A DISCUSSION OF CERTAIN EAR, NOSE AND THROAT OPERATIONS AS PERFORMED IN BOSTON

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The aim of this paper is to put on record a number of operative procedures which have originated in Boston, most of which I have seen employed during my year's stay in that city. They were new to me. Some of them are familiar to you, and you perhaps are using them. New methods of treatment furnish a method of checking up old methods and the results of old methods make it possible to judge the success of new methods.

I shall speak in all of eight different methods, namely: the intranasal approach to the nasofrontal duct; the Mosher-Toti tear sac operation; the physiology and pathology of the lower end of the esophagus; asymmetry of the mouth of the esophagus and retropharyngeal diverticulum; the open method of treating malignant disease of the accessory sinuses; the wire gauze brain drain; the paraffin gauze basket for applying a skin graft to the radical mastoid cavity; and the Manometer test in thrombosis of the lateral sinuses. Of these eight methods, seven of them were either invented or modified by Dr. Mosher and one—the Manometer Test—was developed by Drs. Tobey and Ayer.

1. The Intranasal Approach to the Nasofrontal Duct:

About fifteen years ago Mosher showed the relationship of the nasofrontal duct to the posterior surface of the ascending process of the superior maxilla. This anatomical point has proved of great value in the surgery of the anterior ethmoidal cells. It has remained the surest method which we have ever had of finding the nasofrontal duct.
The necessity of finding the nasofrontal duct usually occurs in connection with acute or chronic infection of the frontal sinus, especially chronic infection. The first procedure in connection with the treatment of chronic infection of the frontal sinus is exenteration of the anterior ethmoidal cells, at the same time obliterating the intranasal course of the nasofrontal duct. (Fig. 1)

In the great majority of cases the nasal duct is short, hardly a duct at all, emptying after a short course into the middle meatus just above the blind end of the unciform groove. In only a small percentage is the drainage channel of the frontal sinus continuous with the unciform groove and so a real duct.

The Procedure: First of all the chin of the patient should be tipped upward so that the operator can get a good view of the anterior end of the middle turbinate and as much of the superior turbinate as possible. The point of attack is the agger nasi cell, if it is present and its mound can be recognized; if not, the upper anterior part of the middle turbinate. The external landmark for this point is the inner canthus of the eye. It is useful to lay the curette on the side of the patient’s nose and to measure off on it the distance from the inner canthus of the eye to the lower edge of the ala cartilage close to the cheek. By using an ordinary mastoid curette, with a long handle and a bowl about half a centimeter wide, the agger nasi cell is engaged and opened toward the lacrimal bone. A common mistake is not to go high enough on the middle turbinate and far enough back. After the curette has entered the cell, it has an allowable outward excursion varying from a half a centimeter to a centimeter and a half. If it is carried too far it enters the orbit. After entering the agger nasi cell or the anterior part of the ethmoidal labyrinth, the curette is then turned forward and brought against the posterior surface of the ascending process of the superior maxilla. When this has been done, the lower ostium of the duct is opened. An ordinary catheter is carried along the posterior surface of the ascending process of the superior maxilla upward into the frontal sinus. This succeeds in ninety per cent of cases.

2. The Mosher-Toti Tear Sac Operation:

You are all familiar with the operation on the tear sac carried out by the intranasal route. The best intranasal operation is West’s, the other intranasal operations being founded on this one. The intranasal operation has been successful in curing dacryocystitis. The intranasal operation, however, approaches the sac from around a corner. It may be very blind and the operator may lose his orientation. For these reasons Mosher, after developing an intranasal operation on the tear sac and using it successfully a number of times, gave it up in favor of
the external operation because in his last case the orbit was infected resulting in an orbital abscess and a very large ulcer of the cornea.

Mosher then turned to the external operation and developed a modification of the Toti operation. The great advantage of this is that it is done by sight and not in the dark. In a series of cases, covering six or seven years and numbering nearly two hundred patients, pus and epithora have been cured in eighty per cent.

The Applied Anatomy of the Lacrimal Sac: A successful operation depends upon the knowledge of the applied anatomy of the lacrimal sac and the surrounding anatomical structures. I shall give first a summary of the anatomy dealt with in the operation. In the adult the average size of the lacrimal fossa is ten by fourteen millimeters (10x14 mm). The posterior half of the fossa is made by the anterior part of the lacrimal bone, that is, by the portion of the lacrimal bone which is in front of the lacrimal crest. The anterior half of the fossa is made by the posterior edge of the ascending process of the superior maxilla. The posterior half where it is made by the lacrimal bone is an easy approach to the anterior ethmoidal cells. One of the anterior ethmoidal cells—lacrimal cell—overlaps a part of the fossa. In series with the lacrimal cell, and in front of it, another cell called the agger nasi cell, is often found. This cell like the lacrimal cell overlies a part of the bed of the lacrimal sac. It extends forward and also overlies the protuberance on the inner surface of the ascending process of the superior maxilla called the agger nasi. These two cells are found on the outer wall of the middle meatus and of course are overlain by the anterior end of the middle turbinate. In entering the nose from the orbit through the bed of the lacrimal sac one or both of the cells just mentioned must be opened. (Fig. 2)

The Mosher-Toti or the Combined Internal and External Operation.

1. Intranasal Procedures: The intranasal part of the operation consists in removing the anterior tip of the middle turbinate and the correction of a high deviation of the septum if this is present. These two minor operations can be done previously; if so done the bleeding is much reduced at the operation on the sac.


Half way between the inner canthus of the eye and the external border of the nasal bone a vertical incision is made beginning above at the level of the summit of the globe of the eye. The incision varies from three quarters of an inch to an inch in length (¾ to 1 inch). It is carried to the bone throughout its whole length. The soft tissues, the palpebral ligament, and the periosteum are separated
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from the ascending process of the superior maxilla by using a flat chisel. The subcutaneous tissues on the nose are undisturbed.

The Second Step: Turning the Sac out of its Bed: (Fig. 3)

The sac is turned out of its bed by using a flat chisel. This is introduced into the orbit above the sac and the periosteum is elevated from above downward and from before backward. The elevation of the periosteum is continued backward a little beyond the crest of the lacrimal bone and downward until the sac is turned from its bed and the beginning of the nasal duct is seen. This amount of elevation of the periosteum is necessary to allow the sac to be turned well outward.

The Third Step: Making the Nasal Opening:

The third step consists in making an opening into the nose. This is done by forcing a conchotome through the posterior part of the bed of the sac. This opening is enlarged especially forward on to the ascending process of the superior maxilla. It is finished with a stronger punch of the Kerrison type. The opening in both diameters should be a little larger than the sac. In making the opening into the nose no attempt is made to save the nasal mucous membrane. This is punched through along with the bone. When the nasal opening is sufficiently enlarged the tags of the nasal mucous membrane are trimmed flush with the bony opening. At this time the remaining anterior ethmoidal cells and what is left of the anterior tip of the middle turbinate are removed. This may be done with the conchotome through the nose or by inserting it into the nose from the opening of the orbit.

The Fourth Step: The Removal of the Inner Wall of the Sac:

This is best accomplished by making a vertical incision along the full length of the anterior margin of the sac while the inner wall is pulled inward by using a small forceps. From the top of this incision and making a right angle with it, a second incision is carried horizontally backward across the summit of the sac. The inner wall is turned backward as a flap and can be cut off from above downward parallel to the posterior edge of the sac. If the two walls of the sac are adherent a probe passed through the canaliculus into the sac is a great help in starting the first incision. (Fig. 4)

The Fifth Step: The Closure of the Wound:

If there is very much bleeding from the ethmoidal region the upper part of the nose is lightly packed with vaseline gauze. Often no packing is used. Before closing the incision, the anterior edge of the
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Sac is sutured to the cut edge of the periosteum over the nasal bone. The skin incision is closed in the ordinary way. The eye is cleaned and the lids are anointed. The eye and the wound are covered with a sterile dressing. The post operative treatment is the usual treatment of a surgical wound.

3. and 4. The Physiology and Pathology of the Lower End of the Esophagus: Asymmetry of the Mouth of the Esophagus and Retropharyngeal Diverticulum:

You may be surprised that I discuss the subjects just mentioned when I am supposed to deal with the technique of operations. Most of these conditions were made out clinically by examinations with the fluoroscope and esophagoscope, and are treated by means of the esophagoscope. The diagnosis is more complicated than the treatment. Therefore these subjects are discussed here.

The Physiology and Pathology of the Lower End of the Esophagus:

The physiology of the esophagus is simple. It carries food to the stomach. When, however, we remember what organs surround it, especially the relation of the lung tips to the terminal portion, we see that alterations in the esophagus might be caused by pressure or by the transfer of infection. This has actually been found clinically to occur.

The Anatomy of the Lower End of the Esophagus:

The esophagus from the sixth cervical vertebra downward is placed on the spinal column a little to the left of the middle line. The descending aorta and the left crus of the diaphragm are behind the terminal portion. The lung tips practically surround the terminal portion of the esophagus. (Fig. 5)

The anterior crus of the diaphragm and the posterior surface of the left lobe of the liver are in front. The terminal portion of the esophagus has the liver on the right, in front, and often the liver edge hooks round and indents the left border of the esophagus. The esophagus, therefore runs through a tunnel of liver (liver tunnel). Between the liver and the esophagus are the crura of the diaphragm. These line the liver tunnel and make what is called the cone of the diaphragm. The cone of the diaphragm acts as a sleeve to hold the terminal portion of the esophagus in place. If the liver tunnel is narrow the terminal portion of the esophagus is cone shaped. When the liver pressure is less, the esophagus opens freely into the stomach. The esophagus enters the stomach opposite the eleventh thoracic vertebra. Its diameter in this region is twenty-three millimeters.
(23 mm). It is connected to the lungs, the pulmonary ligament, and the lung tips by connective tissues. The lung tips expand in the cone of the diaphragm in pockets made for them behind the pericardium.

