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MOSQUITOES.*

by

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Sometime ago, your President, Professor Gerrard, acting on behalf of the University Medical Society, requested me to read you a paper on the subject of Mosquitoes which I now propose to submit to this meeting.

There will be a demonstration afterwards of appliances, specimens and microscopic slides illustrating points which I shall have occasion to mention during the discourse.

The majority of medical students of this University will, I presume, practise their profession in the regions of the Tropics or sub-Tropics, hence a knowledge of and an interest in mosquitoes would be an advantage to them, for although these creatures are not confined to the warmer parts of the earth being found as far north as the Artic regions of Canada and in the neighbourhood of Greenland's icy mountains yet the diseases which they carry are much more in evidence in warmer climates.

In order to examine these insects a hand lens is useful for making out certain details. If one is not available the top or bottom of the eyepiece of a microscope will be helpful, an ordinary microscope can be adapted for examination purposes if suitable pins can be had for arranging the specimen, but the best instrument of all is an Entomological microscope.

The first step in the examination should be that of ascertaining whether the subject is really a mosquito or not, and you will often find yourself confronted with entomological specimens which are not.

* Read before the Hong Kong University Medical Society on 14th March, 1932.

Mosquitoes belong to the Class Insecta, that is to say they possess a head, thorax, and abdomen; the thorax carries two pairs of wings and three pairs of legs, as the hind pair of wings are vestigial club shaped structures and front pair membranous, they belong to the order Diptera.

Mosquitoes have a long rod-like structure projecting from the head which is called a proboscis, but so have certain other flies, some of which suck blood, others are not blood suckers. The safest guide for identification is the wing. Its veins must be arranged in a certain fashion, they should be covered with scales not hairs, and the wing must have a fringe or the remains of a fringe. As to the arrangement of the veins there is an unbranched vein in the middle of the wing which extends half way across the field of the wing, this is the third vein, the second which is above the third is forked and the fourth is forked also the fifth, the sixth being simple. An insect whose wings comply with these details is a mosquito and belongs to the sub family Culicinæ of the family Culicidæ. The other sub family Corethrinæ have usually hairs instead of scales on the veins of the wings and the mouth parts are soft and short and not suited for piercing.

In order to understand certain terms used in mosquitology, a brief description of the external structure of the insect is desirable. On the head are situated a pair of eyes, large kidney shaped bodies. From between the eyes arise a pair of jointed appendages known as antennæ, the segments carry whorls of hair which in the females are sparse and wispy, but in the male are *generally* thickset or bushy, so as to present a bottle brush appearance.

The proboscis consists of a labium or sheath which encloses the piercing and suctorial arrangements, and is a hollow cylindrical tube narrowly open along its dorsal surface, and ending distally in two triangular pointed labellæ which serve to guide the lancets.

The piercing and suctorial parts form a double tube, when in action up one tube goes the blood and any malarial parasites it may contain into the mosquitoe's midgut or stomach, down the other tube goes the mosquitoe's salivary secretions into the wound, and any sporozoites which may be in the salivary secretions.

Male mosquitoes do not suck blood.

Arising from the head and flanking the proboscis one on either side of it are the palps. These vary in length and shape according to sex and species.

Mention has already been made of the thorax. The legs consist of various parts which are named coxa trochanter, femur, tibia, 1st, 2nd, 3rd, 4th, 5th tarsal segments. Commencing at the body, the femur is the first long segment, after that comes the tibia, then the five tarsi.

The last tarsal segments are difficult to distinguish with the naked eye, they carry pairs of claws. Behind the wings is a little bar or ridge called the scutellum whose shape is of considerable importance and will be referred to later.

The abdomen consists of ten segments, eight of which are easily visible; in the female the abdomen ends in two blunt processes known as cerci or ovipositors which direct the eggs as they are laid. At the tip of the male abdomen are two claw-like processes called claspers. The male genitalia is of great importance for identification purposes and in order to be studied requires special preparation.

The body of the mosquito is ornamented with hairs, bristles and scales of various descriptions. In some instances the scales are plain, in others they are coloured accounting for spotting or marking of the wings, banding or spotting of the legs and banding of the abdomen—thus helping in the identification and separation of species.

Eggs are laid on or near the surface of water, some species lay their eggs in collections of water in tins, bottles, bath room jars and other domestic utensils. Some, such as Anopheles, lay their eggs usually in natural collections of water at the edges of swamps, ponds, running streams, seepages; other mosquitoes select the water in tree holes, pitcher plants, whilst some favour water tainted with sewage effluents. The length of the egg is generally ½ to 1 mm. long and is found either singly or in the form of rafts. These rafts may consist of three or four hundred eggs. Some eggs as those of the Stegomyia can withstand prolonged drying.

The larva emerges from the egg after a few days—it feeds, grows and in the course of development throws off skins. The skins when preserved and mounted are very useful as they show almost as many details as the larvæ from whence they originate. The larva finally becomes a pupa which is shaped like a comma—does not eat but is very active. In due course the pupal skin splits and the mosquito emerges. The larva has a head, thorax and abdomen. The head possesses mouth parts, a pair of eyes, a pair of antennæ and a pair of mouth brushes which are collections of hairs arranged on each side of the mouth. In the cannibal larvæ the mouth brushes are replaced by mouth rakes; the rakes resembling saws.

