted into a phosphoric ester. The molecule is then broken down into simpler substances in which double bonds are formed by loss of hydrogen to a hydrogen carrier such as diphosphopyridine nucleotide. The unsaturated compounds so formed then combine with water to form oxy-acids which are subsequently decomposed with liberation of carbon dioxide. The energy potential of the food is to a large extent transferred with the hydrogen and it thus becomes concentrated in the reduced hydrogen carriers. It is made available when the hydrogen is oxidised to water. The free energy of such oxidation is used largely for the conversion of orthophosphate to organic derivatives of pyro- and tri-phosphoric acid. Among such compounds, adenosine triphosphate — ATP for short — plays a predominant rôle in chemical processes whereby respiratory energy is made available for a variety of vital functions.

For example, the contractile protein of a muscle fibre or of a flagellate reacts chemically with ATP in a manner which results in the free energy of hydrolysis of this compound becoming manifest not as heat but as mechanical work. ATP provides also the energy for osmotic work when it participates in reactions which result in the transfer of water, or of glucose and other metabolites across a membrane against a concentration gradient. When ions, which carry a charge, are so transported the energy becomes manifest as an electrical potential. Such a mechanism is exploited in nerve cells and most spectacularly, in the electric organs of certain fish. This same compound, ATP participates also in a great variety of chemical reactions leading to the synthesis of carbohydrates, lipids, and proteins and it thus serves in making respiratory energy available for organic synthesis and growth. In the lantern of the firefly, ATP participates in a chemical reaction which results in the free energy of its hydrolysis being emitted in the form of light. The chemicals essential for this process have been extracted from the firefly and purified. When ATP is added to a solution of them in the test-tube a flash of light results and with sensitive photometric apparatus it has been shown that the amount of light is proportional to the amount of ATP added. In the biochemical laboratory this technique has been used to measure the amount of ATP in isolated nerves.

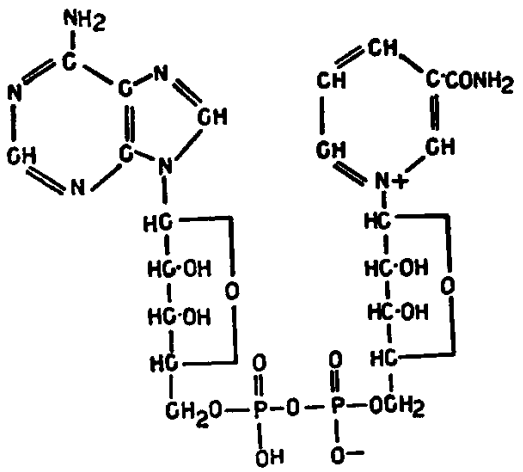
These examples illustrate how the properties of a chemical compound such as ATP can be exploited in a variety of ways to serve a variety of biological

functions. What I also hope to emphasize is that this same compound, which serves both as an energy-distributor and as a phosphorylating agent, is a component of all living cells whether of animals, plants, or bacteria. Also common to all living organisms are the pyridine-adenine dinucleotides which combine reversibly with hydrogen and function as hydrogen-carriers. They serve to render hydrogen available not only for respiratory oxidation, but for reductive processes such as the reduction of carbon dioxide to carbohydrate, of carbohydrate to fat, and of nitrate to ammonia.

The chemical formulae of ATP and of diphosphopyridine nucleotide, DPN, are here represented.



ATP



DPN

Another generality is that every chemical reaction which occurs in a living cell takes place under the influence of a specific catalyst which we call an enzyme. A great number of enzymes have been identified and many have been isolated in a crystalline state of purity. In the test-tube, under suitable conditions, they catalyse the same chemical reaction which they control in the living cell. These reactions, most of which are reversible, occur in accordance with the law of mass action; they obey the laws of thermodynamics. The enzymes are simply catalysts which accelerate the attainment of a chemical equilibrium and, as such, they contribute no energy to the reacting system and the equilibrium is unaltered by their presence.

The view, once held, that enzymes are super-chemicals which activate their substrates by transmitting the vibrations of a vital force thus becomes untenable.

Chemically, the enzymes are globular proteins, some simple, some conjugated with other compounds, such as a carbohydrate, a lipid, a nucleotide, or a metal complex. The globular or soluble proteins are composed of optically active x-amino-acids of the L-configuration united by peptide bonds into long, coiled chains to form roughly spherical molecules, stabilised by hydrogenbonding between different peptide links in the chain. The molecules are of colloidal dimension but of definite molecular size. In general, native proteins are unstable substances and, on heating for example, the relatively weak hydrogen-bonds are momentarily broken and the chains uncoil to recombine with one another at random, when they form an insoluble network of fibres. Such change is irreversible and the specific native properties are lost. We are all familiar with this behaviour of a protein which is easily demonstrated by heating the white of an egg. The proteins are not in themselves alive as was at one time supposed, but any treatment which destroys their native structure results in death of the organism whose vital activity depends upon their specific chemical properties.

The proteins themselves are formed within the cell by enzymically catalysed reactions which bring about the linking together of amino-acids to form polypep-

tide chains. The specific nature and properties of the protein so formed depend upon which and in what order the various amino-acids are joined together. About twenty-five different amino-acids are available for protein synthesis. We can, as a crude comparison, compare the potentialities for variety among the proteins with the potentialities of variously arranging the different letters of an alphabet. It is indeed in such manner that Shakespeare, Goethe, Schiller, and Dante expressed themselves and it is in such manner that their immortality is preserved. The possibilities are not as yet exhausted.

We now have some knowledge of how the living cell achieves such specific arrangements. Synthesis of a protein involves a molecule of ribonucleic acid. This is in the nature of a polynucleotide chain, a polymer of ribose phosphate modified by a specific arrangement of purine and pyrimidine bases attached to the sugar units throughout its length. This specific arrangement determines which and in what sequence the amino-acids line up for protein synthesis. Ribonucleic acid molecules, which are found concentrated in the microsomes of a cell, thus act as templates for the synthesis of specific proteins. The synthesis of these templates is in turn governed by the deoxyribonucleic acids which are found in combination with protein predominantly in the cell nucleus.

Nucleoprotein thus constitutes the genetic material of the cell, and the collection of specific arrangements of the constituent nucleotides in the molecules is a characteristic of the species to which the cell belongs. Each deoxyribonucleic acid molecule actually consists of two identical polynucleotide chains intertwined to form a double helix or spiral. It would appear that, on cell division, the two identical halves of each molecule become separated and each half serves as a template for the synthesis of a new other half. The parent cell thus passes on to each daughter cell a complete set of instructions for the synthesis of the enzymes which will govern its metabolism.

It is possible by micro-manipulation to inject a foreign nucleic acid into a cell and thus induce the cell to synthesize enzymes different from those normal to its species or variety. This has been done experimentally and, of course, this is what happens when cells become infected by a virus. Viruses are nucleic acids or nucleoproteins and some of the simpler ones have been obtained in chemically pure crystalline form. These molecules behave like homeless or rogue genes or collections of genes and, perhaps, that is what they are.

Are they alive? Is nucleic acid the secret of life, a super-molecule possessed of a vital force?

It is sometimes argued that the essence of life is an ability to reproduce: that nucleoproteins of genes and viruses are self-duplicating, therefore nucleoproteins are alive. If we accept this, then we must also admit that a simple hydrogen ion is alive. If, for example, we infect a solution of ethyl acetate with hydrogen ions by adding an acid to it, the hydrogen ions catalyse the hydrolysis of the ester to form an acid which dissociates to give more hydrogen ions. Indeed, on this argument the hydrogen ion has the greater claim to be classed among the living. Neither nucleic acids nor nucleoproteins are capable of growth or of duplicating themselves independently of living cells. They are no more than chemical substances having a molecular structure which serves as a blue-print or template for the synthesis of specific proteins or nucleoproteins. By virtue of this, a virus possesses the ability to induce the living cells of its host to divert their synthesising activity to the production of more virus. It is the host cell which is tricked into duplicating the virus . . . the virus does not duplicate itself. Genes might have a greater claim to be classed as living molecules, but have they any greater claim than ATP, or DPN, or any other cellular component that is essential for growth, activity, and reproduction? I do not think so. The gene is merely a device for ensuring the preservation of a species and I can see no valid reason for claiming that life is an intrinsic property of this or of any other single chemical entity.

What, then, is life?

We can find no experimental evidence for its existence either as a substance or as a force. We cannot measure it. For such reasons some biochemists assert that the term is meaningless. But I do not agree with this.

We recognize life all around us. We and our curiosity are a product and a part of it. We recognize it only in association with matter in a state of activity and if the activity ceases life disappears as a flame disappears when a candle is blown out.

But all matter in a state of chemical activity is not what we call "alive".

What, then, is the quality or process which distinguishes living matter from dead and from inanimate matter? We can explain the phenomenon of fire. Can we explain the phenomenon of life?

In attempt to do so, we must obviously compare the properties of the living with those of the non-living and seek to explain the difference. When we do this, a most striking difference becomes apparent. Living matter consists of self-organizing chemical systems in which the components are in a state of continual if not continuous activity. In inanimate matter, chemical activity resulting in chemical change is not self-perpetuating and such activity ceases when the elements have arranged themselves into those compounds and systems which are the most stable under the prevailing conditions. In living matter, on the other hand, sequences and cycles of chemical reactions are integrated in a dynamic system in which highly unstable compounds, though continually being broken down are continually being brought into being. Living matter is unstable matter in which the chemical processes are so integrated as to preserve the state of instability upon which its continued activity depends.

If such a state of affairs occurred in defiance of the laws of thermodynamics we would be justified in postulating the existence of a vital force. But the laws of thermodynamics are not defied. There is no magic, no mystery, no perpetual motion. A living organism is no miraculous pitcher of energy. The energy expended in vital processes is derived from an external source.

That source is the sun.