The Physiology of the Lower End of the Esophagus:

The act of swallowing is divided into two phases. The second or esophageal phases last six seconds. In swallowing, the upper end of the esophagus follows the larynx and the hyoid bone upward, the excursion being about an inch. When the diaphragm ascends, the terminal portion of the esophagus also ascends about an inch and bends slightly to the right. The terminal portion of the esophagus bends on itself from right to left in the cone of the diaphragm. The point where this twist occurs is a favorite place for strictures and webs. The axis of the greater portion of the esophagus is transverse but at the terminal portion within the cone of the diaphragm, the pressure of the lung tips changes the axis of the esophagus to anteroposterior, the change in axis occurring just above the point where the esophagus twists on itself to the left.

When the lung tips are watched during inflation through the fluoroscope they seem to close the lower end of the esophagus during the first half of the descent of the diaphragm. When the diaphragm is fully down, the lung tips cease to press on the esophagus and the esophagus is seen to open and the barium contents flow freely into the stomach.

Plates taken of the esophagus when the diaphragm is up show that the normal twist of the esophagus is restored and that the esophagus comes to a cone-like point. This has often been taken for a stricture. When the diaphragm is down, the twist is resolved or untwisted and food enters the stomach freely. Also when the diaphragm is down, the esophagus is free from liver pressure.

Cardio-spasm: In the Boston clinics obstruction of the esophagus due to spasm (cardio-spasm) is seldom or never found. The great majority of cases so far examined have been found to be due to a stricture of some degree.

A web-like stricture at the point where the esophagus twists on itself often causes very great obstruction. Often a patient with this condition enters the hospital practically starving. Dilatation or division of the web restores normal swallowing within a week or ten days. These cases are very dramatic and most satisfactory.

Another cause of the obstruction of the terminal portion of the esophagus is twist. In these cases the diaphragm is generally ptotic and the esophagus is without the support of the cone of the diaphragm.
Fig. No. 1. Showing the duct indicated by the dotted lines. The agger nasi cell has been opened with a probe inserted into the frontal sinus.

Fig. No. 2. Of the inner wall of the orbit. The lacrimal bone has been removed, exposing the anatomical structures as shown above.
Orest of lachrymal bone.

Fig. No. 3. Second stage of the operation showing the lacrimal sac dissected from its bed.

Fig. No. 4. to show the bony opening and the removal of the inner wall of the sac.
Fig. No. 5. Drawing from a vertical section of a specimen to show the anatomical points of the esophagus seen from behind. The esophagus located in front of the left crus is indicated by the dotted lines. Notice the intimate relationship of the esophagus with its surrounding organs.

Fig. No. 6. Showing the views of a postcricoid web. The upper one shows the web as it was first seen. The middle and lower ones show the web as it was stretched by strong ballooning. On the left the round knob is the remnant of a web which was broken by passing of a bougie sixteen years ago.
Fig. No. 7. (1) Specimen of a larynx and the upper end of the esophagus showing the size and shape at the beginning of the esophagus. (2) Web of the esophagus. Specimen shows a single web springing from the upper rim of the posterior surface of the cricoid cartilage a little to the right of the median line. Notice the opening of the esophagus which is found to the left of the web.

Fig. No. 8. Tracing from a X-ray film. This film is the lateral view of a small pouch of the esophagus. Notice that the opening of the esophagus is on the top of the pouch.
Fig. No. 9. Showing the wire drain with beveled plunger and grooved director.

Fig. No. 10. Showing the crucial incision of the dura. The black sutures have been passed through each dural flap.
Fig. No. 11. To show the wire drain inserted and anchored by the sutures of the dural flaps.

Figure No. 12 shows the paraffin basket in place in the radical cavity. The dark spots in the upper part of the figure represent the antrum and the middle ear. The sharp, curved line on the left represents the mould fitting down over the facial ridge.
Accordingly the terminal portion twists and turns on the flat diaphragm. In these cases stricture is ruled out because a large esophagoscope passes readily into the stomach and a large bougie (30 to 40 f.) can be passed without difficulty. No relief follows either procedure. The treatment of these cases so far is unsatisfactory because there is no way to keep the twist untwisted. It is becoming more probable that the change in the axis of the esophagus caused by the pressure of the lung tips is a large factor in starting these twists.

Any lower thoracic infection may result in partial obstruction of the lung triangles (the pocket behind the heart into which the lung tips expand), and infection at this point may be transferred to the esophagus. For instance three cases of string-like stricture of the terminal portion have been found which were due to tuberculosis. Similar cases have been found due to basal pleurisy accompanying influenza or pneumonia.

Upper abdominal infection is another cause of obstruction of the terminal portion of the esophagus, either by narrowing the liver tunnel or by adhesions. Dr. Greene has lately had a case in which the breaking up of an adhesion running from the under surface of the liver to the fundus of the stomach restored normal swallowing.

Cardio-spasm, therefore, as far as the experience of the Boston operators goes, is seldom due to spasm. It represents a number of conditions; usually the cause is a stricture at the point of the physiological twist. The strictures, also, may be due to pathology starting without the esophagus in the cone of the diaphragm. Twists of the terminal portion of the esophagus are also a cause of obstruction. Twists are probably started by the pressure of the lung tips. Abdominal adhesions are still another cause of obstruction of the esophagus. All of these causes used to be called cardio-spasm.

Asymmetry of the Mouth of the Esophagus and the Retropharyngeal Diverticulum:

Retropharyngeal diverticulum is a hernia of the mucous membrane of the esophagus through the weak triangle of the esophageal wall. This weak triangle is found on the posterior wall of the esophagus opposite the cricoid cartilage. It is caused by the fact that the longitudinal muscular fibres of the esophageal wall turn forward round the side of the esophagus at the upper end to gain an attachment to the median ridge of the cricoid cartilage. This leaves the circular muscular fibres of the esophageal wall unsupported by the longitudinal fibres and the weak triangle results. Retropharyngeal diverticulum is not usually a fatal disease. When the pouch grows to a considerable size, the patient has to live on liquids and often reaches a semi-starved
condition. The etiology of esophageal retropharyngeal diverticulum has long been unknown. Mosher has for many years suspected that there was an embryological factor back of this condition and recently has shown that this is very probable. In the embryo of the pig there are two retropharyngeal diverticula. The lower one persists during the life of the animal. It occurs in practically the same place in the pharynx that the esophageal diverticulum occurs in man. In human embryos of eleven and thirty millimeters (11 to 30 mm) two retropharyngeal diverticula also are found. Both disappear early but the lower pouch is practically in the same position that retropharyngeal diverticula are found. Whether this lower pouch persists to birth and afterwards becomes a real pouch in the adult cannot, of course, be proved. But it seems that there is an embryological tendency toward the formation of a pouch in man. This has been shown, as was said above, by Mosher and Boyden.

There is another possible cause of retropharyngeal diverticulum. This is asymmetry of the mouth of the esophagus. Mosher has shown that asymmetry of the mouth of the esophagus is present in the majority of cases of retropharyngeal diverticulum. In other words, in these cases the entrance of the esophagus is one-half the normal width and to one side of the median line. Associated with the narrowing of the esophagus there is a narrowing of the corresponding half of the pyriform sinus. This asymmetry of the mouth of the esophagus brings unequal pressure on the weak triangle of the posterior wall of the esophagus during swallowing. Owing to this, hernia of the esophageal membrane is started.

There is still another condition which may bring unequal pressure upon the weak triangle of the esophageal wall. This condition is the presence of a post-cricoid web. The etiology of such webs is somewhat obscure. Webs may be unilateral or bilateral. When unilateral, they are most often found on the right side. The web runs from any part of the posterior surface of the cricoid cartilage to the posterior surface of the esophageal wall. Such a web turns the pyriform sinus of that side into a very sizable pocket. The filling of this pocket during swallowing causes unequal pressure on the weak triangle of the esophageal wall. Mosher feels that bilateral webs are probably congenital. Unilateral webs may be caused by any infection which leads to ulceration of the esophageal mucous membrane. (Fig. 6)

Post-cricoid webs give a certain amount of trouble in swallowing. For instance when the patient eats, the pocket fills with fluid and the food or fluid overflows into the larynx causing spasm. The patient therefore dreads to eat and reduces his diet to the simplest form, generally liquids and soft foods.
Webs can be seen with the laryngeal speculum placed behind the cricoid cartilage and elevating it, or with a short esophagoscope. When the web has been cut away or divulsed the patient is restored to normal swallowing. The after treatment consists in passing a large bougie at intervals for a short period. (Fig. 7)

The x-ray will show the presence of a web, but as the web is situated in the pyriform sinus and attached to the cricoid cartilage it is necessary that the x-ray film should include the whole lateral view of the larynx. Failure to find webs in the x-ray film is almost always due to the fact that the film is taken too low and does not include the lateral view of the larynx.

Now and then a web is found at the lower edge of the cricoid cartilage which proves on examination to be a thin diaphragm with a small central opening. Such a web can cause semi-starvation. A web of this character is easily divulsed and the patient restored to normal swallowing.

5. The Open Method of Treating Malignant Disease of the Accessory Sinuses:

I think you will all agree that the Monre operation is the most satisfactory method for treating malignant disease of the accessory sinuses. However as the operation is usually done, the incision is sutured and allowed to heal. The Boston method purposely keeps the incision open in order to watch for recurrence and treat it by radium or diathermy. The Boston operators do not carry the incision through the middle of the lip as a routine. It has been found sufficient as a rule to stop the incision at the lower border of the alar cartilage. From the middle of the vertical incision a horizontal incision is carried outward to the center of the malar bone. At the end of the operation the triangular flap of the skin below the horizontal incision is turned in on the floor of the antrum and held by packing until it adheres. By this method a good sized opening is kept in the cheek. In this the patient wears a plug of gauze or a plug of dental compound moulded to fit. The patient is little disfigured by this dressing and soon gets accustomed to it. If after three years there has been no recurrence the fistula in the cheek is closed. In performing this operation the triangular flap of skin is dissected free from the base of the antrum and turned on itself so that the skin surface is inward. Then a flap from the cheek is brought over it. In this way the skin flap which closes the fistula has an inner lining of skin. (Fig. 8)

Post Operative Treatment:

After the excision of the tumor, the cavity is packed with gauze saturated with tincture of benzoin. This gauze can be removed in
twenty-four or eighty hours. The cavity can be then left empty in case there is no bleeding. Hereafter the cavity is kept clean with any ordinary dressing. In case there is a return of a suspicious lesion, this is treated with radium seeds. The dose of the radium is according to the size of the lesion. Usually the first dose is from three to five seeds (One millicurie) inserted about one centimeter apart. This treatment may be repeated after three weeks if necessary. The open method was originated by Mosher.