There are two kinds of cannibal larvæ on the Island of Hong Kong —one belonging to the genus Lutzia, the other to genus Megarhinus. Neither of these genera appears to take much interest in man. Mosquito larvæ have a tracheal system by means of which they breathe air: in one tribe the Anophelinii—the two main tracheal trunks terminate in spiracles, openings on the 8th abdominal segment: these larvæ rest parallel to the surface of the water, but so also do the larvæ of the genus Uranotænia which is found in Hong Kong.

In the other tribes (to one of which the Uranotænia belongs) the tracheal tubes do not terminate on the 8th segment but are produced outwards and form a projection known as a syphon. The larvæ rest with their bodies at an angle to the surface of the water, head down, syphon up and thus obtain air. In another kind of mosquito larvæ the syphon is specially modified, there are hooks at the end of it by which the larva attaches itself to the roots of aquatic plants from which it obtains oxygen and does not come up to the surface of the water. These larvæ can be obtained by pulling up these roots. Some of the larvæ will let go their hold and can be captured by " dipping " in the ordinary way. All larvæ have two pairs of leaf-like structures on the terminal segment known as anal or tracheal gills which surround the anal opening.

Most Anopheline larvæ have what are known as palmate tufts on the abdominal segments and some have them on the thorax. In cold climates some mosquitoes hibernate throughout the winter, some of these insects exist during that time in the larval stage and some even in the egg stage.

The sub family Culicidæ can be divided into four tribes - Anophelinii, Culicini, Megalorhini, Sabethini.

The Sabethini are only of academic interest. The Megalorhini are represented here by the species Megarhinus splendens which has already been mentioned. The larvæ are very large and often found in tree holes. Specimens obtained in October 1930 and kept in the laboratory did not become mosquitoes until April 1931, but in the warm season such development would take place in little over a week. The adults are large mosquitoes, highly ornamented, their proboscis instead of being straight is bent like a hook.

The distinction between the Anophelini and Culicini is very important and in some instances requires careful attention. Ornamental wings usually indicate an Anopheline, plain wings a Culicine. In Hong Kong however, we find Anopheles aitkeni with plain wings and Culex mimeticus with spotted wings. In the British Isles Theobaldia annulata has got clumps of dark scales on the wings. Anopheles bifurcatus has got plain wings. In the resting position Anophelines take up an attitude in which proboscis, thorax and abdomen form a straight line, Culicines a hunch backed position, but in India A. culicifacies rest like a culicine and I have known males of Culex fatigans at rest on a mosquito curtain to be pointed out to me as examples of Anophelines on account of their resting attitude. In the female Anopheline the palps are usually the same length as the proboscis but a Borneo species possesses palps which are only 2/3 the length of the proboscis. The palps of the male Anopheline are as long as the proboscis and are clubbed at the ends, but the palps of the male Theobaldia

annulata are spatulate and the confusion is made worse by collections of dark scales on the wings. The acid test to be applied is whether the scutellum is simple or tri-lobed. The demonstration of the scutellum is best effected by selecting a mosquito in which the three lobes are picked out as three tiny white dots. The larvæ of such a mosquito is ubiquitous here and can be found in collections of water in tins, bottles and amongst the bushes in the garden: the larvaæ should be hatched out and the resulting mosquitoes killed and pinned through the side. In the Anopheline the scutellum is simple and has no lobes.

From the Public Health point of view mosquitoes can be considered (1) as biting pests (2) as carriers of disease. In dealing with a mosquito nuisance it is essential to find what mosquitoes are causing the trouble, what places the larvaæ frequent and lastly, how these places are to be dealt with.

It is not sufficient to collect sundry mosquito larvæ in the neighbourhood: there are, I believe, something like 2,000 species in the world, none of the larvæ found may have anything to do with the trouble—thus ill considered recommendations may result in no abatement whatever of the nuisance, in spite of the expenditure of large sums of money on what are often known as comprehensive schemes.

Many samples of the mosquitoes complained of should be obtained —they can be caught by means of various appliances. These should, if possible, be identified and if you are familiar with the corresponding larvæ the nuisance can be abated when you find their breeding places. If you have not got this knowledge at your disposal make collections of larvæ from various sources, hatch them out and compare carefully the resulting mosquitoes with the ones caught in the act of biting and this will give you a fair idea as to whether you are on the right track or not.

In this connection it is well to remember that certain kinds of larvæ which have already been mentioned have a habit of attaching themselves to the roots of plants and cannot be obtained by dipping, hence this knowledge is essential in investigating and dealing with a nuisance caused by these mosquitoes which are most ferocious biters. Oiling the ponds or swamps is of no avail in this case, as the larvæ do not come to the surface, a larvicide is indicated, or drainage or filling —or oiling after weeding. Common biting pests are C. fatigans which breed in collections of water in tins, jars, pots, Aedes albopictus (Stegomyia scutellaris) in similar collections of water, and Armigeres obturbans which favours water contaminated by sewage.