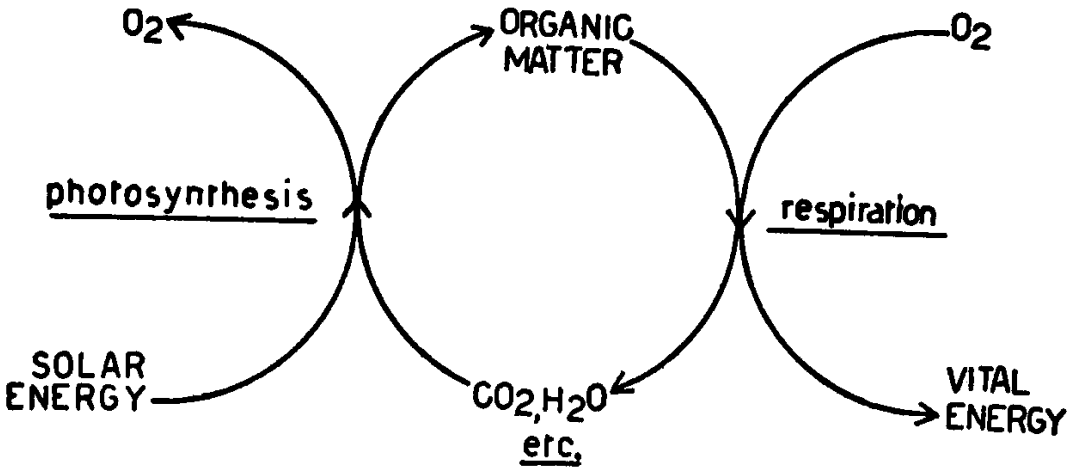
In the competitive symbiosis of living organisms into which living matter has evolved, the perpetuation of terrestrial life as a whole has come to depend upon that part of living matter which is organized in the form of green plants. Green plants absorb light energy and use it for the synthesis of organic matter, which is both fuel and raw material for all life's processes.

In general, photosynthetic processes effect what is virtually a reversal of the respiratory process. The respiratory process exploits the free energy associated with the transfer of electrons from combined hydrogen to oxygen whereby hydrogen is oxidised to water. The photosynthetic process uses absorbed light energy to force electrons away from oxygen so that water molecules are disrupted, free oxygen is liberated, and the hydrogen is made available for reductive processes. Plants are thus enabled to reduce carbon dioxide to carbohydrate in quantity sufficient for the needs of life as a whole.

There are many interesting variations of the general process. The photosynthetic sulphur bacteria, for example, which are adapted for life in deep and polluted water, make use of light of somewhat longer wavelength to obtain their hydrogen by photolysis of hydrogen sulphide. There are some lower plants and bacteria which can assimilate molecular hydrogen photosynthetically.

In general, however, photosynthesis and respiration are complementary process in a natural cycle of chemical events whereby solar energy is converted into vital activity as symbolised in this diagram.

While such a scheme may represent the dominant processes in the general economy of living matter today, it does not necessarily represent the dominant processes of either the distant past or the distant future. I will not speculate about the future. But in concluding this lecture, I would like to say a few words about the past.



Comparative study of the chemistry of living organisms, with a knowledge of biology to guide us, leads to the study of biochemical evolution.

Those chemical processes which are common and fundamentally the same in all living organisms today possibly provide us with a clue to the metabolic processes of primitive organisms from which both plants and animals have evolved. An example of such a process is the sequence of reactions known as the Embden-Meyerhof scheme of glycolysis, which is the basis of a variety of fermentation processes among the bacteria and which is incorporated into a respiratory mechanism common to both animals and plants. Other processes which are widely but not universally distributed are probably less ancient, as for example those which are common only to animals or only to plants. Processes more restricted in distribution probably represent later developments when they are exclusive to certain groups of higher plants or of higher animals. Certain hormonal mechanisms, for example, are peculiar to the vertebrates and quite different from those characteristic of insects and crustaceans. The hormonal mechanisms of plants are entirely different from those of animals. When processes are restricted only to lower organisms there is the alternative possibility that they may be remnants of an ancient metabolism which the main course of evolution has discarded.

From such considerations there is reason to believe that anaerobic metabolism is a process older than aerobic metabolism, that fermentation is more primitive than respiration, and that life on this earth probably began under anaerobic conditions.

Theories as to the origin of life on earth are largely speculative, but an increasing number of biochemists subscribes to the view that a long period of chemical evolution preceded biological evolution, that biogenesis was not a spontaneous and improbable event beginning with the sudden elaboration of complex proteins and nucleic acids, but a slow evolutionary process in which self-duplicating chemical systems arose from the interaction of simple organic compounds of purely physicochemical origin.

Such a possibility was envisaged by Haldane and by Oparin over thirty years ago, but it is only in recent years that the question of the origin of life has gained wider recognition as a problem worthy of serious scientific investigation. The first International Symposium on the Origin of Life was held as recently as 1957. The general concept which emerges from the discussions of the astronomers, biochemists, biologists, chemists, geologists, and physicists who participated is somewhat as follows.

About 4,000 million years ago,—perhaps I should say once upon a time—simple organic molecules such as formic, acetic, succinic, and amino-acetic acids were formed from carbon dioxide or methane, hydrogen, nitrogen, ammonia, and water in the primitive atmosphere

by the action of electrical discharges or exciting radiations such as ultra-violet light. Within the last decade the work of Miller and Urey has demonstrated experimentally the feasibility of this hypothesis. By the interaction of these simple compounds, excited by the ultra-violet and other sources of energy, a greater variety and complexity of potential metabolites would accumulate in the waters to provide a potentially nutrient soup.

In such a soup, containing a variety of amino-acids and possibly simple sugars, compounds of phosphorus and sulphur, metal complexes and other potential catalysts, polymers would undoubtedly be formed and give rise to colloidal aggregates. It is conceivable that, as the hundreds of millions of years rolled by, many autocatalytic systems would occur, compete with one another and sometimes integrate. Self-duplicatings systems would inevitably become dominant and presumably at some stage in the course of time, between three to two thousand million years ago, this chemical evolution gave rise to a self-reproducing *polyphasic system of dynamic chemical equilibria* which might be described as the first living cell.

We have much more to learn, however, before we can claim to know precisely how life on this earth began. Perhaps we shall never know the detailed history, but the concept of chemical evolution is an attractive one. It implies that the emergence of life is an inevitable consequence of the fundamental laws of nature. Whether this concept be true or false, further research should reveal. In seeking an answer to this and other problems concerned with the chemistry of life, biochemistry makes its contribution to natural philosophy.

In conclusion I might add that biochemical research, even that undertaken solely in the pursuit of knowledge for its own sake, contributes not only to our philosophy but, incidentally, to the material welfare of man as, for example, in its applications to industry, to agriculture, and to medicine.

Bactericidal Ultraviolet Radiation in the Operating Room; Twenty-Nine-Year Study for Control of Infections

Hart, Deryl

Journal of the American Medical Association *172*:1019-1028 (March 5) 1960

Mounting evidence that airborne pathogens were responsible for infections of surgically clean wounds in operating rooms led Duke Hospital to install ultraviolet sterilizers. Their use has spread beyond the original installation until now the hospital has 15 operating rooms so equipped. In 23 years of experience there has been no serious or lasting injury to eyes or skin of operating personnel. Fatal infections dropped from 17 in the 5½ years before installing ultraviolet sterilizers to 2 in the 5 years thereafter. Experience with fixtures and their placement shows that wavelengths from 253.7 to 290.0 mμ can be transmitted to the operating site at intensities of 18 to 30 microwatts per square centimeter. No evidence of lasting damage to any patient or other occupant of operating rooms has been detected. Cultures of trapped organisms show staphylococci to be the chief offenders, and occupants of the room the chief carriers, largely by way of the upper respiratory tract. Masks, even when doubled, are not adequately protective. Neither is intensified ventilation — the buildup of pathogen counts in occupied operating rooms is too rapid. Eyeshades or glasses (any lens not made for ultraviolet transmission) protect eyes adequately. The eyes of the patient should be closed and covered. Prolonged exposure calls for a skin cover, although several hours will generally produce no more than a transient erythema. No blister or lasting injury has been observed even after years of daily exposure. Statistical comparisons (with and without irradiation) are reported for infections of surgically clean wounds, postoperative infections, local and systemic reactions, and treatment of contaminated wounds. All demonstrate the benefits of ultraviolet sterilization of air in operating rooms.

PAVLOV

Two dashound dogs passed by a window with the name "PAVLOV" written on a signboard. One dog looked at it, paused for a while, and said, "Pavlov, Pavlov,—that rings a bell!"

Ivan Petrovich Pavlov, the great physiologist known for his experiments with dogs, was born the son of a priest on September 14, 1849 in the town of Ryazan (Russia). Brought up in a family of five children, Pavlov's early life was much influenced by his ecclesiastical background. His father and grandfather were both simple, hardworking clergymen. From them he inherited and acquired his love of physical toil, his unbending scientific spirit, and above all, his great desire for learning and knowledge. These were later manifested in his scientific pursuits. Due to an accident which took place when he was a young boy, Pavlov only started school at the age of eleven at the Ryazan Ecclesiastical High School. After this, he entered the Ryazan Ecclesiastical Seminary where he developed an almost ecstatic attitude toward the teaching and personality of Charles Darwin. It was also here that Pavlov distinguished himself as an earnest and sharp speaker, though he himself was the object of frequent merciless attacks. However, his unusual bashfulness was clearly shown by the fact that even in the presence of new acquaintances, he was somewhat lost. In 1870, Pavlov travelled to St. Petersburg and enrolled as a student of Natural Science in the University of St. Petersburg. Here the young enthusiastic student was much impressed by the skill and exceptional experimental technique of the Professor of Physiology, so much so that in his third year, Pavlov had already decided to become a physiologist. On graduation, he began to take a course in medicine at the Medico-Chirurgical Academy and at the same time secured a post as an assistant in the Physiology Laboratory. In December 1879, he graduated with a gold medal. Thereafter Pavlov continued in the Academy as a research worker and received his degree of Doctor of Medicine in 1883 by presenting an account of his own experiments on the augmentor nerves of the heart as thesis. Through the years which followed, he never for a moment interrupted his investigation. Among the various posts he had taken were the chair of Pharmacology and of Physiology at the Academy. To crown all his successes, Pavlov was awarded the Nobel Prize for Physiology in December, 1904.