6. The Wire Gauze Brain Drain:

The wire gauze drain or the Mosher wire gauze cone is made of copper wire of fairly wide mesh. It is cone shaped and inserted with its plunger in place. The drain is suitable for use in practically all types of brain abscess. (Fig. 9)

Operative Method: This operation is usually done in two stages, rarely in one stage unless the patient is in a critical condition. The dura is exposed to a diameter of three centimeters at the place indicated by the symptoms. The cavity is packed with mercurochrome gauze for forty eight hours. Then the dura is opened with a crucial incision after passing black silk sutures through the tip of the dural flaps. (Fig. 10)

The operator should seek the abscess with a grooved director Gahill guide. This must be done very carefully and methodically. If the abscess is found, without permitting the grooved director to shift to the slightest degree, the drain with its plunger in place, is guided along the groove into the abscess. The director and plunger are removed. The dural sutures are passed through the wire mesh of the drain, so as to hold the drain in proper place. The drain is anchored still further with sutures through the skin edge. The wound is covered in the usual way. (Fig. 11)

Time of Removal of the Drain: In the first two weeks the drain should stay in place properly. If it becomes blocked with granulation, it may be curetted out gently. In the third week if the patient is in good condition it may be replaced by a rubber drain. A week later the rubber tube is also removed and a fistula is left. The fistula usually closes within ten days.

7. The Paraffin Mould for Applying a Skin Graft to the Radical Mastoid Cavity:

The purpose of using a paraffin gauze mould is to reduce the suffering of the patient from the post operative treatment and to get rapid epidermitization. Being a mould it carries the graft snugly to all parts of the radical cavity. Being coated with aseptic paraffin it can be left for ten days. This is a great comfort when the patient is a child.
Making the Paraffin Mould: The mould is made of gauze folded four times towards the center, resulting in a tape an inch and a half wide. This is soaked in melted paraffin until the meshes of the gauze are well obliterated. Pieces of prepared tape are made into a roll and kept in a retainer. When needed, the roll of tape is softened by immersing it for a few minutes in warm sterile water.

The Method of Using the Mould: When the radical cavity has been made, the operator takes a piece of the unwound paraffin tape six inches long and loops it over his index finger. Then the finger is given a half turn forward. This results in a spiral twist and the formation of a cone. This cone is cut free from the tape. The overlapping edge is smoothed down until the joint disappears. The tip of the cone is filled with melted paraffin for a quarter of an inch. The cone made, the radical cavity is cleaned and the paraffin mould placed in it. The handle of an ordinary searcher is used to tamp the mould into place and to make it fit all parts of the cavity, especial care being taken to get an accurate fit in the middle ear. If the meatal flap has not been cut this is now done. The mould is left in place for hemostatic purposes while the graft is being cut. Under the ordinary way the graft is spread on the mould and while this is being done the cavity has to be cleaned again. The mould is then trimmed flush with the mastoid. The meatal flap is tucked in place back of the mould and the cavity of the mould is filled with ordinary gauze. The post-aural mould is entirely sutured. (Fig. 12)

Post Operative Treatment: The mould can be left from five to ten days. If the incision becomes red and puffy or there is very much discharge in the canal this is a sign that the mould should be removed. To remove it the gauze in the cavity is taken out and the mould is collapsed on itself. It then comes out easily. The radical cavity is left alone.

8. The Manometer Test in Thrombosis of the Lateral Sinus:

This test is based on the fact that intracranial pressure can be detected in the cerebrospinal fluid and that this pressure can be increased mechanically by pressing the normal jugular vein. On the other hand, if the lateral sinus is thrombosed, thus cutting off the communication between them, there will be no effect on pressing the jugular vein on the thrombosed side.

What is a Manometer? It is simply a glass tube of two millimeters bore, with degrees marked on it without. The lower end is connected with a lumbar puncture needle when the test is being done.

Method of Manometer Test for Diagnosis of Lateral Sinus.
Thrombosis: With the patient in the lateral position, lumbar puncture is performed, and the spinal fluid is allowed to run into the manometer tube. The initial pressure reading is noted. Now, without in any way disturbing the patient, an assistant gently presses on one side of the neck between the larynx and the sternocleidomastoid muscle until he feels a strong carotid arterial pulsation. During the compression, the operator watches the rise of the fluid in the manometer, the promptness of its beginning and the full height which it attains, and on releasing the jugular compression, the rapidity of the drop. The procedure is repeated on the opposite side of the neck, and then for comparison, both sides of the neck are pressed simultaneously.

Result: First, in a normal case the rise should be over fifty degrees or millimeters more than the initial reading. Second, the difference of the rise between both sides should not be over fifty millimeters in a normal case. Third, in thrombosed cases the rise is somewhat less than forty millimeters when the vein on the thrombosed side is being pressed, or even no rise at all; whereas the rise on the opposite side is prompt and rapid to twice or three times the initial reading.

RECENT RESEARCH ON THE LEISHMANIASES OUTSIDE OF CHINA

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From January until October 1926 the writer had the opportunity of visiting many of the workers who are studying kala azar, oriental sore and the canine leishmaniases, to see their clinics and laboratories, and to observe something of the conditions in these endemic regions. The information gleaned during this journey from Assam to Tunis is the basis of the present record.

In India, kala azar is found especially in Assam, Bihar and Orissa and in that part of Bengal near the confluence of the Ganges and Brahmaputra and thence south to the Bay of Bengal. There is a much lower incidence all along the east coast as far as Cape Comorin. At present, intensive study of the disease, especially of the method of its transmission, is being conducted by two groups. The first is the Calcutta School of Tropical Medicine. The second is the Kala Azar Commission of the Indian Medical Service, with its winter or field headquarters at Golaghat in Sibsagar District, eastern Assam, and its summer headquarters at Shillong.
It was in Calcutta that Knowles, Napier and Smith (1) first detected the development of *L. donovani* in the intestine of *Phlebotomus argentipes* after the sandflies had been fed on patients. This observation has led the workers, especially in India, to focus their attention exclusively on the sandfly as the probable transmitter of kala azar. Napier is attempting to solve the puzzle by analyzing the epidemiological factors of the disease and has compiled many interesting data (2). How much of this is relevant to the question cannot be said at present. Napier and Smith have studied the bionomics of *Phlebotomus argentipes* (3). Lloyd, Napier and Smith have shown that *P. argentipes* prefers a blood meal from a cow to one on man (4).

The Kala Azar Commission in Assam, at first under the direction of Col. Christophers and now headed by Major Shortt, has attacked the problem from a different angle. Centering their attention on *P. argentipes*, they have studied especially its development in the intestinal tract of this sandfly after feeds on kala azar patients (5,6,7,8,9,10). Barraud has shown that adults of this species are to be found throughout the year in the region of Golaghat, except the latter part of December and all of January. A temperature of 28° C. seems to be the optimum for its whole life cycle (11). The optimum temperature for feeding experiments is 23-24° C. (12).

By paying due attention to the above facts, Shortt has been able to get about 60 per cent of his laboratory-bred female *argentipes* to engorge within a half hour when placed in a muslin cage into which the patient's arm was introduced. If *L. donovani* has been demonstrated in the peripheral blood of the subject, about one-fifth of the engorged sandflies develop flagellates in their intestines; i.e., 12 per cent of the sandflies offered a feed on a favorable patient develop infection with *L. donovani*. Furthermore, these parasites (short flagellate forms) become attached by their flagella to the epithelium of the midgut just behind the preventricular fold. They multiply, sometimes forming a plug-like mass, and then grow forward into the pharynx. Five to eight days after the infecting feed, long flagellate forms are occasionally found in the anterior pharynx and even in the buccal cavity (9,10). It is these long flagellates that Shortt considers the probable infective forms (12). He has found it necessary to give nourishing feeds to the infected insects at two to three day intervals.

Based on the hypothesis thus built up, i.e., transmission by means of the adult female *argentipes* infected at its first feed on a patient, Shortt has carried out a large number of the following experiments: laboratory bred female *argentipes* are allowed to feed on the arms of
patients in whose blood *L. donovani* has been demonstrated. They are given nourishing feeds on rabbit, mouse or human blood at two or three day intervals and after five to eight days, or longer if the insects survive, they are placed in muslin cages into which white mice are introduced. Up to the time of my visit last February, this routine had been carried out for seven or more months but no transmissions had been obtained. Some of the hamsters (*Cricetus griseus*) which I took to Shortt were used instead of the white mice as they are more susceptible to kala azar. Although this was eleven months ago, I have not heard that these workers have obtained any experimental transmissions. The most important findings of the Indian workers up to the end of 1925 have been published as Indian Medical Research Memoirs, No. 4, February 1926.

Recently Shortt, Barraud and Craighead (13) have reported finding a single specimen of *Phlebotomus argentipes* infected with a herpetomonad "morphologically identical with *Herpetomonas donovani*." This sandfly was found in an infected house in the infected village of Baktiapur near Pusa in North Bihar on July 26th, 1926.