Diseases caused by mosquitoes apart from septic complications arising from their bites, which in England for example sometimes leads to very serious results, are in the human race Dengue, Yellow Fever,

Filariasis, Malaria: in dogs Filariasis (heart worm) and in birds and monkeys infections with plasmodia.

Dengue is carried by Aedes aegypti and has been experimentally transmitted by Aedes albopictus in the Philippines—Aedes ægypti and albopictus fed on cases of Dengue in Sumatra have been sent to Amsterdam and allowed to feed on people at the Tropical Institute there; in practically every case Dengue was produced in susceptible people. Aedes ægypti does not appear to be very common in Hong Kong as compared with Aedes albopictus. Yellow fever is fortunately unknown in Hong Kong. It is carried by Aedes ægypti.

Filariasis. Complete development of the larval Filaria bancrofti has been observed in two species of mosquitoes found in Hong Kong —namely Culex fatigans and Aedes togoi.

Sir Patrick Manson at Amoy in 1878 discovered that the mosquito served as intermediary host. It obtains the microfilaria from the blood of its human victim; these are sucked into the midgut of the mosquito along with the blood, their sheaths are discarded and they find their way into the thoracic muscles, remain there for a certain period, undergo certain changes and finally find their way into the proboscis of the mosquito. When this mosquito feeds, the filaria find their way to the skin and finally reach the lymphatics and glands where they attain maturity and give rise to generations of microfilaria.

The filaria of dogs has C. fatigans as intermediate host. The microfilaria develope not in the thoracic muscles but in the malphigian tubes of the insect.

Malaria. In the blood of an infected person two forms of parasites are to be met with (1) the asexual forms which if present in sufficient numbers give rise to pyrexia of various types and (2) the sexual forms which when numerous enough and containing male and female parasites in equal proportions can infect an Anopheline imbibing the blood of such a host.

When the blood containing sexual forms of the parasites is taken into the midgut and stomach of the Anopheline, if conditions are favourable certain changes occur. The male parasites or microgametocyte throws off whip-like processes known as microgametes or what were formerly called flagella.

The female parasite or macrogametocyte by extrusion of the polar bodies becomes a macrogamete and is fertilized by one of the microgametes. The product of the union is known as a zygote and is at first rounded, it then becomes oval, lastly vermicular in shape, pointed at one end broad at the other end which contains the pigment.

The vermicule is also known as the ookinete. It penetrates the epithelial layer of the stomach and comes to rest in the muscular coat.

It increases in size, becomes spherical, acquires a cyst wall and is known as an oocyst.

The nucleus of the oocyst divides, the protoplasm forms a sort of sponge work containing protoplasmic masses, around which are formed a vast number of minute, slender, spindle-shaped nucleated bodies which finally fill the oocyst.

When mature, the oocyst ruptures and these sporozoites are discharged into the body cavity and some find their way into the salivary glands. The removal of the midgut from the body of the mosquito is not a difficult procedure but the removal of the salivary glands is far from easy.

The Sergent brothers have introduced a new method of demonstrating sporozoites in infected mosquitoes. The insect deprived of wings and legs is placed on its side upon a clean slide and the head cut off. The thorax is gently pressed upon with a needle and a drop of fluid forced out on the slide where it is mixed with a minute drop of saline and examined. This method is stated to present no difficulties and to be reliable. After Ross's epoch-making discovery it was thought that all Anophelines were equally guilty of causing malaria, but the work of Christophers, Stephens, James, and others in the Dutch East Indies has shown that some species are of great importance, others of very little in the transmission of the disease. To be of any value dissections should be carried out all the year round of the Anophelines caught in houses and arrangements made for obtaining such.

Some Anophelines are said never to enter human habitations, but one should ascertain if these will bite in their native haunts, or, if they favour domestic animals.

Of the Anopheles which frequent human dwellings, some leave immediately, or soon after they have had their meal of blood, and do not figure in morning catches, whereas others appear to be unwilling to leave in a hurry.

Since 9th January of this year morning catches in a certain rural area have resulted as follows:—

Total catch = 116.

A. minimus	11 males	95 females
A. hyrcanus	——	3 ,,
A. jeyporiensis	——	6 ,,
A. maculatus	——	1 ,,

These were caught between the hours of 9 a.m. and 11 a.m. In this locality as in other rural areas of the Island, larvæ of A. maculatus are about ten times as numerous as A. minimus.

An empty tool shed in the area yielded nothing, this was searched to ascertain if the Anophelines were only seeking shelter in houses after having fed on animals or birds. Having found out which of the species in a locality are dangerous carriers of Malaria, it is essential that their habits should be studied before embarking on a plan of campaign for the purposes of prevention, especially as regards their breeding places —if drainage or oiling schemes are contemplated.

In some countries swamps and malaria are closely associated, but it is not so in others, where the dangerous breeding places are in seepages and edges of small streams. In Bombay, Bentley found that the carrier A. stephensi bred in wells in the yards behind the houses hence the remedy was obvious. Epidemiological evidence is some times useful. In the Federated Malay States it was found that clearing ravines of virgin jungle usually led to serious outbreaks of malaria if a susceptible population were housed near by: this was due to the fact that when the jungle was cleared A. maculatus which in that country was a notorious carrier of malaria bred in the seepages and running water exposed to the sunlight.