In his twenties, Pavlov already showed clear indications of those traits of the inspired and incorruptible scientific investigator which he preserved for the rest of his long life. His chief interest was always exclusively how to solve a particular scientific problem. It was for this reason that no irrelevant considerations, and especially those of a worldly nature, were of any interest to him. This does not mean that he lacked a practical knowledge of life; he knew very well how to deal with difficult matters and situations. But if any conflict arose between the practical demands of life and of science, Pavlov without hesitation took his stand on the side of science. As a true son of the nineteenth century, Pavlov also believed in science wholeheartedly, and devoted himself to it. To him science was the essence of his life; but he had also other spiritual interests and deep feelings, such as a great love for his native land and a keen interest in art, although in his mind science dominated everything else. A man of strong principles, he was on the whole tolerant and indulgent toward human weaknesses. For instance, he was opposed to capital punishment, reluctant to give students a low mark in examinations, and restrained others from condemning people for their failure. Pavlov's in-

tegrity was beyond dispute. He was honest in his scientific research, in his relationship with people, and in his political convictions. His sense of duty was extremely strong, always arriving punctually for lectures or meetings. His extraordinary persistence helped him to realize his scientific aspirations. In addition, Pavlov also had an amazing power of concentration. For example, he could work on the physiology of the digestive glands for some fifteen years and on conditioned reflexes for the last thirty-four years of his life. Lastly, but not the least, mention must be made of Pavlov's sense of reality and creative imagination. He constructed hypotheses freely and easily, and when a new fact was observed, he incorporated it into the scheme of facts already established. Combining such a number of qualities, it is small wonder that Pavlov should have made his multitudinous discoveries and successes.

Pavlov's experimental work can be divided into three categories. His early physiological work included the regulation of the blood circulation, centrifugal nerves of the heart, trophic innervation, innervation of the pancreatic gland, and the effect of vagotomy. The next stage was on digestive glands to which he devoted a great part of his time and research. During these investigations, Pavlov introduced for the first time systematic antiseptic and aseptic surgery to study the functions of the digestive glands — so called Physiological Surgery. Although he had made quite a reputation from these works, Pavlov was perhaps still better known for his experiments on conditioned reflexes, which he designated as a physiological discipline. While working on this, he began to suffer from gall stones in 1927, but he paid no attention to his health. He continued to work all day in his laboratory, even hurrying up his speed until a few days before his death on February 27, 1936 as a result of double pneumonia.

Though Pavlov's death was a great loss to the whole world, his spirit and attitude shall always live in the hearts of those who are striving for the same goal —that of scientific knowledge and understanding. He had indeed, in his own words, greatly "contributed to world science and human thought".

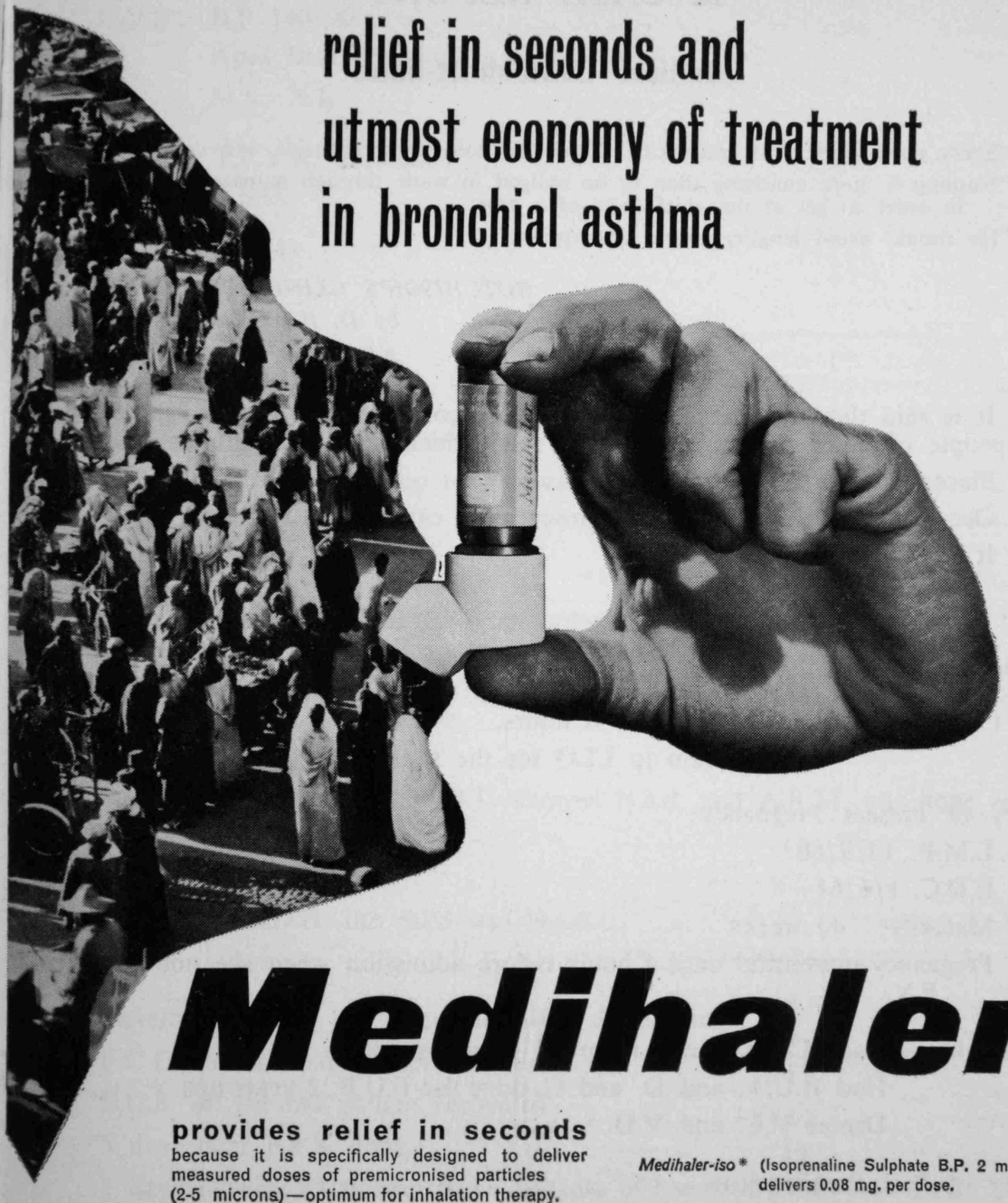
— EC —

Use of a Combined Formulation of Tetracycline Phosphate Complex and Amphotericin B in Therapy of Urinary Tract Infections
Trafton, Howard M. and Lind, Howard E. Current Therapeutic Research *3*:59-65 (February) 1961

For prophylaxis against overgrowth of yeast such as *Candida albicans* during therapy with broad-spectrum antibiotics, a new tetracycline phosphate complex was tested in 50 patients in combination therapy with amphotericin B (Fungizone). All patients (most of them ambulatory) had urinary tract infections with such symptoms as burning, dysuria, frequency and urgency. Some had received sulfisoxazole or demethylchlortetracycline, without a good response; others had received no therapy for 6 months or more. The combined drug was given in 150 mg. capsules to 25 patients, and as an aqueous syrup to the other 25; this report is on results obtained with patients receiving 250 mg. capsules. Clinical response was good in 7 patients and fair (symptomatic improvement and marked lessening of pyuria) in 17. In the one patient not responding to treatment the offending organism (*Aerobacter aerogenes*) disappeared but gave place to *Alcaligenes faecalis* and a resistant enterococcus. Side effects were absent in 18 patients; the 7 adverse reactions included 2 cases of diarrhea and nausea (stopped in one patient by giving the drug after meals), one of slight nausea, one of gaseous indigestion, and one of general aching. These effects usually began after the fifth day of therapy. Although there is no proof that deleterious overgrowths would have occurred with antibiotics alone, success of the prophylaxis is indicated by the complete absence of any overgrowth with monilia or other fungal organisms.

anytime anywhere

relief in seconds and utmost economy of treatment in bronchial asthma



Medihaler

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because it is specifically designed to deliver measured doses of premicronised particles (2-5 microns)—optimum for inhalation therapy.

utmost economy of treatment
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A CASE REPORT

Medical Ultra-short-hand

"Every good method of case-taking should be both comprehensive and concise . . .
"Nothing is more annoying than to be obliged to wade through a mass of verbiage in order to get at the chief facts of a case . . .
"He should avoid lengthy verbal descriptions."

HUTCHISON'S CLINICAL METHODS
by D. Hunter and R. R. Bomford
p.1.

It is said that members of our profession converse in a language quite different from people of other fields. Below is a relay which attempts to illustrate the matter.

Place: a Hospital.

Occasion: a medical student presenting a case to a C.A.

It runs as follows:

" . . . Patient F36 P.3, G.4.

E. Case

Chief Complaint: Bleeding P.V. for 4 hours.
Colicky plain in LLQ for the same time.

History of Present Pregnancy:
L.M.P. 14/9/60
E.D.C. 1/6/61
Maturity: 40 weeks.
Pregnancy uneventful until 4 hours before admission when she noticed bleeding P.V.

Past Health: Had N.T.N.G. and removed 10 years ago.
Had E.U.A. and D. and C. done for F.U.B. 2 years ago.
Denies V.E. and V.D.

History of Past Pregnancies:—
1st Child had P.D.A. and die of S.B.E.
2nd Child had V.S.D.
3rd Child was delivered by L.S.C.S. for A.P.H.

Family History: Husband had P.P.U. and V. and P. was done.
Father die of P.V.D.

Examination of Patient:

General Condition: Good

Oedema ++

C.V.S.: B.P. 140/90

Apex Beat: 6th i.c.s. a.a.l.

M.S., A.I.

R. S.: T.F.V.R. normal.

N.S.D.

C.N.S.: N. S.D.

Abdomen:

Term Size

VxLOA F.H.H.R.

Dx: A.P.H. and P.E.T.

The patient was taken up to the wards with orders of:

S.F.D.