One of the reasons I wished to visit Assam was to see one of the tea-gardens where, according to the reports of Rogers (14), Dodds-Price (15) and McCombie Young (16,17), kala azar was eradicated by the single measure of moving coolie lines a few hundred yards and excluding all "fever cases" from the new lines. I visited the Dooria Tea Estate near Badlipur, Golaghat, with Major Shortt and was taken over the sites of the old and new coolie lines by Dr. Percy Foster, the physician in charge. From his account there are two sets of facts not disclosed by McCombie Young's history (17) of the epidemic and the measures taken against it. First; the old lines were unhealthy from many standpoints. The coolies and their families suffered from malaria, dysentery and hookworm, as well as from kala azar. The new site was on higher ground. New and better houses were provided. Second; besides excluding families in which there were cases of kala azar, intravenous treatment with antimony was instituted in all cases discovered. In spite of these measures, there have continued to appear five to fifteen new cases annually in the new line up to the present time.

In Calcutta, Acton and Knowles (18) have isolated and cultured *Leishmania* from a lesion diagnosed as *xanthoma tuberosum multiplex*. Further than to study its morphology, the identity of the organism and its etiological connection with the lesions from which it was isolated, have not been investigated or at least reported on.
In the wards of the Calcutta School of Tropical Medicine, I saw two cases of Brombachari's "dermal leishmanoid" (19, 20, 21). This is a nodular eruption either universal or confined to the face, arms and upper trunk. It is a rare condition. All the cases reported have been in-patients who have been treated for kala azar intravenously with antimony and apparently have been cured. So far as I have been able to find, it has not been observed outside of India.

These cutaneous manifestations of leishmania infection must be distinguished from true oriental sore, which they do not resemble clinically. In India, oriental sore (locally called Delhi boil, Lahore sore, Frontier sore) is confined to the Indus basin, especially in Sindh and Baluchistan. I was able to observe cases in Lahore and to obtain cultures from the lesions. I found nobody studying oriental sore in India.

In Baghdad, the notorious home of "Baghdad boil" one can study the clinical manifestations of the disease indefinitely. The English names, "Baghdad boil" and "Oriental sore", are misnomers. The essential lesion is neither a boil nor a sore. The French term "bouton", roughly translated "button", is better. It is first a tiny papule, which increases in size and becomes an elevated plaque which may measure several centimeters in diameter. In cleanly persons who protect the lesions from trauma there frequently is healing in six to eighteen months without ulceration and hence without a scar. The infiltrated cutis, which is covered by a thinned epidermis, is easily injured. Such trauma leads to the introduction of pyogenic organisms with ulceration and subsequent scar tissue formation. In the natives such ulceration is part of the usual clinical course of the disease.

In addition to the human cutaneous leishmaniases so common in Baghdad, there is much among the dogs. The lesions are confined to the nose and the inside of the ears. Machattie, in the Civil Veterinary Hospital, was beginning to investigate it but had discovered nothing significant as yet. The abundance of canine leishmaniases in Baghdad is in contrast to the sparseness in India, where only two cases (22, 23) of the cutaneous and none of the visceral canine disease have been reported.

The other great center of oriental sore is Aleppo in northern Syria. It was here that Wenyon (24) found 6 per cent of the sand-flies he collected infected with a herpetomonad, which he did not identify further. As no important work is being carried on there, I confined myself to study in the Dermatology Clinic of the Medical College of the American University of Beirut. Dr. Rawdah, a Syrian,
who is in charge of this clinic, is an energetic clinician and an excellent teacher. He assembled for me cases in all stages from the early papule to lesions healed naturally or as a result of treatment. Therapeutically he uses carbon dioxide snow with great success. I made a trip into the Lebanon Mountains to a village where there were endemic cases. I also had the opportunity there of questioning a native woman practitioner regarding her methods of diagnosis and treatment. She has a great reputation locally for her ability to treat Aleppo "buttons" successfully.

While in Beirut I saw in the College Hospital the first case of kala azar in the Levantons to be diagnosed microscopically. It was in a baby about eight months old from near Tripoli, fifty miles north of Beirut.

The new Hebrew University in Jerusalem is interesting in many ways but I can only mention Dr. S. Adler and his studies of oriental sore or "Jericho boil", as it is known locally.

Adler, assisted by Theodor Ber, has collected and dissected more than 4000 sandflies, principally P. papatasii. Of these he found seven containing flagellates. Four of these were discovered in 1925 in Jericho, where he could find only four "boils" among the inhabitants. He dissected out the intestines from three of these sandflies and rubbed them into scarifications on the forearms of himself and his two assistants. In two cases (Adler, Ber) intracutaneous papules in 35 and 25 days respectively resulted; in the third (Theodor) a subcutaneous nodule at the end of 7 months. All contained Leishman-Donovan bodies which were stained and cultured. From one (Ber) he then prepared an immune rabbit serum. Using a culture agglutination method first applied to the study of Leishmania and Phlebotomus by Noguchi (25), he showed that the three strains derived from the three wild sandflies were identical serologically and also identical with strains obtained respectively in Baghdad from a typical clinical boil, and one from Kligler, who brought the Rockefeller Institute (Noguchi). Adler then, for the first time, has identified a known pathogenic Leishmania in a wild insect. He further attempted to produce artificial lesions by inoculating the organisms from the intestines of P. papatasii fed on oriental sores. In 11 inoculations from 7 flies on 7 volunteers he failed to get lesions. Very recently he has succeeded (26). The source of the original sandfly infections and the transmission to man by these insects are still not demonstrated. Unfortunately, Adler's brilliant work is injured by his too enthusiastic claims. He says, "The proof that Phlebotomus papatasii is a transmitter of cutaneous leishmaniasis is therefore complete." Nobody yet
has transmitted leishmaniasis experimentally, so far as I am aware, with the exception of a single instance in a series of bed-bug experiments by Dr. Hertig and myself.

For many years before the discovery of Leishmania, kala azar had been known clinically in Italy under the name of infantile splenomegaly. The infection in Sicily and Calabria is heavy. Certainly one of the best places to study it is the Pediatric Clinic of the University of Naples, of which Jemma is director. I found the kala azar clinic in charge of Dr. Alessandro Laurinsich, an enthusiastic and keen observer and clinician. For diagnosis the head of the tibia is punctured with a sterile needle, No. 18 or 20, through the skin without anaesthetic. Their skill in intravenous injection in infants and children is noteworthy. The striking thing about their kala azar clinics is that the patients are exclusively infants and children. Dr. Laurinsich has not seen any cases over nine years of age. He took me to the most heavily infected region near Naples, two villages on the slopes of Mt. Vesuvius not far from Pompeii. Canine visceral leishmaniasis is common in Southern Italy, especially in Sicily.

In Tunis, Nicolle found *L. donovani* in a child in 1904 and named it *L. infantum* because of its occurring only in infants and children. He has since abandoned that specific name in favor of Ross's older one because he believes the organisms to be identical. Nicolle has studied intensively the sparse clinical material in Tunis, less than 100 cases in 12 years. Recently he and Anderson have centered their attention on attempting to elucidate the transmission of canine kala azar, which is fairly common in Tunis. They attempted (27,28,29) to repeat Basile's (30) early work on the transmission of the disease by the dog flea (*Ctenocephalides canis*). After a series of very carefully conducted and controlled experiments, they conclude definitely that the dog flea does not transmit kala azar from dog to dog. The same investigators have done interesting work in conserving the virus of kala azar in dogs. They have now kept it through thirteen passages but it tends to die out (31). They find the organisms most abundant in the marrow of the long bones. All the marrow from the femora, humeri, tibiae and other bones of sufficient size, is suspended in 20 to 40 cc. of saline. 6-8 cc. are inoculated intraperitoneally into 3 to 6 dogs. Not all dogs inoculated become infected and even the positive animals tend to recover (33). They have also made some interesting observations on immunity in experimental kala azar in dogs (33). They conclude that the experimental disease (whether canine or human) confers an immunity on the dog. This can be demonstrated by reinoculation after the complete recovery of the dog from the experi-
mental disease. The duration of this immunity is unknown. Kalaazar produced by inoculation usually is milder than the natural disease. There are individual differences in susceptibility of non-immune dogs.

In order to make more complete the summary of recent research on the leishmaniases, the work of the Sergent brothers and their colleagues in Algiers should be mentioned. I did not have an opportunity to see it. In 1921 these workers (34) deposited on scarifications on the arms of volunteers, crushed sandflies (P. papatasii) collected in the military hospital at Biskra, an oasis in northern Algeria. In one experiment, in which seven sandflies were inoculated, a papule developed after about three months. From this lesion leishmaniform organisms were obtained in stained smears. Although it was claimed by the authors that this demonstrates that *Phlebotomus* is the transmitter of oriental sore, it cannot, of course, be accepted as such. It merely shows that in the sandflies used, were organisms which when inoculated resulted in a papule. In this lesion leishmaniform organisms were demonstrated microscopically. Their identity was in no way established. However, following this earlier work, studies of the experimental lesions were continued and are now reported upon (35). Seventeen white mice inoculated with cultures from this papule (6th to 15th cultural passage) gave seven positives showing organisms in the viscera. Two inoculated intratesticularly gave testicular or parascrotal tumors with ulcerations containing *Leishmaniae* but no organisms in the viscera. Eleven mice inoculated intratesticularly with cultures of the 51st to 59th cultural passages were negative. Five dogs inoculated into the skin of the forehead with suspensions from the testicular tumor of one of the mice, gave nodules with ulcerated centers which showed leishmaniae in smears. The authors claim that they have thus further proved *P. papatasii* to be the transmitter of oriental sore. It is true that the lesions produced are similar to those obtained by Gonder (36), Laveran (37) and Row (38,39) with cultures of *L. tropica* and it seems likely that the original sandflies did contain *L. tropica*. Actual proof of the identity of the organisms is, however, still lacking and, as in the case of Adler's work, the proof of the ability of the sandfly actually to transmit the parasite to the human host has not been demonstrated.

Of special interest to us is the recent report of Martin Myer (40) of Hamburg. He obtained infection of three European hamsters (Cricetus frumentarius) in all three attempts with liver juice from a patient, and one out of three with cultures from the same case.