In countries where malaria exists, localities are sometimes met with which are free from the disease, although it is rife in neighbouring places. A knowledge of the Anopheline larvæ found in these parts will often furnish useful information. On one estate in the Federated Malay States there was a large Tamil population who are particularly susceptible to malaria and the health record of this estate was exceptionally good. The spleen rate amongst the children, some 140 in number, was negligible. A larval survey yielded only A. hyrcanus and A. barbirostis neither of which were considered of any importance as vectors of malaria. No anti-malarial work was done in spite of a great swamp being in close proximity which furnished the Anophelines barbirostis and hyrcanus.

In another part of the Federated Malay States I was particularly struck with the good health of Tamil coolies and the low spleen rate amongst the children on the estate. The country was flat, being situated only a few miles from the foothills where A. maculatus was found in abundance, and bordering on the sea.

Anopheline larvæ existed in quantities even within a few yards of the cooly lines. The prevailing type was A. separatus, the others where barbirostris and hyrcanus. On one of these estates, for example, the spleen rate in 1922 was 0 for 28 children. In 1923 the spleen rate was 0 for 47 children. In 1924 the spleen rate was 0 for 39 children.

The inference being that A. separatus which did not occur in the hill country was of no great importance as a carrier.

EXHIBITS.

Apparatus for capturing mosquito larvæ.

Apparatus for capturing mosquitoes.

Apparatus for despatching mosquitoes.

Apparatus for hatching out mosquitoes.

Apparatus for hatching out mosquito from single larva.

Culex egg rafts in phial. (Larval skin and pupæ skins of Megarhinus splendens in phials). (Live larvæ of Megarhinus splendens).

Anopheline mosquitoes pinned in tubes.
A. tesselatus
A. minimus

Culicine mosquitoes pinned in tubes.
C. fatigans
C. mimeticus
C. bitæniorhynchus
Aedes albopictus
Armigeres obturbans.
Megarhinus splendens

Drawing of wing of mosquito, head & palps of Anopheline ♂ & ♀, Culicine ♂ & ♀, Megarhinus splendens ♂.

Drawing of syphon of Tæniorhychus showing its peculiarities.

Drawings of dissections showing midgut, hindgut, ovaries and spermatheca of mosquito.

EXHIBITS UNDER MICROSCOPE.

Culicine egg raft in aluminum ring on slide.
Culicine egg raft teased out.
Eggs of Aedes albopictus.
Anopheline eggs.
Ova of Mansonia uniformis.
Culicine larva showing syphon.
Mansonia larvæ showing modified syphon.
Anopheline larva showing spiracle on 8th segment.
Skin of larva of Megarhinus splendens showing mouth rakes.
Dissection showing midgut, ovaries and spermathica.
Salivary glands of mosquito.
Male genitalia of Armigeres obturbans.

Exhibits under Entomological Microscope.

Aedes albopictus showing scutellum.
Mansonia uniformis showing peculiar wing scales.
A. maculatus.
Theobaldia annulata (male) showing spatulate palps and clumps of dark scales on wings.

THE INTER-RELATION OF ORGANS IN DISEASE

by

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The progress of modern knowledge of physiology has shown that the functions of many organs are correlated in a wonderful manner by a variety of mechanisms. It has long been known that the nervous system plays a very important part in many diseases and a familiar instance of this is afforded by the relationship existing between the onset of pneumonia or pleurisy with abdominal pain and tenderness together with vomiting. This is especially the case when the disease involves the lower part of the thoracic chamber, and it is well known that symptoms simulating appendicitis are not very uncommon in cases of right-sided basal pneumonia. It is probable that the occurrence of these abdominal symptoms is sometimes dependent on the thoracic inflammation involving the lower intercostal nerves and so producing a neuritis which shows itself clinically by pain and tenderness over the area of cutaneous distribution of such nerves. In such instances as these it is clear that the inter-relationship of the thoracic and abdominal organs is not real, but is one simply associated with the distribution of a particular nerve or nerves.

Another familiar and important illustration is the pain in the neck and shoulder that is experienced in many inflammatory processes involving the upper or under surface of the diaphragm, and such as is seen in cases of pleurisy, pericarditis, peritonitis and abscess of the liver. The diaphragm is supplied from the same region of the cord as that supplying the skin over the neck and shoulder. The sensory phenomena produced in this segment of the cord by the irritation of the nerve endings in the diaphragm are erroneously interpreted by the nervous system as having been produced in the peripheral cutaneous area. Anginal pains down the arm in morbus cordis and sciatica-like pains down the legs in prostatic, uterine and other pelvic diseases all fall into the same category.

Again, referred pain is afforded by the frequent association of headache with ocular diseases, and more especially with errors of refraction, in fact, the latter may be looked upon as one of the commonest causes of headache. In all this great class of cases the inter-relationship is really simply dependent on reflex effects produced through the nervous system, the distribution of these being determined by the representation of the visceral and cutaneous areas in the nervous system.