Hrly. pulse and B.P.

Since bleeding continued P.V. the orders 2 hours later were:—

P.P.P. for E.U.A.

X-Match Blood.

B.G.S. ready.

Subsequent E.U.A. at the O.T. showed N.a.d. and A.R.M. was done resulting in a F.T.S.D. 1 hour later.

Examination of Child:

Except for C.D.H. the child was N.a.d.

Puerperum:

Developed P.P.H. and later precordial discomfort.

E.C.G. shows n.a.d. except L.V.H.

B.G.S. set up and patient recovered.

5 days later P.P.S. done.

2 days later a KUB was taken because of haematuria but was n.a.d.

Summary of Case:

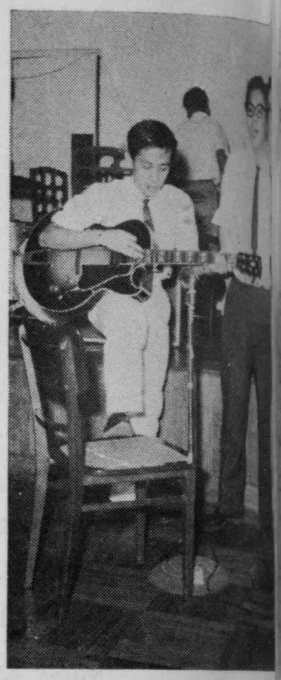
A E case of A.P.H. and P.E.T. with M.S. and A.I. giving rise to F.T.S.D. P.P.H. follows and treated. P.P.S. done. Both mother and child discharged well. T.C.A. in 6 weeks.

E.E.E.

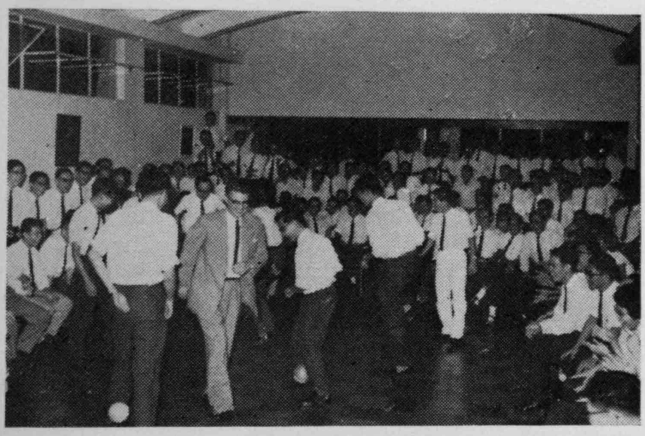
We get together . . .

We gather together . . .

We welcome . . .



Two new members . . .
their spirit . . .



Between dancing and fighting

'h year harmonica quintet

Acts and performances . . .

2nd year mixed choir

THE

MED-NITE

Date: 6th October, 1961

Place: Lady Ho Tung Hall

Remarks: Most Heart-warming
Most Joyous
Most successful

The society crest for the President

". . . Once in awhile we gather together to enjoy ourselves not as staff and student but as members of the Society which we are proud to be in . . .

"... like all previous years there will be acts and performances ...

"... unlike previous years we take this opportunity to show our new members our beloved Society. We welcome them to be one of us provided they want to be one of us . . .

"... throughout the unceasing efforts of some members we can see the Medical Band in action giving her first performance tonight...

". . . We take this opportunity too to express our gratitude to our Advisers . . ."

(An extract from the Chairman's Speech on Med-Nite.)

Functioning Medical Band

Through the
unceasing efforts . . .

PALÆOPATHOLOGY OF ANCIENT EGYPT

AN INAUGURAL LECTURE FROM THE CHAIR OF PATHOLOGY AND BACTERIOLOGY

By Professor ROBERT KIRK, O.B.E., B.SC., M.D., F.R.F.P.S. (Glas.), F.R.C.P. (Lond.), F.R.S. (Edin.), D.P.H., *delivered on December 4, 1961.*

When I received an invitation from the Senate to deliver an inaugural lecture from the Chair of Pathology in Hong Kong — an honour and privilege which I deeply appreciate and for which I would like to express my thanks — I thought I would try to take you with me, in imagination, to a far away land that I know well, and backwards across the centuries to an ancient civilization that flourished there, centuries before the birth of Christ, but has now disappeared completely.

The word palæopathology was introduced by Sir Marc Armand Ruffer as a name for 'the science of the diseases which can be demonstrated in human and animal remains of ancient times'. It is an interesting little byway of pathology, of more academic than parctical interest perhaps, but it has always exercised a peculiar fascination over the minds of those who have come into contact with it. Palæopathology takes us backwards in time to the period before the appearance of man on the earth. There is evidence of pyorrhoea alveolaris, bone lesions and arthritis deformans in fossilized remains of dinosaurs and pleiosaurs from the Mesozoic era, and even from the remote Palæozoic age there are examples of fractures, dental diseases, and parasitic infections.

The richest field for the study of disease in antiquity is probably ancient Egypt. The palæopathology of ancient Egypt takes us back to the dawn of human civilization. The civilization of ancient Egypt has disappeared, but we know a great deal about it because the Egyptians, in their preoccupation with the life after death practised so extensively the art of mummification and other funerary customs designed to render the body incorruptible and ensure immortality. In this they were aided by the natural climate and sandy soil of Egypt, which helped to preserve the dead bodies for centuries. At first mummification was the exclusive privilege of the king, so that he might continue his existence indefinitely as the god Osiris. But as time went on the practice spread, first of all to the aristocracy, and finally to the whole population. By the beginning of the Christian era the land of Egypt had become like a vast necropolis in which men had for over thirty centuries deposited the embalmed bodies of their dead, exaggerating as time went on the vain grandeur of their tombs.

The ancient Egyptians wrote surprisingly little about their techniques of mummification and most of our knowledge has been derived from the application of modern scientific methods to the study of mummies found during Egyptian excavations. Thanks to modern studies of the pathology of mummies by Elliott Smith, Armand Ruffer, Wood Jones, Douglas Derry, and others we know more about the diseases of the Nile Valley in remote antiquity than in any other part of the world. These studies have been amplified and enriched from two other sources of information: the interpretation of ancient Egyptian works of art, including statues, pictures, basreliefs, and decorations; and ancient Egyptian medical writings, the oldest medical textbooks in the world, generally referred to as papyri. Papyrus is a large reed that grows in the Nile and from it the Egyptians made the first paper

in the world. The two most important medical papyri are the Ebers papyrus and the Edwin Smith papyrus, named after the people who first obtained them. Other less important ones are known as Hearst, London, Berlin, Chester Beatty, and Kahun.

I shall confine my remarks mainly to the evidences of disease found in the bodies of the mummies, as attempts to translate and interpret the ancient papyri and hieroglyphs are beset with so many snares nad pitfalls, that the final results are often mere guesswork.

In order to indicate just how much we can expect to find out from the examination of mummies it is necessary to give a brief account of the process of mummification and to indicate the risks of destruction and damage to which the mummies were liable in later centuries.

Although the Egyptians themselves have left little or no literature on the technique of mummification, a few other writers of the ancient world were interested in the process of embalming and have provided descriptions of it. The most instructive of these writers were Herodotus (*c.* 484–425 B.C.), whom men now call 'the Father of History', and Diodorus Siculus who lived about 400 years later than Herodotus. The papyrus of the Ritual of Embalming, the Rhind papyri and inscriptions from the tombs of Thoy and Amenope also give some information and there are references in Porphyry, Plutarch, Strabo, and Pliny.

The methods used and the skill of the embalmers varied in different periods, but reached their highest development in the time of the XXI Dynasty (*c.* 1090 B.C.). The embalmers belonged to a special guild or organization of their own and the office was often hereditary. In the later Graeco-Roman period they were of two kinds, the 'cutters' or 'paraschistes', who merely made the initial incision, and the embalmers proper or 'taricheutes'. The former were often regarded with execration, ceremonially at least, but the latter were deemed worthy of every honour and respect, associating with the priests and being admitted to the temples as holy men. In this late period also both Herodotus and Diodorus record that three methods of embalming were in use, varying in price and complexity. The relatives usually made a bargain about the costs and the manner in which they desired the body to be treated, and when all was agreed upon the corpse was delivered to the embalmers to be dealt with the appointed manner. The whole process of embalming was performed in strict accordance with a definite canon (now lost) and occupied exactly seventy days, neither more nor less, including the ritual bandaging, immersion in the natron bath, and the actual process of packing and embalming the body.

The brain was first removed through the nostrils by scraping with an iron hook through the fractured ethmoid bone, which had to be perforated to reach the interior of the head. Then with a sharp Ethiopian stone an incision was made in the left flank, and when the body was thus cut one of the embalmers inserted his hand through the wound in the corpse and extracted the abdominal viscera, with the exception of the kidneys. The diaphragm was then incised through the abdominal wound, and the lungs extracted, leaving the heart *in situ*. The body was then treated with natron, usually by immersion in a bath or jar containing a solution of this substance. Natron is a naturally occurring mineral found in three principal sites in Egypt and consisting mainly of sodium chloride, mixed with sodium carbonate and bicarbonate in varying proportions. At most periods sodium chloride was the essential preservative agent used by the ancient Egyptians for embalming.

The viscera were also washed in natron. Before the XXI Dynasty the viscera were placed in the four canopic jars. The lids of these jars were fashioned like human heads until the end of the XVIII Dynasty, after which they were fashioned after the heads of the four children of Horus, the hawk-headed son of Osiris: the human-headed Imsety, into whose care the liver was entrusted, the jackal-headed Duamutef, who took care of the stomach, Hapi, with the head of a baboon, who was custodian of the lungs, and the hawk-headed

Quebeh Snewef, who looked after the intestines. After the XXI Dynasty the viscera were restored to the body cavity after removal, in four parcels, each of which contained a wax image of the appropriate deity.