In New York, I found that Noguchi (41) had just completed studies on the fermentation reactions, as well as on the agglutinations
Recent Research on Leishmaniases

of several strains of *Leishmania* and *Herpetomonas*. These confirm and extend the earlier work of Noguchi (25), Wagener (42) and Kligler (43). Mrs. Wagener, of the University of California, has also continued her studies of the biological relationships of the *Leishmaniae* (44). Among other interesting findings, she, as well as Noguchi, seems to have demonstrated a serological difference between cultures from China (one of our strains) and from Tunis. With the cultures obtained during the recent trip, I hope to repeat this work but with a more extensive series of species and strains.

**Bibliography**


(17) Young, McCombie: 1924. Kala azar in Assam. Chapter VIII, "Clinical types of the disease and preventive operations on tea estates."


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(31) Personal communication.


Sympathetic ophthalmia is considered by ophthalmologists the most terrible disease of the eyes that man can have. Fortunately the number of such cases are comparatively few the world over, and, although the exact etiology of the disease is obscure, it appears to be diminishing rather than increasing under the influence of the newer and better methods of prophylaxis and treatment.

Glaucoma (intraocular hypertension) is undoubtedly the most serious ocular disease next to sympathetic ophthalmia. Unfortunately glaucoma, unlike sympathetic ophthalmia, is a common disease the world over. But like sympathetic ophthalmia, the etiology of primary glaucoma, chronic or acute, is unknown. Pathological increase of the intraocular tension of an eye may be caused by serious injury or inflammation involving the cornea or the iris, or generally both; the disease is then referred to as secondary glaucoma. In both the primary and secondary types of glaucoma the normal escape of aqueous is hindered or wholly prevented from passing through the filtration channels of the eye which lie just behind the junction of the corneosclera. This hindrance to the escape of aqueous is brought about by a mechanical narrowing or closure of the filtration angle due to a gradual shallowing, either slow or rapid, of the anterior chamber. Or it may be brought about by a sclerosis of the structures that make up the filtration area. In either case the pathological condition is believed to be secondary to something else. In secondary glaucoma we know what that "something else" is; in primary glaucoma we do not.

The interference to the escape of aqueous produces an increase in the intraocular pressure, since the entrance of fluid into the eyeball, either by osmosis into the vitreous chamber from the vascular and lymphatic systems chiefly of the choroid, or by secretion from the uveal tract within the eyeball, continues more or less unabated. The tissues of the eye are constructed to sustain a certain intraocular pressure with a considerable margin of safety to spare. In the normal eye the intraocular pressure varies from 10 mm. to about 25 mm. of mercury. Various tonometers are on the market with scales graduated

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Spontaneous Trephining in Glaucoma

To read in millimeters of mercury. Among the best tonometers may be included the Shiötz and the McLean. We use both of these at the Peking Union Medical College. When the intraocular pressure rises above the normal limit of a certain eye, the weakest part of that eye will soon begin to give away. The first evidence of this "giving way" is almost always disclosed by a fundus examination, which shows that the optic nerve head has receded from the plane of the surrounding retina. This recession is known as "cupping" of the optic disk. As the intraocular tension increases the cupping of the disk increases. But there is a limit to this recession or cupping of the disk, which is apparently due to the resistance of the connective tissue envelope in which the optic nerve is protected. This connective tissue envelope is continuous with the fibers that make up the sclera surrounding the nerve. I have never seen a glaucomatous cupping of more than six or seven diopters, which means about 2 mm. in depth. This cupping of the disk has a disastrous effect upon the delicate fibers that converge from the nerve fiber layer of the retina to make up the optic nerve. The pressure upon and the stretching of these delicate fibers at the margin of the cup soon produce an atrophy of the fibers, which can never be restored, no matter what happens, either spontaneously or artificially (i.e. surgically), to reduce the tension.

The connective tissue coats of the eye, consisting of the sclera and cornea, are very resistant to high intraocular pressure. Except in very rare instances, these coats do not give way even though the eye may become what is referred to as "stony hard", meaning an intraocular tension as high as 100 mm. of mercury, or even more. But if such a high tension be maintained for a long time, even these structures will eventually give way at their weakest spot. This weakest spot is just behind the corneo-scleral junction. There exists at this place an oblique line of weakness in all eyes due to the location (named in their order from within outward) of the meshwork of the so-called pectinate ligament, the Canal of Schlemm, and the anterior ciliary veins (Fig. 1). Therefore, from an anatomical standpoint, an eye is predisposed to rupture along that line. Moreover, a rupture in this position is something that not infrequently happens. Most ophthalmologists who have had much clinical experience have seen such cases. Terrien has reported several that came under his observation.

The narrow strip of sclera which contains the above mentioned structures and which is situated in front of the ciliary body and behind the margin of the cornea, and which also lies in front of the root of the iris, is sometimes called the intercalary zone. In Duane’s translation of Fuchs’ textbook, there is a statement referring to intercalary staphyloma or ectasia as conditions which have been produced by
rupture of the eye at some place in this zone from high intraocular pressure. The rupture is always preceded by a stretching and thinning of the sclera in the predisposed zone of weakness (Fig. 2). Intercalary ruptures, with their resulting staphylomas or ectasias vary in position, but they generally occur above the cornea, because the habit of wide-eyed staring on the part of those going blind, together with the habit that man has of looking down to watch his step, puts that part of the eye more on the stretch and also provides less support for it on the part of the upper lid.

Intercalary ruptures in glaucoma also vary in degree, depending upon whether a case is seen early or late. In a beginning rupture, one may see only a small dark elliptical area. In a rupture of long standing he may find a marked hernia of ocular tissue, among which he might find the lens, much of the ciliary body and iris, and some of the vitreous, if he later had the opportunity to examine that eye as a pathological specimen. Sometimes a small-sized rupture is followed by such a decrease in tension that ectasia of the structures within, and staphyloma of the sclera and cornea, do not follow. In such a case an adequate channel of filtration for the aqueous has apparently been re-established—a spontaneous alleviation of the glaucoma being the result. But this alleviation will have come too late to have saved any vision, since the nerve fibers of the retina and optic nerve will already have become completely atrophic. However, the patient, by this rupture, is relieved of the symptoms of severe pain and headache which generally accompany high intraocular tension.

One of the saddest sights in our eye clinics is a patient, generally middle-aged, being led in totally blind with what is called absolute glaucoma. Unfortunately we see a considerable number of these patients, who have postponed their coming to the clinic until they have entirely lost their sight. It is then too late to do anything for them. Many of them give a history of having tried various forms of Chinese medicine, or of having rubbed the eyes of the bronze horse in one of Peking's temples, or of having paid priests, sorcerers and charlatans out of their material substance until there was no more left. In this extremity they come to the clinic where they have heard that fearful modern medicine is practised. Among the large number of glaucoma cases that have come to our clinic during the past ten years, was one patient who was a striking but rare example of intercalary rupture of both eyes, which had not progressed beyond the early stage, i.e., no ectasia ensued. It seems worth while to put this case on record.

History: Tung Tsung Feng, male, age 61, Hosp. no 3308, admitted to the eye ward of the Peking Union Medical College hospital on January 3, 1922.
Fig. 1. Normal eye, showing anatomical line (xy) of weakness, due to (a) meshwork of the pectinate ligament, (b) Canal of Schlemm, (c) anterior ciliary veins. × 500.
Fig. 2. Case of secondary glaucoma, showing at (a) marked stretching and thinning of the sclera behind the corneo-scleral junction, blocking of the filtration channels by the adhesion of the iris at (b), posterior synechia of the iris at (c). X 20.

Fig. 3. Tung Tsung Feng, Chinese male, age 61, Hosp. no. 3998, Peking Union Medical College. Double spontaneous trephining (or intercolary rupture) in absolute glaucoma of the chronic simple type.
Patient stated that thirteen years before he noticed a blurring of vision of the right eye; seven years later the left eye became similarly involved. The vision of both eyes steadily diminished until total blindness finally ensued five years later. Patient stated that he had not suffered much with pain in the eyes or headache. No history of injury or inflammation. Past and family histories were negative.

**Examination:**

*Vision:* R.E. nil  
L.E. nil  

**Conjunctiva:**  
R.E. Beneath the bulbar conjunctiva, about 2 mm. above the upper limbus, there is a small oval shaped rupture of the sclera, through which the structures beneath look greyish-brown in color. There is a very slight protrusion of this area, but nothing that could be called a real ectasia. The structures visible through the rupture are evidently iris and ciliary body.  
L.E. Same as the right eye, except that the rupture is much smaller, and the color of the area is lighter.  

**Cornea:** Moderately hazy throughout.  

**Pupils:** Dilated and slightly irregular.  

**Tension:** R.E. = 22 mm. Hg. (McLean tonometer)  
L.E. = 25 mm. Hg. (McLean tonometer)  

**Fundus:** Media very hazy due to corneal condition, blood vessels contracted, optic disks pale and distorted with deep cupping. Depth of cupping not measurable on account of hazy media.  

**Other organs:** Examinations show extensive pyorrhea and urinary cystitis, otherwise negative.

**Diagnosis:**

Chronic simple glaucoma of both eyes with amaurosis; slight interciliary rupture of both eyes.  

The impression received on examining the ruptured area of each eye was that a trephining had previously been performed, although the one in the right eye appeared larger than a surgeon would like to see following such an operation. The rupture in the left eye was exceedingly like a trephine operation for glaucoma, with its resulting scar tissue formation (Fig. 3). In view of the fact that the ruptures, from all that we could learn, had not increased for several months, and that the tension of both eyes was within normal limits (the McLean tonometer registers rather high), the conclusion was justified that the filtration of fluid was proceeding satisfactorily, the same as if a successful trephine operation had been performed. The title of this paper, "Spontaneous trephining of the eyes of a Chinese in glaucoma," therefore, seems justified. Gray of the Indian Medical Service has reported a similar case and in describing it, he stated that "it looks almost as if a spontaneous trephining had occurred." In his case, as in mine, a definite filtration area existed at the usual seat of trephining. Perhaps, as Harston suggests, such an occurrence speaks volumes in favor of the sclero-corneal trephining advocated by Elliot, as one of the most rational operations for the cure of glaucoma.
REFERENCES
3. Gray, W.C., Indian Medical Service. (Quoted by Harston, see reference no 4).