Malignant diseases afford many illustrations of an apparent relationship existing between different organs. Thus, many patients,

who come under observation with malignant disease of the liver, present no symptoms of the involvement of other organs, and yet the malignant disease of the liver is really secondary to a primary deposit in the rectum, the stomach, the lower end of the œsophagus or the pancreas, etc. In cancer of the stomach secondary growths are necessarily common in the liver from purely anatomical reasons, but in some instances of primary cancer of the stomach there is a widespread deposit of secondary growths in the peritoneum.

The many undoubted instances of the definite Inter-Relation of Organs in Disease may be classified under the following headings:—

1. ANATOMICAL.—In many instances the inter-relationship between the affections of different organs may be explained on purely anatomical grounds, although even in such cases the striking effects produced clinically by the inter-relationship are often in part dependent on the original primary malady running a more or less latent course. Numerous diseases afford illustrations of this. Abscess of the liver and actinomycotic deposits in this organ are frequently associated with the lesions of an ulcerative or actinomycotic type in some other portion of the intestine, such, for instance, as the cæcum, and vermiform appendix, but the primary lesion may produce only trivial effects, or in some instances may have actually healed and the secondary process associated with it may alone have undergone development. In all these instances the inter-relation is a purely anatomical one and dependent on the anatomy of the nervous or lymphatic system.

The well known association of cerebral abscess with ear disease is also to be accounted for on anatomical grounds, the morbid process in the ear spreading in such a manner as to produce thrombotic or embolic effects in the vessels supplying the cerebral cortex and the infecting agent thus reaching the cerebral circulation is enabled to produce an abscess.

Many other illustrations might be quoted of the inter-relationship depending on mere anatomical effects. and the growth of aneurisms both in the thorax and the abdomen afford many examples of pressure symptoms.

2. PHYSIOLOGICAL.—Very striking instances of the inter-relationship of organs dependent, not on anatomical, but on physiological causes are afforded by diseases. The most convincing of these are perhaps seen in the diseases of the thyroid, the suprarenal and the generative glands, and in all cases the inter-relationship would seem to depend on pathological processes involving the activity of the internal secretions of these glands.

Morbid process involving the ovary may be accompanied by changes in the mammary gland, and it is not uncommon for the latter

to undergo some degree of enlargement in association with the development of ovarian tumours. Some authorities have considered that the influence whatever its nature may be, exerted by the ovaries may be followed, not only by atrophic processes in the mammary glands, but is even capable of influencing the progress of such a serious disease as mammary carcinoma.

A premature menopause may be of course brought about by removal of the ovaries owing to the very direct relationship existing between these structures and the uterus, and in some instances serious mental disturbance has accompanied this premature menopause.

In the male many of these effects are not so well marked, with the exception of those following castration, but prostatectomy is said to be followed by atrophy of the testicle.

Thyroid.—Diseases of the thyroid are accompanied by widespread effects on other organs of the body, more especially on the heart, circulation and nervous system. Further, exophthalmic goitre is almost invariably accompanied by persistence and enlargement of the thymus. In the case of the thyroid the evidence is peculiarly definite, owing to the fact that more or less opposite effects are seen as regards the nervous system and the circulation in cases where the gland is hypertrophied to those observed where it is atrophied. In the hypertrophy accompanying exophthalmic goitre, restlessness, excitement and even mania are not uncommon. The activity of the heart is quickened, the organ itself enlarged, and there is a greater or less tendency to general vaso-dilatation. In myxœdema where the gland is atrophied the mental faculties are dulled, apathy is marked, the circulation is slow and the skin is dry. Further, it may be added that in the latter disease the temperature is usually subnormal, whereas in the former pyrexia, unaccompanied by obvious inflammatory processes, is common.

Suprarenals.—The weakness, and especially the weakness of the circulating system, that occurs in Addison's disease may be looked upon as dependent on the diminution or arrest of the internal secretion of this gland. This conclusion is justifiable, inasmuch as the gland has not only undergone degenerative changes, but the active constricting substance, adrenalin, has been shown to be absent in this disease. The pigmentation of Addison's disease has been supposed by some writers to be the fault of the irritative lesions of the abdominal sympathetic produced by the chronic inflammation and consequent matting together of the fibrous tissue surrounding these glands.

3. SPECIFIC SELECTION.—The inter-relationship seen in some diseases is dependent not on some real inter-reationship between the organs affected but rather on what may be called some specific selection on the part of the morbid agent. The involvement of the valves of the heart in acute rheumatism affords a good illustration of this. The

rheumatic virus apparently has a selective affinity for fibrous structures, and the involvement of the cardiac valves in the rheumatic process probably depends chiefly on this fact, assisted perhaps by the physiological fact that the cardiac valves cannot be kept at rest in the same way that an affected joint can and therefore are unfavourably situated in case they are attacked.

4. CONGENITAL ANOMALIES.—Congenital anomalies are not only frequently answerable for the production of diseases but sometimes for the association of morbid processes, thus anencephalic fœtuses present great enlargement and hypertrophy of the suprarenal bodies, but one of the most important illustrations of such inter-relationship is afforded by renal anomalies. Displacements of the kidney of congenital origin are often associated with malformations of the large intestine, and an extreme form of this is seen where the kidney is displaced in the pelvis and associated with imperforate anus.