The body cavity was then packed with various materials, each having some magical significance. Sawdust, particularly that of cedar wood, resin, linen, and mud from the Nile were commonly used. The outlines of the trunk, limbs, and face were restored and remodelled by subcutaneous packing with a mixture of resin, natron, and mud or linen. The skin was anointed with various aromatic substances, such as cedar oil, myrrh, and cinnamon, and spices which had not only the power to preserve it for a long time but also imparted a fragrant smell. The embalming incision was usually left open and covered with a protective plate on which was engraved the Eye of Horus symbol. Finally the body was elaborately bandaged, after which the corpse was ready for his introduction to the next world, described in the Rhind papyri as 'meeting the winter sun'.

When the bandaging was completed the body was carried in a ceremonial funeral procession to be deposited in the elaborately prepared tomb, usually on the western side of the Nile, where Amen-Ra, the Sun-god, sinks into the underworld every evening. During life each one in Ancient Egypt was absorbed in the preparation of his eternal chamber, with an anxiety scarcely conceivable to us nowadays but which in those times dominated all others, the anxiety of assuring the magnificence and inviolability of sepulture, which in the case of a great king might exhaust thousands of men in building the pyramid or hewing out the underground labyrinth that was to be his last resting place.

The early Pharaohs built pyramids for their tombs. With the body of the king was buried much of the treasure he possessed in his lifetime to ensure his comfort in the after life. Everybody knew about the wealth that was buried with the kings, including the starving and under-privileged labourers who toiled to fashion the tombs. Men were as hungry for riches then as they are now, so tomb robbing has been prevalent in Egypt all down the centuries. It was not long before the pyramid tombs were violated and plundered, so the later Pharaohs had their tombs fashioned underground and took elaborate precautions to conceal them. In the famous Valley of the Kings innumerable insignificant-looking openings in the rock lead to subterranean palaces, the tombs of great kings. This valley is a vast and fantastic necropolis in the Libyan chain of limestone rock that rises in the hot desert sands west of the Nile. Here no rain ever falls from the cloudless skies, no green thing ever grows. The calcined limestone seems to belong not to this world but to some burned-out planet that has for ever lost its clouds and atmosphere. This was the last resting place of the most august mummies, those of the royal Pharaohs.

Each tomb was cut down into the limestone rock, chamber after chamber in a labyrinth to conceal the final burial chamber. When the King's body was deposited in the tomb the entrance was walled up, hidden with care, and remained lost for centuries. If you go down into one of those tombs, chamber after chamber to the last hidden one, you will seen in each chamber mural decorations showing all the ordeals and demons that the king must pass in his journey through the 'country of shadows' to the underworld. If he passed all the trials and ordeals and was proved worthy, he would at last be brought to Osiris, the great Dead Sun, the most beloved and the most compassionate of all the gods of Egypt, with whom he would be identified.

It was in the depths of such a tomb that the Kings and great ones of Egypt waited as the centuries passed slowly. It was necessary to preserve the physical body, or Khat, at all costs, for a certain Ka or ghost of the dead man continued to dwell in the mummy, lest corruption should overtake it. Embalming oils and spices were left in the tomb, so that if things went wrong this Ka could come out of the mummy and re-embalm it. Slowly the centuries rolled on, sometimes

tens of centuries, in absolute silence and darkness, with nothing to mark the days or the nights or the seasons or the years or the centuries. Then one day there was a noise of blows on the hidden door and the tomb robbers broke in carrying lights and torches. They plundered everything in the semi-darkness, destroyed things, and carried off all the gold and jewels, the ornaments and decorations. As they left they closed up the entrance to the tomb again, leaving in the darkness a confusion of shrouds and coffins, of mutilated human bodies, shattered vases, broken gods and emblems. And this is what was found later when the tombs were excavated in the interests of Egyptology. This was not the only risk of destruction that threatened the mummies. A Greek papyrus in the Louvre describes a tomb robbery in which the door of the tomb was left open and the well-preserved bodies had suffered from wolves which had partly devoured them. Erosions in a pre-dynastic skull from Roda and considered by Lortet and Galliard to be syphilitic, were later shown to have been caused after death by beetles or rodents. There is no doubt also that the unwrapping of a mummy, even unsealing the coffin or grave, affects it adversely. The Rameside mummy in Leeds, which was partly dissected in 1827 by Hey, has with time become so hard and friable that dissection would now be impossible; and the same applies to the female mummy dissected by Granville in 1826, the tissues of which are now so dry and fragile that they crumble into dust when handled. Even the royal mummies in the Museum of Egyptian Antiquities in Cairo have greatly fallen away and deteriorated within the memory of living people. Already they are beginning to accomplish the final return to dust and nothingness which has been deferred for so many centuries.

The number of diseased conditions which it is possible to identify in mummified bodies is limited. Apart from the diseases that leave some definite record in the bones it is quite often impossible to establish any kind of pathological process in the soft tissues with certainty. Pre-dynastic bodies are usually mere skeletons with none of the soft tissues remaining, but some of the later mummies are so well preserved as to allow detailed anatomical, even histological studies of the soft tissues. Early attempts to prepare sections of the tissues for histological examination were unsuccessful, as the tissues were too hard and brittle to cut dry, and too soft and jelly-like when re-hydrated with saline. The first histological studies of Egyptian mummy material were made in 1852 by Czermack, who made drawings of tissues teased in caustic soda. Fifty years later Wilder, in America, used 1 to 3 per cent caustic potash to soften dried human tissues and checked the process by transference to 3 per cent formalin. Ruffer (1910) used solutions containing sodium carbonate and formalin for softening brittle specimens from human mummies, after which they could be embedded, cut, and stained almost like fresh material. The histological appearances vary greatly. Sometimes very good definition is obtained, but nuclei and cell details are rarely seen, although soft tissue pathology can frequently be recognized.

The appearance of the skin of several mummies suggests that some skin disease may have been present during life, but it is always difficult to exclude post-mortem changes, and the embalmers could never be certain how permanent their results would be. Also the natron bath used in embalming had the effect of stripping off all the epidermis, including the body hair. The nails were retained only because special precautions were taken to prevent them from being dislodged by the embalmers who either tied them on to the fingers and toes or placed a metal thimble over the finger or toe for the same purpose. The Pharaoh Rameses V and a mummy of the XX Dynasty had eruptions on the skin resembling smallpox. Ruffer and Ferguson (1911) obtained sections of the skin in the latter case and concluded the condition was smallpox from histological examination of the vesicles which showed characteristic vertical septa. Ulcers of the skin have been found in several other

mummies. The mummy of an aged priestess of Amen of the XXI Dynasty had extensive bedsores over the buttocks and shoulders. The body was that of an extremely emaciated old woman, whose general condition indicated that she had been long bedridden. She had suffered from a pelvic abscess, and the bedsores had been skilfully covered by the embalmers by sewing patches of gazelle skin over them. These were sewn on to the healthy skin beyond the affected areas and the sutures concealed with strips of linen soaked with resin.

Many interesting pathological conditions have been found from examination of the bones and teeth of Egyptian mummies and predynastic bodies, as those are the most enduring parts of the human body after death. Even the radiographic appearance of the bones remains virtually unaltered, and Harris's lines can even be recognized on occasion.

Osteomyelitis and periostitis were fairly common. Periostitis may be caused by an injury or a blow setting up a chronic inflammation, with thickening of the periosteum which produces new bony outgrowths adherent to the old bone with the result that the normally smooth surface becomes rugged and deformed. Many such bones have been found in Egypt. Osteomyelitis, or inflammation of the bone marrow, was also fairly common. There are numerous examples of mastoid disease, an acute osteitis of the mastoid region of the skull following inflammation of the middle ear, and the medical papyri contain numerous descriptions of remedies for painful and discharging ears. It is only comparatively recently that these diseases have become uncommon. When I was a medical student, middle-ear disease was extremely common in Great Britain, and mastoid inflammation was one of the surgical emergencies which we all had to be prepared to deal with at any time.

Fractures were common, especially of the forearm bones, and splints have been found applied to the forearm of a mummy from the IV Dynasty, the oldest known splints in the world. Splints of the same curiously distinctive type are still in use in Abyssinia and the Sudan as well as in Borneo and other parts of the Malay Archipelago.

Many specimens of fractures which have healed through the formation of a callus have been described from ancient Egypt and Nubia by Professor Wood Jones. He also found the skeletons of 100 men who in Roman times had been executed in Nubia by hanging and showed the characteristic fractures of this form of 'man's inhumanity to man.'

Elliott Smith found numerous skulls with bilateral parietal thinning, a condition in which there are large symmetrical depressions of both parietal bones associated with thinning of the bones, chiefly affecting the outer table and always occurring in aristocrats or Egyptians of the upper classes. A condition of symmetrical osteoporosis affecting mainly the frontal and parietal bones of the skull but sometimes extending also to the occipital and temporal bones and the sphenoids, has been found in skulls from Egypt and Nubia. A similar condition occurs much more extensively in skulls from South America, notably Peru, affecting all ages, but chiefly young individuals. The nature of the conditions is unknown. A somewhat similar condition has recently attracted the attention of radiologists (Steinbach and Obata, 1957) and appears to be symptomless.

Arthritis, with great deformity of the bones and joints, was a very common condition in all periods of ancient Egypt and Nubia, even in the archaic and pre-dynastic periods, 4000 B.C. or earlier. Arthritis deformans was *par excellence* the disease of the ancient Egyptian and Nubian, according to Elliott Smith and Dawson. The pre-dynastic Nubian scarcely ever grew to adult life without suffering some of its effects. People of all ages, but especially elderly people, must have suffered atrocious pains in their joints, which gradually became stiffened and deformed until they could hardly move. Spondylitis deformans is a name for the same disease affecting the spine, and almost all the skeletons of old people from ancient Nubia show spondylitis deformans, often with complete bony ankylosis of the spine. The condition was not confined to the Egyptians.

Nearly every skeleton of the men of Alexander's army buried in Alexandria reveals some evidence of it, and forty per cent of these were Thracians, the remainder of mixed origin. There has always been much speculation about the reasons for this striking prevalence of arthritis deformans in ancient Egypt. The aetiology and pathogenesis of these diseases are not very well understood, even to-day. It has been suggested that endemic fluorosis may have been partly responsible. There is evidence of fluorosis in many of the present day inhabitants of Upper Egypt and Nubia. It has been held that the arthritis deformans of ancient Egypt is identical with the 'cave gout' (*Hohlengicht*) which Virchow found in the bones of prehistoric men and bears, and which is also common in the skeletons of the inhabitants of the early German forests. Chronic arthritis is still a relatively common disease in wild animals.