DIABETES AMONG THE CHINESE; DANGER OF INSULIN USAGE

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The death of two Chinese diabetic patients within one month as a direct result of insulin administration forcibly brought out the possibility that the Chinese may possess a particular susceptibility to this useful drug. Examination of the histories of all diabetics admitted to Peking Union Medical College Hospital since it was opened in 1921 revealed three other severe insulin reactions, with two deaths from insulin shock. It was therefore felt advisable to report this hypersusceptibility of the Chinese to insulin in order that its use among them may be guarded, and greater care exercised.

Of 123 diabetic patients admitted to the hospital, 98 were Chinese. Insulin was used in the treatment of 22 of these 98 patients. Four of the 22 died early of overwhelming infection, three died in insulin shock, one died two days after a severe insulin reaction, two recovered from severe reactions, while 12 tolerated the insulin in a normal manner. The details of the insulin reactions and deaths will first be submitted.

Case 1

T. T. K. (9551) Chinese farmer, age 31, was admitted to the hospital Nov. 27, 1924, complaining of weakness, loss of weight, excessive appetite, polydipsia and polyuria for 11 months. His weight on admission was 39.2 kilograms and his height 64 inches. For the last 5 months there had been some edema of the legs. Physical examination showed marked emaciation and pallor, with slight edema of the feet. There was atrophy and decrease of motor power of the left arm and right leg, with subluxation of the right ankle (presumably due to old infantile paralysis). Physical findings were otherwise negative. The pulse rate was 89 per minute, the temperature 37°C., and the blood pressure 80/40. The fasting blood sugar was 190 mgm per cent and the CO2 combining power 59 vol. per cent. The urine contained much sugar, but no acetone or diacetic acid.

On Dec. 2, he was placed on a basal diet of 1228 calories, with a glucose-fatty acid ratio of 1.5, on which the sugar output dropped to 28 gms daily. On Dec. 3, the patient developed pleurisy, a productive cough and fever. This condition progressed rapidly, and on Dec. 6, X-ray examination confirmed the diagnosis of severe, semi-acute pulmonary tuberculosis.
On Dec. 5 at 6 a.m. "four units of insulin" were given, and at 9 a.m. the record mentions a low blood sugar, although no laboratory report is to be found. The urine still contained sugar but no acetone. On Dec. 6 at 10.30 a.m. a second injection of 4 units of insulin was made. At 2.45 p.m. the nurse reported the pulse weak and thready, and the patient bathed in a profuse perspiration and unconscious. Rectal temperature was 36.2° C. At 3.15 p.m. he was given 140 cc of 5 per cent glucose intravenously, and immediately opened his eyes and asked for food. At 4.45 p.m. he was given 90 cc of 5 per cent glucose by mouth, but again soon became unconscious. At 5.30 p.m. the above intravenous injection was repeated, with the same striking effect. He received during the night about 50 gms of glucose by mouth and another intravenous injection of 40 cc of 5 per cent glucose. At 6.30 a.m., Dec. 7, he again became unconscious. Intravenous injection of 200 cc of 5 per cent glucose revived him and he demanded food. He was again unconscious at 9.30 a.m. At 10:30 a.m. his blood sugar was 23 mg. per cent, and he received 100 cc of 10 per cent glucose by injection and 40 gms by mouth, but the result was less striking than before. Further glucose injections were attempted but without success, and the patient died at 12.10 p.m. No autopsy was permitted.

This patient was in undoubted hypoglycemic shock for almost 22 hours, the symptoms coming on 4 hours after the injection of only 4 units of insulin. A total glucose administration of about 130 gms orally and intravenously failed to effect more than temporary relief. One cannot be certain just how much of the reaction was due to the rapidly progressing tuberculosis, but the inference must be that in the main this was an insulin death.

Case 2

A Chinese patient (16629), age 42, ricksha coolie, height 62.4 inches, weight 40.2 kg., was admitted to the Peking Union Medical College Hospital on April 15, 1927, with a diagnosis of far advanced pulmonary tuberculosis and diabetes mellitus. Polyphagia, polydipsia and polyuria had been recent for the previous 5 months. For 1 month there had been cough with the production of yellowish black sputum. There had never been hemoptysis nor night sweating. Physical examination and X-ray findings showed extensive pulmonary tuberculosis with cavitation at both apices. Tubercle bacilli were present in the sputum. The general condition was poor but emaciation was not extreme. Maximum temperature on the day of admission was 39.2° C. Sugar was present in the urine in considerable amounts. Analysis of the blood taken on admission showed 307 mgms of sugar per 100 cc and a CO₂ combining power of 58 vol. per cent. On April 15th the fasting blood sugar was 200 mgms.

At this time he was placed on a diet of 1,800 calories, with a fatty acid-glucose ratio of 1:4, and containing 45 gms of protein. During the next five days sugar excretion in the urine varied from 4.3 to 11.4 gms per day, and the fever showed a tendency to a small but steady increase. On April 20th the diet was increased to 2,500 calories, with the same fatty acid-glucose ration, and 55 gms of protein, ten units of insulin (Iletin, Lilly) being given twice a day. The third injection of insulin (10 units) was given at 11 a.m. on April 21st, 15 minutes before the mid-day meal. At noon the rectal temperature was found to be 35.4° C, the extremities were cold and there was profuse sweating. The patient felt no discomfort and was mentally clear. The pulse and respiration were
normal and there were no muscle twitchings nor restlessness. As these findings persisted he was given the juice of an orange at 4 p.m. At 5 p.m. the temperature had dropped to 34.4° C., so he was given further carbohydrate in the form of 40 gms of glucose by mouth. After this his recovery from the shock was prompt. Sugar was absent from the urine during April 20th and 21st. Fasting blood sugar on the morning of April 22nd was 154 mgms.

For the next four days insulin was withheld. The urinary sugar rose steadily, reaching 13.7 gms on April 25th, and the fever again showed a daily increase. On April 26th at 6:15 a.m. he received an injection of 5 units of insulin from the same bottle as had been used before. Breakfast was served to him at 6:30 a.m. and while eating he was seized with a sudden convulsion. After receiving 90 cc of a 10 per cent glucose solution intravenously at 6:55 a.m. he promptly recovered from his shock and finished his breakfast, which was augmented by 25 gms of pure glucose. At about 8 a.m. he gradually lapsed into quiet unconsciousness. Reflexes were maintained but the muscles were flaccid and entirely free from twitchings. At 8:15 a.m. he was given 90 cc of 33 per cent glucose intravenously, but without response. The respirations became slower. Caffein produced no improvement. The injection of 1 cc of 1:1000 adrenalin was likewise without effect. Cyanosis developed and increased until death at 9:30 a.m. The blood pressure at 9:15 a.m. was 100/72. Blood taken from the heart ten minutes after death showed 25 mgms of glucose, 35.4 mgms of N.T.N. and a CO₂ combining power of 73 vol. per cent. Bladder urine contained no sugar. The spinal fluid was clear and free from blood.

A complete autopsy was performed 26 hours after death. The physical and X-ray findings were confirmed. There was no evidence of pulmonary hemorrhage, embolism or edema. The brain was normal. There was marked atrophy and hypoplasia of the islands of Langerhans; glycogen in the renal epithelium; atrophy of the liver, spleen and heart; early central necrosis in the liver lobules; gelatinous degeneration of the bone marrow; and syphilitic aortitis. No immediate cause of death was evident.

That the coma and death of this patient resulted from insulin shock seemed incredible until the post mortem chemical and pathological reports forced this conclusion. According to all previous experience with insulin, the amount of glucose given (25 gms intravenously and breakfast plus 25 gms by mouth) should have been amply sufficient to counteract any ill effect following the injection of 5 units of insulin. There was certainly no mistake in the dosage of insulin, nor did the solution appear in any way abnormal. The last dose of 5 units was taken from the same bottle as the previous three doses.

This case appears to demonstrate a rapidly developing sensitivity to insulin. This was not due to progressive starvation and rapid loss of body weight, as the patient never failed to consume the whole of the diet presented, and the body weight was maintained. The period of time between the first and last injections of insulin (six days) was scarcely sufficient for the development of protein sensitization, nor was the reaction in any way similar to that of anaphylaxis. It could not have
been due to a direct toxic action of the insulin, else it would have occurred on the first day of administration when he received 20 units in two doses.

Case 3

Y. J. F. (16840) Chinese man, age 48, was admitted to the surgical service of the hospital May 6, 1927, suffering from two large carbuncles of the neck. Onset was one month previously, with chills and fever. Temperature on admission was fluctuating between 37.6°C and 39°C; pulse rate 100 to 125 per minute. Physical examination was negative, except for the presence of the carbuncles. The heart was normal in size and function, with no murmurs. Blood pressure was 120/78. There was no history of past heart trouble. The lungs were clear. The urine contained sugar and acetone on admission. The sugar persisted, although the acetone disappeared after May 7, with the patient on a soft diet. Surgical treatment of the carbuncles was carried out, with incision and drainage on May 10 and 16. Cultures of Staphylococcus aureus and Streptococcus hemolyticus were obtained from the pus.

On May 13 a diet of the following composition was ordered: carbohydrate 60 gms, protein 50 gms, and fat 180 gms. Owing to difficulty in chewing, this diet was poorly taken, but no record was kept of the actual food consumption. The body weight steadily declined, being 51.3 kg. on May 14th, 50.5 kg. on May 16th, and 49.5 kg. on May 18th.