5. PATHOLOGICAL.—The most common as well as the most important cause of inter-relationship between the affections of distant organs is afforded by pathological processes themselves. In many instances it would seem that these effects even when present in a part of the body distant from that originally affected, may be dependent, in a large part at any rate on mechanical or physical reasons. One of the simplest of such effects is the occurrence of varicocele on the left side as a result of tumours of the kidney interfering with the circulation in the spermatic vein.

The relation of cardiac hypertrophy to arterial and to renal disease may also be in part attributed to physical and chemical effects, and this inter-relationship between the heart, the arterial system and the kidneys is one of the utmost importance to the practitioner from the fact that heart disease arising secondarily from renal disease is very apt to be confused clinically with a primary affection of the heart. This is a matter of considerable practical importance owing to the prognosis and complications, and, in fact, the whole course of the malady being different in the two conditions.

The occurrence of cardiac hypertrophy to a marked extent in exophthalmic goitre is also a fact of considerable clinical importance, as the cardiac signs and symptoms are not only the most constant of the effects seen in this disease, but they are not infrequently the initial manifestations, and further they may reach a high degree of development without any correspondingly great increase in size of the thyroid body or the presence of any marked ocular signs.

The hepatic enlargement that is apt to occur in morbus cordis, especially in mitral disease, is another important illustration of mechanical effects produced in the course of disease. The hepatic enlargement may not only occur, but its effects may be the cause of

the patient seeking advice, and it is not uncommon for patients suffering from valvular disease of the heart to come under observation on account of ascites rather than for general dropsy or ordinary cardiac symptoms. A somewhat analogous condition is seen in the great splenic enlargement that sometimes occurs in anomalous cases of hepatic cirrhosis, the size of the spleen rivalling that seen in splenic anæmia and in some forms of leukæmia and malaria.

In many instances the undoubted inter-relationship existing between different organs is dependent on the original morbid process producing a lowered resistance, although it must be admitted that this does not entirely explain why certain complications are especially associated with certain diseases. Cirrhosis of the liver is very liable to be complicated by tuberculosis of the peritoneum or lungs, and here again the effects are usually regarded as due to lowered resistance.

The association of lesion of the bladder with the lower urinary tract on the one hand and with renal diseases on the other is a relationship dependent in part on anatomical and mechanical causes and in part on lowered resistance. Thus the lower urinary tract may be infected from the kidney, and tuberculous disease of the genito-urinary tract affords a good illustration of this, as in a considerable proportion of cases the infection is a descending one, and the presence of tuberculous disease in the lowered urinary tract is dependent on the excretion of tubercle bacilli in the urine. The ascending infections which may occur in tubercle, and which frequently occur as a result of cystitis, prostatic disease, etc., are dependent on the infection reaching the kidney either through dilated ureters or else by ascent through the lymphatics.

One of the best instances of a morbid process producing a lowered resistance and in that way leading to secondary infections is afforded by the occurrence of carbuncles, and other inflammatory infections of the skin in glycosuria and diabetes.

There are a number of instances of the inter-relation of morbid processes where the factor determining the distribution of the lesions is by no means clear. Thus in a number of blood diseases, especially pernicious anæmia and leukæmia, certain columns of the cord, especially the posterior and the lateral, are liable to undergo degeneration, producing effects not unlike those seen in lateral sclerosis and in tabes. These results are by no means rare in these maladies and are not to be imputed to the drugs used in the treatment, as for instance arsenic, but would seem to be definitely related to the morbid process itself. There is no evidence at the present time which will afford an adequate explanation of the occurrence of these complications.

It is the sincere hope of the writer of the above article that other clinicians interested in this theme of observation in diseases will advance further theories and shed more light onto this subject.

A SHORT NOTE ON THE TREATMENT OF SUPPURATED SEBACEOUS CYST.

by

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Sebaceous cyst, as it is, is one of the simplest forms of surgical diseases. In a clinic it is the usual practice to hand over cases of this nature of the House Surgeon for his exercise. Hence the teachers of surgery have scarcely a chance to see a case of sebaceous cyst and at the same time the condition is considered to be too insignificant for them to make a remark on. Very little information of it, if not misguiding ones, can thus be obtained from the various text books. On the other hand, the outside medical practitioner has often got to deal with cases of sebaceous cyst himself as this disease is of such common occurence and the condition is too trivial to warrant the summoning of a specialist to his assistance. Yet it gives more than annoyance to the person who, as it quite often happens, finds that his patient comes back with reproachfulness to consult him again about the recurrence of the trivial and insignificant malady which he treated before. The method advocated for the treatment of suppurated sebaceous cyst in this note is based on the writer's personal experience on a small number of cases only, hence his mind is still open as regards the proper procedure to be adopted and he welcomes suggestions and comments.

It can be taken for granted that the best treatment for simple and uncomplicated cases of sebaceous cyst is to excise the cyst with or without taking away a little of the redundant skin. It may also be pointed out that the cyst should better be dissected out within its capsule and on no account should the cyst be allowed to burst before the dissection is completed.