A typical example of gout has been observed in a Coptic body from Philae. The feet showed gross changes in all the joints associated with gouty concretions or tophi. Several other joints also showed gouty changes. In addition to the typical concretions of true gout there were signs of osteo-arthritis in the vertebrae, shoulder joints, and left side of the jaw. The specimens were sent to the museum of the Royal College of Surgeons of England. The concretions were tested by Dr. W. A. Schmidt in 1908 and found to give the reactions of uric acid, and a further analysis in 1960 confirms the presence of uric acid and urates.

The bones are not the only tissues that survive the centuries with little change. Still more enduring are the teeth, and a great part of palæopathology is concerned with the teeth and jaws of man and animals.

Signs of pyorrhoes alveolaris and root abscesses in the jaws are found very frequently in Egyptian remains from all periods. Typical dental caries was rare in the predynastic period, but according to Elliott Smith it increased in frequency with the development of civilization and luxury, especially among the wealthy classes. Nearly all the royal mummies, even those of young men, have well-worn teeth, and in many cases show severe dental caries and alveolar abscesses as well. Dentistry was one of the medical specialities in ancient Egypt. There were many dentists, or 'physicians of the teeth', but their treatment consisted of drugs and magical remedies only. There is no evidence that they used operative measures, and dental fillings have not been found in any of the mummies.

One typical case of hydrocephalus is known in the mummy of a young woman from Nubia. Her skull is now in the museum of the Royal College of Surgeons in London. Two other doubtful cases are known. One is that of the mummy of Smenkere, originally believed to be that of Akhenaton and considered by Elliott Smith (1912) and Ferguson to have a slight degree of hydrocephalus. The other is one of the daughters of Akhenation, a portrait statue of whom has been thought to indicate hydrocephalus. In a mummy of the Roman period Derry (1913) described hydrocephalus associated with atrophy of the bones of the left side, indicating hemiplegia.

There are numerous records of dwarfs and deformed persons from ancient Egypt. Seligman considered the skull of a dwarf from the XVIII Dynasty to be that of a cretin. Most of the dwarfs were not cretins, however, but owed their deformity to the disease known as achondroplasia, a congenital defect in cartilage formation at the epighyses of the long bones. Achondroplastic dwarfs have normal heads and bodies but diminutive and stunted limbs. There is no mistaking the diagnosis, as the form and features are very distinctive. Many ancient Egyptian statuettes are accurate figurations of achondroplasia. The dwarfs were often greatly prized by the kings and great nobles, who liked to have one or more of them in their retinue. A famous example is Chnoum Hotep, whose statuette is in the Cairo museum. He lived at the time of the V Dynasty (*c.* 5000 B.C.) and rose to the rank of an important official in Pharaoh's court with the title of 'Chief of the Perfumes'.

Spina bifida has been observed in both young and old skeletons from ancient Egypt. One case of cleft palate has been brought to light and two of club foot (talipes). The left foot of the mummy of Khnumu Nekht of the XII Dynasty, now in Manchester, shows marked adduction deformity or club foot, with no arthritic changes. The Pharaoh Septah of the XIX Dynasty suffered from a marked equinus deformity, also of the left foot. This is not shown in contemporary portraits of the Pharaoh, and used to be considered an example of the deformity caused by poliomyelitis, but this view has been contested. A stele of the XVIII Dynasty, now in Copenhagen, shows a male figure with a typical shrunken, short leg produced by poliomyelitis. A pre-dynastic skeleton now in the University of Pennsylvania has the left femur 8.2 cms. shorter than the right one; this is suspected to be due to poliomyelitis also.

The lady Tiye of the XXI Dynasty had fibrocaseous tuberculosis of the lung and numerous examples of bone tuberculosis have been discovered. Examples of Pott's disease (or tuberculosis of the spine) are known from several periods of ancient Egyptian history. The finest is probably the case described by Elliott Smith and Ruffer in 1910. The mummy was a young man, one of the priests of Amen in the XXI Dynasty. The disease had invaded some of the lower dorsal and first lumbar vertebra producing the typical gibbous deformity and there was extensive destruction of the right psoas muscle by a tuberculous abscess. Tuberculous disease of the hip has been noted in a mummy of the V Dynasty and other cases of spinal tuberculosis have been found in Nubia. In a cemetery at Dakka on the Nile, ten pre-dynastic skeletons were found, four of which showed signs of Pott's disease. In one tomb were the skeletons of a husband and wife, both showing destruction of the spine by tuberculosis. In another tomb a boy of nine years and an adult were found, both showing signs of the same disease. A pre-dynastic statuette found in the desert near Assuan shows typical and clearly recognizable features of spinal tuberculosis. There is thus evidence that tuberculosis was present in ancient Egypt in all periods including pre-dynastic times four thousand years before the Christian era.

On the other hand, no evidence of syphilis or rickets has been found in any ancient Egyptian remains. All authorities are now agreed on this point. Syphilis produces more characteristic changes in the bones than does tuberculosis. Elliott Smith and Wood Jones examined over 25,000 skeletons and many more have been examined by other investigators without evidence of syphilis coming to light, and it is now generally accepted that syphilis, as we know it, was not present in ancient Egypt. This is an interesting conclusion, because lesions which all authorities agree to be syphilitic are found in the pre-Columbian mummies of South America. It agrees with other facts known about the history and epidemiology of syphilis and supports the theory that this disease was introduced into Europe by some of the sailors who returned from the New World with Christopher Columbus, forming part of the Old World's debt to the New.

There is little evidence to suggest that leprosy was prevalent in ancient Egypt. Only a single case has been observed, in a Coptic mummy of early Christian date. The hands and feet show unmistakable changes of advanced leprosy.

Eggs of lice were found by Ruffer adhering to the hair of some of the mummies, and lice are mentioned in the Bible as occurring in Egypt (*Exodus* viii. 17). We do not know whether louse-borne relapsing fever or epidemic typhus were present in ancient Egypt. Both have repeatedly occurred in Egypt in historical times. Records in the Bible and other literary sources indicate that Egypt repeatedly suffered devastating epidemics in ancient times, but their nature is uncertain. As a rule bodies are not embalmed in times of great wars and pestilence when many people die simultaneously and most of the killing epidemic diseases affect only the soft tissues. We have already noted evidence that smallpox may have been one of the epidemic diseases of ancient Egypt. A

case of pneumonia studied by Ruffer suggests that plague may have been another. Fleas were probably plentiful; the Ebers papyrus gives instructions for expelling fleas from a house. It would be interesting to know if malaria was prevalent in ancient Egypt. Ruffer found enlarged spleens in several mummies, and this condition is usually due to malaria in the tropics and subtropics, but can be due to other causes.

The only evidence of tumour growth in ancient Egypt is provided by the bones. Elliott Smith and Dawson record three cases which they believed to be osteosarcoma, two in the humerus and one in the femur. The last is almost certainly an osteo-chondroma rather than sarcoma. Ruffer also describes a large bony tumour of the pelvis from the catacombs of Kon el Shougata, Alexandria, which he considered to be an osteosarcoma. A case has been observed in which erosion of the bones of the face has been thought to indicate the presence of a rodent ulcer there during life, and another in which erosion of the sacrum suggests carcinoma of the rectum. Two skulls from the I and XX Dynasties, described by Professor L. Rogers (1949), indicate the presence of meningioma during life. Both skulls show the typical hyperostosis commonly seen in this condition, but unfortunately no soft tissues survive. As far as I am aware there is no example of new growth in a mummy that can be definitely diagnosed from the histology of the soft tissues.

In 1925 Granville dissected a female mummy in which the abdominal skin was much wrinkled and from the internal findings he wrote the following opinion. 'The ovarium and broad ligament of the right side were enveloped in a mass of diseased structure . . . the uterus was larger than normal, while the remains of a sac were found connected with the left ovarium, all of which connected with the appearance of the abdominal integuments leave no doubt of ovarian dropsy having been the disease under which the individual suffered'.

It is generally believed that malignant disease was rare in ancient Egypt. This may have been due to the short expectancy of life in these days; or the belief may be erroneous, due to the absence of soft tissue pathology in ancient Egyptian remains. There are obscure references in the medical papyri to the 'Tumours of the god Chonsu' that suggest a diagnosis of multiple secondary growths, and the instruction that they are not to be treated is consistent with this suggestion. On the other hand the German scholar, Karl Sudhoff (1933), examined all passages in the Egyptian papyri that might refer to cancer, and concluded that it was impossible to tell from the extant literature whether the Egyptians knew what we call cancer or not.

Arteriosclerosis, or hardening of the arteries, was common in ancient Egypt. The principal types of the disease seen today seem to have been well represented in all periods of Egyptian history. Today these conditions compete with cancer for the first place among the killing diseases or causes of death in Europe, America, and other civilized countries. We do not at present understand much about the causes of these diseases, but there is a great deal of talk and writing about them. The general tendency is to attribute them to the stress of modern life, but it is interesting to find that the ancient Egyptians suffered from the same conditions. The embalmers usually removed the aorta and larger blood vessels, but sometimes pieces of the aorta were left behind and in some of the mummies the vessels of the arms and legs were intact. Ruffer has described the appearance of the arteries in a series of mummies from the XVIII to the XXVII Dynasties as well as in later Greek and Coptic mummies. The majority of them showed gross atheromatous changes with plaques and ulcers, and some of the mummies had completely calcified limb arteries, probably the condition known to my students as Monckeberg's disease.