On May 17th the patient complained of some shortness of breath. The fasting blood sugar was 400 mgm per cent. The urinary sugar had increased and acetone was present. The temperature dropped as low as 36°C on the 17th and 18th. May 18th the breathing was more labored, and in the evening acetone was detected in the breath. Blood taken at 6 p.m. this day showed 150 mgm per cent glucose and 10.9 vol. per cent CO₂ combining capacity. At this time 20 units of insulin were given intravenously and 40 gms of glucose by mouth. At 8 p.m. the hyperpnoea was marked, the acetone odor of the breath was strong, the extremities were cold, and the pulse of low tension. Blood pressure was 50/30. At 8.30 p.m. 40 units of insulin were given, accompanied by 80 gms of glucose orally. At 9.15 p.m. several hundred cc of fluid were vomited. At 10 p.m. the extremities were cold, and the patient was irritable, restless, and thirsty. There was free sweating, and the body temperature was 35°C. Between 10 and 10:30 p.m. 320 cc of 20 per cent glucose were given intravenously with relief of the shock symptoms. At 12:15 a.m., however, he had lapsed back into the same condition as was present at 6 p.m. Between 1 and 1:30 a.m. 40 units of insulin in 200 cc of 20 per cent glucose plus another 200 cc glucose were slowly injected intravenously. As the last 10 cc was being given, the patient’s pulse became very irregular and weak. Two injections of adrenalin into the heart failed to relieve him, as did also 0.3 gm caffeine and artificial respiration. Death occurred at 1:35 a.m. Blood taken from the heart 30 minutes after death showed 71.5 mgm per cent glucose and 16.4 vol. per cent CO₂ combining power. No autopsy was permitted. Twenty four hour urine specimens on May 17th and 18th showed about 16 gms of sugar each. No examination of individual voidings was made at any time in the last two days.

This case presented definite diabetic acidosis in the last two days of life, with high blood sugar and very low alkaline reserve. One cannot say with certainty that the death was due to insulin, although
certain facts point that way. The insulin shock at 10 p.m. following
the 40 units of insulin was probably due to the fact that the patient
vomited the glucose given by mouth. This shock was promptly
relieved by intravenous glucose administration. One can only con­
jecture whether the death immediately following the second 40 units of
insulin in glucose was due to the insulin or to unknown factors. Some
significance might be attached to the fact that 30 minutes after the
injection of the 80 gms of glucose was finished, the blood sugar was
only 71.5 mgm per cent, although sufficient glucose had been injected
to almost triple this figure. This would seem to point to a very rapid
glucose utilization, such as was seen in the two preceding cases here
presented. In view of the lack of previous evidence of cardiac dis­
order, one is inclined to attribute the death to an insulin reaction.

Case 4

L. S. C. (8834) a Chinese soldier, age 25, was admitted to the hospital
August 26th, 1924, complaining of polyuria, polyphagia and polydipsia of 18
months duration. He also had primary syphilis. He was treated by dieting
and insulin with satisfactory results, being discharged Nov. 8th with a carbo­
hydrate tolerance of 100 gms daily. His syphilis also received active treatment.
He received insuliu from September 12th to November 3rd. From September
23rd to October 23rd the amount given was 21 units daily (7 units before each
meal. On September 23rd the fasting blood sugar was 166 mgm per cent, on
September 29th 72 mgm, on October 15th 63 mgm, on October 18th 53 mgm, and
on October 21st 46 mgm. There were no definite symptoms of hypoglycemia
except an excessive appetite during this time.

He was readmitted to the hospital October 17, 1925, in a drowsy state, with
acetone breath, fever, and evidence of far advanced pulmonary tuberculosis.
Blood sugar on admission was 444 mgm per cent, and the CO₂ combining
capacity 59 vol. per cent. The urine contained sugar. Twenty units of insulin
given at 3:30 p.m., accompanied by the oral administration of 2 gms glucose (20
gms were ordered but through an error only 2 gms were given). At 6 p.m. the
drowsiness lessened and a cold perspiration appeared. Blood sugar at 7.30 p.m.
was 66 mgm per cent, and the urine was sugarfree. At 11.30 p.m. the bed
clothes were soaked with perspiration, the pulse was rapid and respirations
shallow. He was given 10 gms glucose at 2.10 a.m., and 5 gms at 4 a.m. The
next day, October 18th the symptoms of hypoglycemia had disappeared, and he
was placed on a diet consisting of 40 gms C., 40 gms F., and 40 gms F. On October
19th the fasting blood sugar was 70 mgm per cent and the CO₂ combining power
59 vol. per cent. The urine showed no sugar or acetone after October 17th. The
heart action weakened and he died October 20th.

This case presents an instance of severe insulin reaction following
the administration of only 20 units to a patient with a very high blood
sugar. For an American diabetic such a reaction would be an unusual
occurrence. The death three days later can scarcely have been con­
nected with the insulin reaction, since the blood sugar rose to a low
normal in the meantime.
One other patient developed signs of hypoglycemia after receiving 7 units of insulin during the course of two days. The symptoms all disappeared after taking the juice of an orange.

When it is considered that the reactions detailed above all occurred in the course of the insulin treatment of a total of only 22 diabetic patients, it is evident that a real danger attends the use of this drug in Chinese. The protracted character of the insulin reaction is one of the striking features, while the amount of glucose needed to overcome the hypoglycemia seems to be many times that required by foreign diabetics. The first patient, for instance, received a total of 130 gms of glucose during the shock following the injection of 4 units of insulin, and still died in hypoglycemic shock. The second patient was given 50 gms of glucose in addition to his breakfast, and yet died in insulin shock within 3 hours after receiving 5 units.

**Diabetes Among the Chinese**

In going over the histories of the diabetic admissions to the hospital, one striking feature noticed was the mild character of the disease in most instances, good results being obtained by dietary treatment alone. Statistical data derived from the records are given below.

Total number of diabetic patients admitted, 123.

Foreigners, 25, of whom 11 were women.

- Americans, 4 women, 8 men.
- Russians, 5 women, 4 men.
- British, 1 woman, 1 man.
- French, 1 woman.
- German, 1 man.

Chinese, 98, of whom 12 were women.

Average age of Chinese, 47.4 years on admission.

- , , , , women, 49.9 years.
- , , , , men, 47.2 years.
- , , , , foreigners, 46.6 years.
- , , , , foreign women, 41.2 years.
- , , , , men, 50.8 years.
The accompanying chart shows the age incidence among the Chinese, the peak falling between 55 and 60 years, as has been observed in America.\(^1\)

Complications present on admission (Chinese):

- Boils, furuncles, carbuncles: 25
- Other purulent infections: 10
- Pulmonary tuberculosis: 15
- Acidosis and coma: 5
- Syphilis: 10
- Erysipelas: 3
- Gangrene: 2
- Cholelithiasis: 2

The high incidence of purulent infections as a major complication is strikingly evident from these figures. Still more striking is the fact that 32 out of the 35 so afflicted had no symptoms of diabetes previous to the onset of the infection, and were admitted primarily for treatment of the infection, diabetes being discovered after admission.

The high incidence of pulmonary tuberculosis is also of interest, as the prognosis is very poor under such circumstances. Gangrene is rarely seen, contrary to the finding with cases of diabetes in America.

Of the 98 Chinese diabetics, 59 had symptoms of the disease for only a short time (4 months or less) before admission, and the diagnosis was first made in the hospital. The greatest occurrence of acute onsets came in May, August, September and November, thus showing no correspondence with other types of acute infections in this part of China.

Sixty-six of the 98 did very well on dietary treatment alone, leaving the hospital sugar-free and on a maintainance diet. Eight left without treatment.

Of the 49 cases treated before insulin came into effective use, there were 4 deaths, while in the later 49 there were 11 deaths. Whether or not this represents a relaxation in the dietary treatment since the advent of insulin cannot be said.

One other interesting point in these data is that only 12 out of the 98 diabetic patients were women. Since women patients have

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Danger of Insulin Usage

constituted 33 per cent of the total admissions to the hospital, this would seem to indicate a greater prevalence of the disease among males. However, one cannot yet evaluate the social factors here involved in determining requests for medical aid.

Whether the mildness of diabetes here is a racial characteristic, or whether it is a result of the low basal metabolic rate is a question for investigation. The Chinese diet is very high in carbohydrates, but this is practically all in the form of starches. It would be of interest to know whether diabetes in the Japanese is also mild. The 98 Chinese diabetic patients represent only 0.7 per cent of the total hospital admissions of Chinese.

CONCLUSIONS

1. There is frequently a distinct hypersensitivity to insulin in Chinese diabetic patients. Hypoglycemic reactions, when they occur, are very severe and protracted, requiring large amounts of glucose to secure recovery. Insulin should be used with particular caution in Chinese patients.

2. Diabetes among the Chinese tends to be mild in type, and in most instances to be accompanied in its onset by acute purulent infections.

3. It is almost four times as frequent among males as among females, calculated on the basis of hospital statistics.

Chart 1
The province of Yunnan is the second largest in area, though one of the least populated of the provinces of China. It consists mainly of immense tablelands of from 5000 to 7000 feet elevation surrounded by mountains which in the north reach the snow line. Geographically it is a province difficult of access. Yunnanfu the capital may be reached by an arduous journey from Burmah or from Szechuan, via the Yangtse. The brilliant engineering skill of the French has within recent years brought the city within three days of the sea by the construction of a railway from Haipheng. The price paid in deaths from malignant malaria was however heavy as the jungle was penetrated. The study of disease in a relatively isolated province like this is therefore not without added interest.

It has been said that Bubonic Plague was cradled on the Mungtze plain, from whence it swept along the trade route by the West river to Canton and then to India and the West. What Western doctors for a time thought was a disease de novo, Encephalitis Lethargica, is most certainly endemic in Yunnan in common with other parts of China, but we may reasonably infer that its presence here means that it dates back to a considerable antiquity because of the static condition of the population. If this feature is borne in mind it may serve to add a little interest to the rather dull catalogue of diseases which follows.