If suppuration has already taken place the above treatment can not be applied owing to the practical impossibility to excise the cyst within its capsule without bursting it, since in the case of suppuration the cyst wall is found to be very pliable and the greater part of it is destroyed. If excision is to be performed it has to be done widely which is unjustifiable, besides, there is the danger of sepsis due to the formation of a big wound round an infected area resulting from this operation. A mere incision and drainage will usually mean a further operation to get rid of what is left behind. If the wound heals at all there is always the possibility of recurrence, owing to the fact that some epithelial cells might be buried underneath the skin. It can be argued that incision plus scraping might get rid of whatever epithelial element that is left behind if the inflammation has not destroyed all the cyst lining yet. But the scraping of infected tissue always carries with it the danger of spreading the infection and there is actually no way to be sure of get-

ting rid of all the epithelial cells in the cyst short of an excision of the tumour. Theoretically a single cell left behind is capable of giving rise to a fresh cystic growth in future.

The writer has found that by taking away an elliptical piece of skin and cyst wall over the most prominent part of the suppurated cyst and leaving the wound open after washing away the cyst contents, he was able to get the wound to heal in an amazingly rapid time with no fear of any chance of recurrence. It has been observed that in the cases thus treated the wound shrinks very rapidly in size and in a few days' time it is actually reduced to a lineal wound the base of which is covered not by granulation tissue but by epithelialised tissue and the wound when healed presents a lineal scar only. The result is thought to be due to the fact that, while leaving the wound open, it is actually "skin grafted" by the epithelial cells left undestroyed by the inflammation. The edge of the cyst wall will then be joined to the skin and the cyst wall is actually everted to form the epithelial covering of the scar. The shrinkage of the wound is perhaps due to the main portion of the epithelial lining of the cyst having been destroyed by the inflammatory process. Recurrence is impossible as there is no chance for any epithelium to get buried. The operative procedure involved is very minor in degree and the danger of spreading infection is also minimised. As regards the amount of skin to be taken away it is rather difficult to lay down any rule, but it may be safely said that after the ellipse is taken away the edges of the wound should be just short of coming together and thus made impossible for any attempt of primary union to take place. On the other hand the taking away of too much skin will do no harm but the wound will not heal up so quickly and the ultimate scar will be larger than it should be. It has to be pointed out again that the majority of the epithelial cells are actually destroyed by the inflammation hence it is unnecessary to take away too much of the overlying skin in order to have the desired effect produced.

To summarise it, it may be said that the taking away of an ellipse of skin and cyst wall has been practiced for suppurated sebaceous cyst with satisfactory results. It consists of a very simple procedure for the cure of the affection. Recurrence is prevented by the bringing of the bottom of the wound to the surface. The wound heals up more readily than expected and the chance of sepsis is minimised.

Notes and Comments.

We print below a list of the new appointments made to fill the posts of House Officers at the Government Civil Hospital from July 1st to December 31st, 1932.

We are also publishing a complete list of the examination results of the Degree Examinations held in May 1932, and in doing so we take this opportunity of offering those successful candidates our heartiest congratulations.

HOUSE OFFICERS.

Clinical Assistant to the Medical Unit .....Dr. Wong Hok Nin
Clinical Assistant to the Surgical Unit .....Dr. Tsai Ai Le
Clinical Assistant to the Obstetrical & Gyæcological Unit .....Dr. Lam Shiu Kwong
House Physician .....Dr. Ling Ke-dieh
House Surgeon .....Dr. Ling Tsoong Kya
House Obstetrician .....Dr. Cheng Hung Yue
Out-Patient Officer .....Dr. Khoo Fun Yong

EXAMINATION RESULTS.

The following have completed the FINAL M.B., B.S. EXAMINATION :—

Lien Tsoong Kya
Chan Wah
Kho Han Po
Khoo Fun Yong
Lam Shiu Chun
Law Nai Koey
Lim Poh Sim
Teo Soon Wan
Tsai Ai Le
Wong Hok Nin
Yeoh Guan Eng

The following have passed in MEDICINE in the FINAL EXAMINATION :—

Chan Wah
Kho Han Po
Khoo Fun Yong
Lam Shiu Chun
Law Nai Koey
Teo Soon Wan
Tsai Ai Le
Wong Hok Nin
Yeoh Guan Eng
Yip Yuet Fong

The folliwing have passed in SURGERY in the FINAL EXAMINATION :—

Lam Shiu Chun
Law Nai Koey
Lee Shiu Kee
Li Ching Wa
Lien Tsoong Kya
Lim Nget Siew
Lim Poh Sim
Ng Tin Fong
Tan Liang Hwat
Tsai Ai Le

The following have passed in OBSTETRICS & GYNÆCOLOGY in the FINAL EXAMINATION :—

Khoo Fun Yong
Law Nai Koey
Lee Shiu Kee
Lee Ching Wa
Lim Nget Siew
Ng Tin Fong
Wong Hok Nin
Yeoh Guan Eng

The following have passed in MEDICAL JURISPRUDENCE & PUBLIC HEALTH :—

Bee Hoat Teck
Hui Luk Yip—Miss
Lee Ho Tin
Loke Kam Thong
Teo Thean Ming
Tsu Tsoong Ji
Wong Siong Hing
Ng Tin Fong
Ng Yeok Kin
Tseng Wah Kit
Wong Hok Nin
Yip Yuet Fong