A very fine example of cardiovascular renal disease is the case of the lady Tiye, of the XXI Dynasty (*c.* 1000 B.C.) whose mummy was dissected by Long (1931) in America. The heart showed a small calcified mass on one cusp of the mitral valve, indicating old endocarditis. Coronary arteries showed well marked

thickening of the inner layer. There were areas of fibrous tissue, like little scars, in the heart muscle. The aorta showed moderate arteriosclerosis. There was marked anthracosis in both lungs. One lung had a few areas of caseation that were well encapsulated, but no tubercle bacilli were demonstrated. Both kidneys were recognizable by their histological structure, many glomerculi being fibrous. The renal capsules were thickened, there was a large amount of interstitial fibrous tissue, with arteriosclerosis of medium sized arteries.

The lady Tiye was over 50 years of age when she died. Shorn of its technical jargon the report indicates that she had valvular disease of the heart, high blood pressure with kidney damage and probably suffered from heart attacks, one of which caused her death. The interesting feature is that although she died over thirty centuries ago the post-mortem report on her remains by a modern pathologist is just the kind of post-mortem report one finds in the case of many people who die today in the middle years of an energetic and well-fed existence.

Another interesting example is the Pharaoh Merneptah, the Pharaoh of the Hebrew Exodus. Examination of the mummy showed that the Pharaoh was not drowned in the Red Sea, as is generally believed, but died on land, as a rather corpulent and bald headed old man, with a little fringe of white hair, and very few of his teeth left. He had marked arteriosclerosis. His aorta, the main blood vessel of the body, was sent to Professor Shattock at the Royal College of Surgeons in London, who made sections of it and exhibited them at a meeting of the Royal Society of Medicine. Merneptah was an old man, about sixty years of age, when he succeeded to the throne of Pharaoh at a time when the country needed a young and vigorous ruler to counteract the effects of the luxury and vanity of the long reign of his father, Rameses the Great.

Merneptah's father, Rameses II, probably the most famous of the Pharaohs, also had marked arteriosclerosis, which involved particularly the superficial temporal arteries, which were tortuous and calcified, the condition we call today temporal arteritis. It probably did him no harm. Rameses II had a long reign of 66 years and was a very old man, well over 90 when death finally delivered him to the embalmers in Thebes. The top of his scalp was bald, with a fringe of white hairs on the temples and occiput, but his teeth were all healthy, in spite of the Pharaoh's extreme old age. It is difficult to realize now that once the destinies of the world were ruled, without appeal, by the nod of his head; that this sad mummy was once the great Sesostris who monopolized all the glory and magnificence of the world, Ozymandias, king of kings, whose youthful limbs and fine athletic torso are still seen in many colossal statues in Memphis, Thebes, and Abu Simbel. These colossal statues had the same purpose as the mummy: to make eternal Rameses the Great.

Several diseases of the lungs have been identified in mummies, although the lungs are usually much shrivelled and distorted. The condition of anthracosis was described by Ruffer in a mummy of the XX Dynasty, indicating either that the individual lived or worked in a smoky atmosphere, or was addicted to opium smoking. Another mummy of the same period showed very clearly the typical changes of pneumonia, and in this case the tissues were well enough preserved to allow confirmation of the diagnosis histologically. The alveoli of both lungs were filled with cells, in many of which nuclei could be seen. In one of the best preserved of all the mummies, that of Har-Mose, the singer from the XVIII Dynasty studied and described by Shaw (1938), there was evidence of anthracosis, emplysema, old pleurisy, and an acute bronchopneumonia, the last being regarded as the immediate cause of death. Shaw's pathological report on the remains of Har-Mose was illustrated by very fine pictures and coloured pictures of sections of the tissues. In the lung of a late mummy of the Greek period Ruffer found patches of inflammation in the upper part, while the lower part was consolidated. In both lungs and liver he found bacilli which he considered looked

like those of plague, and he regarded this mummy as possibly a case of plague. Pleurisy was recorded in various mummies examined by Wood Jones and Elliott Smith. No proved case of pulmonary tuberculosis has been found in Egyptian mummies, although there is now abundant evidence of bone tuberculosis, based on gross morbid anatomy only. These cases of pleurisy are suggestive, however, and the condition of the lungs in the case of the lady Tiye strongly suggests tuberculosis and nothing else to the morbid histologist, in spite of failure to identify tubercle bacilli in the lesions, which is the critical and final test.

Ruffer describes hypogenesis of the right kidney in one of the mummies he examined and multiple abscesses with well-staining gram-negative bacilli in the kidneys of another mummy. Vesical calculi have been observed, but not very often. Ruffer described three vesical calculi (stones in the bladder) found by Sir Flinders Petrie in a pre-dynastic body. They were mixed phosphate and uric acid stones, the largest weighing 30 grams. Elliott Smith and Dawson record three cases of stone in the kidney in bodies of the II Dynasty and bladder stone in the mummy of a priest of Amen of the XXI Dynasty. The last was submitted for analysis to Professor Shattock of the Royal College of Surgeons, London. It was found to consist of uric acid, but careful examination failed to reveal evidence of bilharzia disease.

In 1909 Ruffer demonstrated calcified ova of *Schistosoma haematobium* in the kidneys of two mummies of the XX Dynasty (*c.* 1200–1000 B.C.). This worm is the cause of bilharzia disease, which to-day is one of the curses of Egypt and other parts of the world. Ruffer's discovery of the eggs in mummies proves that the disease was indigenous in Egypt three thousand years ago. One of the chief symptoms of the disease, haematuria, or passage of blood in the urine, is noted many times in the Egyptian medical papyri — the 'AAA disease'. 'A' is the heiroglyphic sign for the Egyptian vulture, and the disease was symbolized by three Egyptian vultures, with a dripping phallus used as a determinative of the word. Since haematuria is one of the chief signs of bilharzia disease, and the palæopathological findings confirm the occurrence of this disease in antiquity it is reasonable to conclude that the ancient Egyptian texts refer to this disease especially as some of its other symptoms were accurately noted also by the Egyptian physicians. A further conclusion seems justified, namely that the disease was not a rarity, but probably fairly common.

Few diseases of the gastro-intestinal tract have been found in embalmed bodies, as the viscera were usually removed. In a female mummy of the Byzantine period from Nubia, Elliott Smith found adhesions of an old appendicitis. The appendix was firmly bound down to the left side of the pelvis by a thickened adhesion band. One case of gallstones has been found: the liver of a priestess of Amen of the XXI Dynasty shows the gall-bladder to be packed with stones. Ruffer has described a condition which suggests cirrhosis of the liver. Wood Jones mentions prolapse of the intestine, and an interesting passage in the Ebers papyrus describes the application of an astringent agent in prolapse of the rectum. Elliott Smith considers that the Pharaoh Rameses V suffered from inguinal hernia. The scrotum was very bulky and must have contained either a hernia or a testicular tumour. The Ebers papyrus contains a recognizable description of hernia and recommends treatment by reduction.

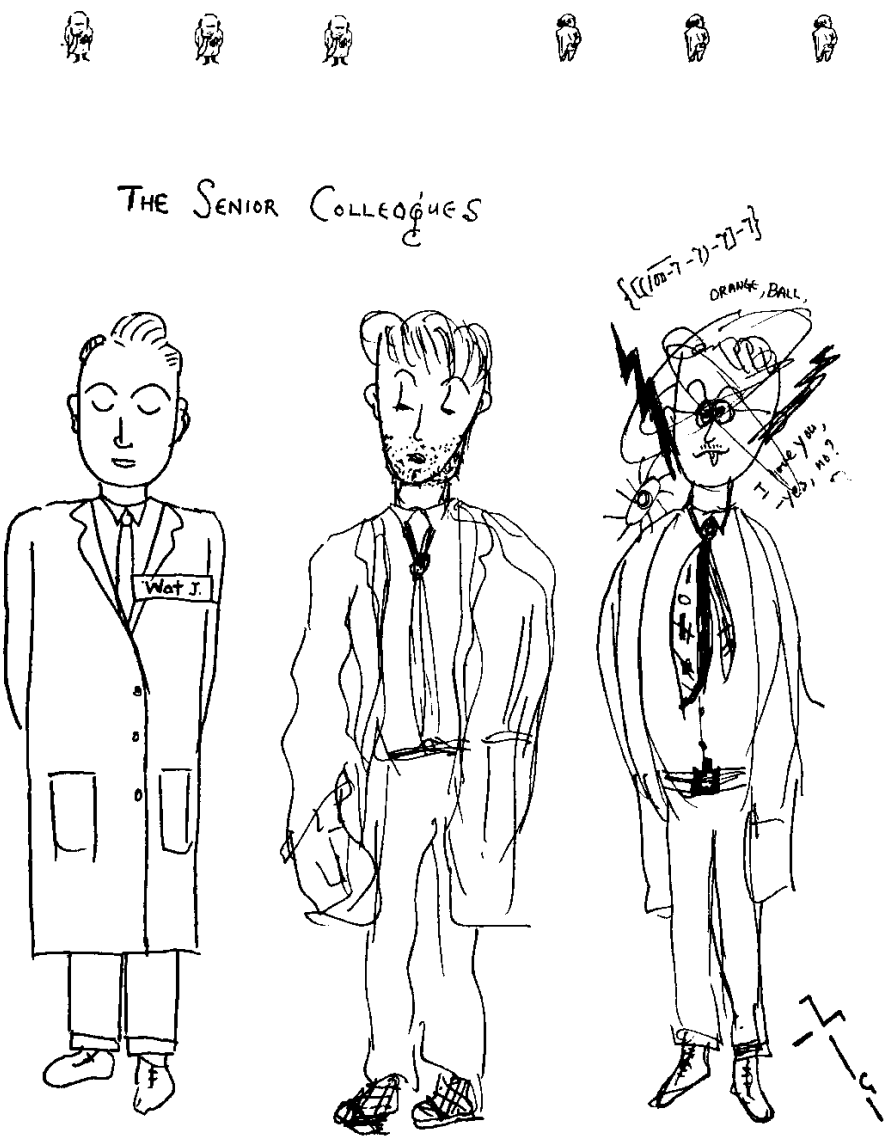
Intestinal worms were probably quite common in ancient Egypt. They are plentiful at the present time throughout the whole Middle East. Except for the discovery of Schistosome eggs by Ruffer no worms have been identified in any ancient Egyptian remains, but numerous recipes to expel worms are given in the medical papyri. Two kinds of worms are mentioned in the texts, one that is designated by the same word as the snake, probably the round worm, *Ascaris lumbricoides*, which is still designated as a snake in Egypt and the Sudan. The other was probably a tapeworm; after

Egypt had become part of the Roman Empire, Pliny mentioned the frequent occurrence of tapeworms among the Egyptians. Other worms often described as occurring in ancient Egypt are the Guinea worm (*Dracunculus medinensis*), *Enterobius vermicularis*, the hookworm *Ancylostoma duodenale*, and even filaria worms. The identification of these worms based on the papyri is mere guess work, however, and cannot be accepted.