The following have passed in PATHOLOGY & BACTERIOLOGY :—

Bee Hoat Teck
Hui Luk Yip—Miss
Lee Ho Tin
Loke Kam Thong
Teoh Thean Ming
Tsu Tsoong Ji
Wong Siong Hing
Chan Fook
Ho Suk Yee
Law Nai Koey
Ng Ting Fong
Ng Yeok Kin
Tsan Wei Chean
Wong Hok Nin

The following have passed in THERAPEUTICS & PHARMACY :—

Bee Hoat Teck
Lee Ho Tin
Loke Kam Thong
Teoh Thean Ming
Wong Siong Hing

The following have passed in SENIOR ANATOMY & PHYSIOLOGY including PHARMACOLOGY :—

Chan Seck Fong
Leong, R. E. G.
Nagalingam, K.
Ong Ewe Hin
Szeto Eng Kee

The following have passed in PHARMACOLOGY (OLD REGULATIONS) :—

Lau Yong Boon
Lo Chong Fie
Sung Sheung Hei

The following have passed in ELEMENTARY ANATOMY & PHYSIOLOGY :—

Choong Gim Seong
Gosano, E. L.
Kan Lai To
Kho Pek Po
Koppe, E.
Ng Yew Seng
Teng Pin Hui
T'so Lai Ki—Miss
Yang Ke
Yeung Wai Wah

The following have passed in ORGANIC & PHYSICAL CHEMISTRY :—

Koppe, E.
Ng Yew Seng
Yang Ke
Yeung Wai Wah

The following passed in PHYSICS :—

Khoo Soo Lat
Koe Kheng Loke
Lee Ching-Iu
Lim Yew Poh
Ooi Kee Wan
Sie Tjoan Djin
Tan Eng Gwan
Tan Peng Cheow
Wong Ching Kuen

The following have passed in INORGANIC CHEMISTRY :—

Ampalavanar, T.
Chew Choon Hock
Heng, Willie
Khoo Soo Lat
Koe Kheng Loke
Lee Ek Leong
Ng Bow Kwee
Ong Keng Seng
Ribeiro, G. A. V.
Tan Eng Gwan

The following have pased in BIOLOGY :—

Chew Choon Hock
Heng, Willie
Koe Kheng Loke
Lee Ching-Iu
Ng Bow Kwee
Ong Keng Seng
Ribeiro, G. A. V.
Tan Eng Gwan

Review of Books.

"*Reports, National Quarantine Service Series II 1931.*" Edited by Wu Lien Teh & Wu Chang Yao.

This report is the second that has come to hand from this recently organised service, a fact which in itself shows that China is in earnest over this venture. Most of the aspects of quarantine service are touched on, beginning with a history, and ending with an elaborate and efficient set of preliminary regulations which govern the service. The reports from the centres in Canton, Amoy, Swatow, etc., already make interesting reading, as does the detailed and searching report on the Cholera outbreak in Shanghai in 1931. Such an outbreak was a great test for the new service and a test which found the service more than competent. One cannot refrain from heartily commending the directors for the virility already shown and wisdom in their three-year plan. It is cerain that the next few years will see China in possession of one of the most up to date and ambitious Quarantine Service in the world, and it would be a great thing for our University if in addition to one of our LL.D.'s being its Director, many of our M.B's were to be found doing honest and important work as some of its officers.

"*Bailliere's Synthetic Anatomy.*" Parts 1—12 and Binding Case, 7½" × " 156 plates. 42/- net.

Bailliere Tindall & Cox,

7-8, Henrietta St. Convent Garden, London.

With the publication of Part X. "The Brain" this unique and ingenious aid to learning Anatomy, is now put on the market complete with a neat red binding case. Each part is arranged in order but they may be taken out and used separately. Along with each part is a printed sheet explaining to what various uses the transparent drawings may be put.

Each figure can be used by itself or in conjunction with figures above or below it giving a remarkable appearance of perspective. Especially is the great help demonstrated in the figure of the muscles in the forearm, or the attachment of muscles and ligaments in the hand and foot. Some specially important and intricate parts of the body have been honoured by enlargement, but as explained in the text, with the aid of some squared paper an enlargement of any part can be made with accuracy and detail by the student himself.

The fact that the completed edition has already been translated into French, German, Italian and Spanish must mark it out as one of the Anatomical events of the year, and any student who is keen on getting some help at visualising his body and dissections, could not do better than equip himself with the Synthetic Anatomy.

Acknowledgements.

Bulletin of the New York Academy of Medicine.
Japanese Journal of Experimtntal Medicine.
University of Durham Medicine Gazete.
St. Mary's Hospital Gazette.
Okayama Igakkai Zasshi.
Fukuoka Ikwadaigaku Zasshi.
The Hospital.
Queen's Medical Journal.
Post Graduate Medical Journal.
Revue Medicale Roumaine.
Birmingham Medical Review.
The Ulster Medical Journal.
Societe des Science Medicales.
Health & Empire.
University College Hospital Magazine.

The Bristol Medico-Chirurgical Journal.
Acta Pathologica et Microbiologica Scandinavica Supplementum.
Moukden Medical College Journal.
New Zealand Medical Journal.
Journal of Bone & Joint Surgery.
St. Bartholomew Hospital Journal.
Medical Journal of Australia.