It is unusual to find evidence of pregnancy in mummies, as the embalmers usually removed all the viscera except the heart and kidneys. The queen Makere of the XXI Dynasty may have died in childbirth, or shortly after giving to the world a little dead prince. When the mummy was unwrapped the breasts were found to be larger than usual, indicating that the queen may have been lactating. Her body had been elaborately prepared and carefully wrapped in linen of fine texture. The mummy of her infant was found in the same coffin, veiled and mysterious as the mother herself, placed there like a little doll to keep her eternal company in the slow passage of endless centuries. The condition known as vesico-vaginal fistula was found in the mummy of the Princess Hehenit of the XI Dynasty. According to Derry 'the injury is associated with an abnormally narrow pelvis, and it seems fair to suggest that it was probably produced during difficult labour and caused the death of the mother, who was quite young'. Derry also describes the case of a negress who died in childbirth and whose body was found in a Coptic cemetery in Nubia. The baby's head was firmly wedged in the narrow pelvis. The mother's right sacro-iliac joint was missing, probably since birth, and the right innominate bone was small, producing distortion of the pelvis. The woman had been a cripple all her life and was probably a slave, but she had become pregnant and this caused her death. Another interesting case is that of an unknown mummy, which was unwrapped in the Cairo Medical School by Elliott Smith in the presence of Sir Alexander Simpson, professor of midwifery in Edinburgh who was visiting Cairo at the time. The body was that of a young woman, sixteen years of age and in the sixth month of pregnancy. In this case there was no definite evidence of mummification. Nothing was found inside the wrappings but bones that revealed that the girl had been killed by a blow on the head, which fractured the skull, and that both forearms had been broken shortly before death. Elliott Smith and Dawson reconstruct the tragedy as follows: 'Perhaps in these facts we have the record of an incident for which many parallels might be found in modern Egypt. For it is no uncommon occurrence when the relatives discover that a girl has committed an indiscretion — the results of which in the case we are considering became apparent at the sixth month of pregnancy — to set on her with sticks and kill her. From the injuries revealed in her bones it is clear that she put up one hand after the other to fend the blows and had both wrists broken in turn. Then, when she was writhing on the ground in her agony, she received the blow upon her head, which was fatal. The body was prepared for burial in a summary fashion without the care that would have been bestowed upon her remains if she had not been disgraced. The body was neither eviscerated nor embalmed'.

The last case I have described has a medico-legal flavour, and there are many such cases of violence and brutality, crime and murder, motivated by hate or love or rage or ambition or cold-blooded policy. One last case, and I have finished. It is the case of another imperfectly prepared mummy, that of Seknenre, one of the last Pharaohs of the XXII Dynasty. When the mummy was unwrapped, all that remained of the king was a badly damaged skeleton, enclosed in a covering of soft, dark-brown flesh and skin. Mummification had been done in a rough and imperfect way. No attempt had been made to remove the brain, and no attempt had been made to put the body into the customary attitude of repose. The face was left as it was found at the time of death, with the lips widely retracted from the teeth. The head was not straightened on the trunk,

the limbs were not extended but left in the agonized attitudes into which they were thrown in the death spasm following the murderous attack, evidence of which is clear in the battered face and skull. The anatomical details of the injuries enabled the death scene of the king to be reconstructed, and indicate that Seknenre met his death in an attack by at least two armed assailants, one of whom used an axe and the other a spear. The absence of injuries to the arms or other parts of the body indicate the absence of any struggle or resistance. The attack was unexpected, and probably launched while the Pharaoh was lying asleep on his right side. Elliott Smith and Dawson write, 'This long-forgotten tragedy has left its mark for ever in a large gash in the frontal bone, in the broken bones of the nose, in the broken malar bone and orbit, in a spear thrust immediately below the ear which smashed off the mastoid process and was only prevented from doing further damage by the spear point striking the axis vertebra; in all these gruesome details and in the expression of the face and contortions of the body, is the vision of agony which once seen is not easily forgotten'.



NEWS FROM THE GAZETTE

(15th January, 1962)

Faculty of Medicine

HONORARY RESEARCH FELLOWSHIP

Robert M. Worth, B.A., M.D., of the University of California, has been awarded an honorary Research Fellowship to undertake a public health research project among refugee children in Hong Kong.

Appointments

Constance Elaine Field, M.D., M.R.C.P. (London), to the new Chair of Paediatrics from May, 1962.

(Miss) Chung Ho Kei, M.B., B.S. (Hong Kong), to be Assistant Lecturer in Obstetrics and Gynaecology from July 1, 1961.

Rosie Yong Tse Tse, M.D. (Hong Kong), M.R.C.P. (London and Edinburgh), Assistant Lecturer in Medicine, to be Lecturer from January 1, 1962.

Resignations

Dr. Kwaan Hau Cheong, Lecturer in Medicine, from December 31, 1961.

Chew Wei, Lecturer in Obstetrics and Gynaecology, from March 1, 1962.

Publications

DEPARTMENT OF ANATOMY

S. T. Chan, K. S. F. Chang (with F. K. Hsu):

"Growth and skeletal maturation of Chinese children in Hong Kong", *American Journal of Physical Anthropology* Vol. 19, No. 3, pp. 1-12 (1961).

Majorie M. C. Lee:

"Postmortem changes in glycogen content of human eccrine seat glands", *Journal of Investigative Dermatology 37 (3), pp.* 207-211 (1961).

DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

D. P. C. Chan (with A. C. de Barros Lopes):

"Three case of compound presentation", *Bulletin of Hong Kong Chinese Medical Association* Vol. 12, No. 1. (July 1961).

D. P. C. Chan:

"A study of 65 cases of compound presentation", *British Medical Journal* Vol. II, No. 5251 (August 26, 1961).

K. K. Chow, H. Y. Tso, and Daphne Chun:

"Report on cytology in the diagnosis of neoplastic disease of the genital tract", *Bulletin of the Hong Kong Chinese Medical Association* Vol. 12, No. 1 (July 1961).

DEPARTMENT OF BIOCHEMISTRY

STATISTICS FOR MEDICAL STUDENTS, a practical guide, by Doris E. Gray, Senior Lecturer in Biochemistry at the University of Hong Kong. October 1961. 23.5 x .5.7 cm., vi + 54 pages. Limp cover. HK$6. Published by the Hong Kong University Press.

Tratamento do pênfigo foliáceo pelo triamcinolona (Triamcinolone therapy of pemphigus foliaceus)
Furtado, Tancredo A. and Batista, Geraldo
O Hospital *56*:107-114 (October) 1959

Triamcinolone was given to 10 patients with pemphigus foliaceus; 7 cases were severe, 2 moderate, and one mild. Treatment period ranged from 34 to 166 days. The initial dose was 32 mg., the maximum average daily dose 22 mg., and the maintenance dose 4 to 8 mg. Skin lesions, even in the 7 severe cases, healed and did not return. Tolerance was good; undesirable side effects minimal or absent. Menstrual regularity was restored in those cases involving amenorrhea. Severity of condition did not affect prompt response to triamcinolone but in some cases required larger average daily doses until the maintenance dose could be established. Although its action is suppressive rather than curative, triamcinolone enabled even severely affected patients to return to normal activity. It is described as the corticosteroid of choice for this condition.

THE NEW CHAIR OF PAEDIATRICS

CONSTANCE ELAINE FIELD. M.D., M.R.C.P., (London)

Dr. Field has been appointed to occupy the newly-created Chair of Paediatrics and will head a new teaching department. She will arrive to assume her post in 1962.

Her first postgraduate appointment was at University College Hospital with the late Dr. F. J. Poynton, one of the great English pioneers in children's diseases. Thereafter she held a series of appointments at the Hospital for Sick Children at Great Ormond Street. After the war, during one academic year she was Assistant to the Director of the Institute of Child Health in London. From 1946 to 1948 and again for a short period in 1949 she held a Nuffield Fellowship in Child Health, part of the time in the United States of America, Scandinavia, and Finland.

From 1949 to April this year Dr. Field held senior specialist appointments in Malaya and Singapore, and was closely associated with the Faculty of Medicine of the University of Malaya in the clinical training of medical students, and with the Singapore Academy of Medicine, of which she was president, in post-graduate and refresher courses in medicine.

She has been active in the formation of voluntary associations for the care of children, in particular the Singapore Paediatric Association and the Spastic Children's Society, of both of which she was the prime mover.

Dr. Field's published papers, case reports, chapters, and books are numerous; her main interest lies in chronic chest diseases of children.

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16th Dec., 1961

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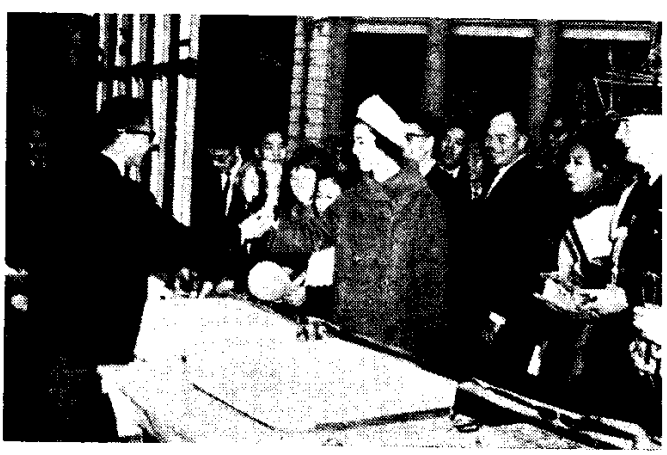

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