At the outset it may be remarked that there are two quite dissimilar factors which are lowering the general health of the community at the present time. The first of these is the prevalence of endemic Goitre to a most serious extent. The doctor at Tengyueh reports a great incidence in that district i.e. near the Burmah border. The doctor at Chautung in the north east reports it as exceedingly common there with not a few cretins, and any visitor to Yunnanfu is struck by the large numbers in the streets and in the surrounding villages. Its cause and prevention provides one of the many subjects which await the attention of the Public Health Service in China.

The second factor is the prevalence of the Opium habit of which one would say as a conservative estimate that it affected more than two thirds of the men and more than one third of the women. The province grows the most, and it is said, the best opium in China, and in the spring, as far as the eye can stretch, one beholds the beauty of the poppyfields—a sad commentary upon the statements made at Geneva. Opium may be purchased everywhere much cheaper than tobacco and so it is found in almost every house. The facility with which it may be obtained makes it only too easy for those who, in a fit
Notes on Medical Practice in Yunnanfu

of passion, wish to take their lives to do so. We have in this hospital to deal with more than 100 cases of poisoning by opium every year. The great majority of these are women and the act is deliberate in nearly every case. A few babies have been brought in who have accidently swallowed the opium which is carelessly left about. Two fine babies have died recently from this cause. Of the others about two thirds have recovered under treatment which consists of the prompt injection of apomorphine with or without strychnine and gastric lavage with a weak solution of potassium permanganate. An injection of caffeine is then given and the usual efforts made to maintain consciousness.

In several cases where life was despaired of an injection of the new respiratory stimulant, Lobeline, had a dramatic effect; though if the time which has elapsed from the taking of the opium to the commencing of treatment is long there is no response even from this drug. In one case where a big dose of opium had been taken 14 hours previously, and the above routine had been followed, it was necessary to use artificial respiration to maintain life. The great expense of the Lobeline limits its use, but in this instance it was given and had the effect of restoring respiration but not consciousness. For about ten minutes artificial respiration was resumed and at intervals of an hour, two other doses of one sixtieth of a grain of Lobeline were given with similar results. The patient finally succumbed.

It is our experience that if the Lobeline is given in serious cases it will cause a rapid return to consciousness usually with additional vomiting but where there is but a slight response little will be gained by pushing it.

The use of atropine, the supposed antidote for morphine poisoning has been so disappointing that we have abandoned its use as a routine.

With reference to the effect of the opium habit it is true that one meets a few cases where opium has been smoked for years and the span of seventy has been attained in spite of it. It is also true that octogenarians are found at home who have consumed many gallons of whisky in their time. Such exceptions prove nothing. If it does nothing worse, the habit of smoking leads in a very large number of instances to the much more serious habit of opium eating. Indirectly the opium evil colours all our hospital work, for on principle opium smoking is not allowed in the hospital, a special mixture being given free to allay the craving. Post operative treatment is often adversely affected as some patients suddenly get a craving and depart, even the promise of an injection of morphia not availing to hold them.
The stuffy surroundings of the opium den also aid the onset of Phthisis, which is very prevalent in this province. We consider that our policy of forbidding opium in the hospital is justified because during the past year a number, certainly more than 25 men, have given up the habit permanently—though more than ten times that number do so for a time, and also because our wards remain full throughout the year, at least on the men's side.

**Diseases influenced by physical causes.** A brief reference may be made to the number of patients found suffering from vesical Calculus. They cannot all be induced to come for operation but a fair number do. Some months ago we had side by side in the ward three boys of between 8 and 9 years of age, two of them Chinese and one a Miau. Quite large stones were removed from each.

**Bronchial Asthma.** This may be conveniently referred to here. A large number of cases of chronic asthma are found among the village people and recently three patients from other provinces who had not suffered from an attack for years have, after a short residence in Yunnanfu, had an attack precipitated. Thus it would seem that this is not a good climate for the subjects of this malady.

**Infections Diseases.**

**Measles** is very common and appears in a more severe form than in England. Many deaths occur among infants from secondary Broncho-pneumonia. The other common sequelae are Otitis Media and Adenitis, and Eye affections such as Blepharitis.

**Scarlet Fever.** This disease exists here though only one case has been seen during the last year.

**Diphtheria.** Some years ago a very severe epidemic in Yunnanfu caused many hundreds of deaths, although in some quarters doubt was thrown upon the diagnosis. The suggestion was made that it was a peculiar form of Scarlatina and swabs examined in French Tonkin were reported as negative. The Bacteriological Laboratory of this hospital was not built at that time but Dr. Bradley and Dr. H. Gordon Thompson were confident of the diagnosis on clinical grounds.

During the last year sporadic cases of membranous croup were seen and after several cultures had been made a definite culture of Neisser's Bacillus was obtained by Dr. H.P. Yew, late of the Bacteriology Dept. Guys Hospital, London.

This was in March 1927 and only a week ago a very definite case of Diphtheria was seen from which a culture of the true bacillus was easily grown.

The following have been treated but call for no special comment:

- **Mumps, Chicken-pox, Hooping Cough and Labor Pneumonia.**
- **Tetanus** is also present, pack ponies being the main form of transit.
Epidemic Cerebro-Spinal Meningitis. The following cases show that this disease is present. Early in the year a small boy aged 5 was brought to the hospital with extreme opisthotonos, practically moribund. Lumbar puncture was followed by a jet of purulent fluid under great pressure. In spite of a dose of anti-serum the child died a few hours after admission.

About a week later I was called to a small shop in the centre of the city to see a boy of 9 who had fever and pain in the limbs. There was slight rigidity of the neck and on explaining to the father that the disease was a serious one and required lumbar puncture found to my surprise that this was the elder brother of the fatal case described above. This boy recovered after relief of pressure and three daily intrathecal injections of antimeningitic serum. A stained smear of the spinal fluid showed intracellular diplococci.

Typhus. It is possible that this is the most serious and fatal disease in the province, though one has not first hand knowledge of it. During the year not more than a dozen cases of Typhus have been treated in the hospital but it is in the villages where the disease is so deadly. One of the senior missionaries here is emphatic as to the widespread distribution of Typhus in the province.

Typhoid Fever. Of this disease we have at least direct knowledge. There is never a time when the wards are without a case. Struck by the fact that the majority of patients recover fairly easily cultures were made and these agglutinated with para A serum. It has not been possible to extend these experiments yet, but it is interesting to find Paratyphoid A in Yunnan. It will be remembered that this variety was formerly absent from Europe. It is probable on clinical grounds that Typhoid itself is present, and it has of course not been shown that para B is absent.

Relapsing Fever. There is a great deal of this disease in the province particularly in the west of Yunnanfu. At a branch hospital at the salt wells of Yuan Yung Ching there have been many cases during the past year. At our own hospital about 20 cases a year are treated. The majority of cases seen are not very severe; a very common symptom is a slight icteric tinge in the conjunctiva which is rarely absent, also pain in the limbs is a usual symptom.

Severe cases show marked respiratory embarrassment, jaundice and severe attacks of epistaxis and there can be little doubt that such cases if not promptly treated with salvarsan would end fatally. Fortunately a small dose suffices, about 0.3 gramme, and is tolerated by the damaged liver.
Dysentery. Amoebiasis is very common during the summer months among children as well as adults. The Bacillary form of dysentery has not been proved yet though one or two cases have been suggestive.

Cholera. Two years ago there was a severe epidemic of Cholera but the disease has been absent during the past year in spite of the prevalence of a severe epidemic in Tonkin. The compulsory measures taken by the Tonkin Government for inoculation with anti-cholera vaccine of all travellers has no doubt prevented the epidemic from spreading along the railway route.

Plague. No cases of Bubonic plague have been seen for some years.

Smallpox. This disease is well established. Owing to the popularity of vaccination we may hope that the epidemics will gradually be brought under control.

Arthritis seems to be a not uncommon sequel, the writer has seen within recent years four cases of ankylosis of the elbow joint from this cause.

Malaria. All three forms of Malaria are endemic in Yunnan. Of these the Quartan is not common in Yunnanfu, but Dr. Austin of Chautung in the north reports it to be very prevalent there. The benign tertian form is very widespread in its incidence especially in the surrounding villages. The Subtertian or Malignant form is confined to the south of the province along the Red River. The majority of the cases treated in hospital come from the district around Hokow. It is a terribly fatal form and many of the victims have the adynamic variety of the disease. Broncho-pneumonia often occurs and in one recent case this was followed by Bronchiectasis and death.

We are rarely without a case of Malaria in the hospital and a short time ago three consecutive films examined contained the parasites of the three different varieties, one the Benign, one the Quartan and the third the Subtertian.

Leprosy. This dread disease is well established in Yunnan. In the city itself there are a number of cases and a government asylum was erected five years ago about four miles from the city. At present (September 1927) there are 45 inmates, an increase of 15 during the past year. With the permission of the Mayor the writer has gone weekly since July 1926 and given ethyl chaulmoograte injections.

An examination of the outpatient clinical records of the C. M. S. Hospital here reveals the fact that on an average this year two cases
of leprosy have been diagnosed each week or nearly 1% of the total patients (200 new ones per week). It is not suggested that the disease is widespread as this suggests, only the fact that in a year 10,000 outpatients have included 100 lepers. In Yunnan as is well known there are many tribespeople and there is much leprosy reported among them. Only two of the above 100 were tribes people and so the disease is widespread among Chinese here. About 20 sufferers have attended the outpatient department for injections but less than half persevere and there is much to be said for the erection of an institution where not very advanced cases could live and be treated. It is only natural that they should recoil from the average leper hospital where a large number of advanced cases mix freely with the others, and yet under present conditions they are the potential advanced cases of the future. The introduction of the method of injecting instead of taking Chaulmoogra Oil or its derivatives was such an advance that it has unfortunately had a tendency to blind the eyes of many as to the present position, which is, that a real specific remains yet to be found for Leprosy. We are also ignorant as to the means of its transmission, and of any explanation of the startling paradox that in skin leprosy where there are often vast cohorts of bacilli there is for long periods, an almost negligible toxæmia and a minimum involvement of the nerves, while in the so called nerve form where the bacilli are exceedingly difficult to demonstrate, there may often be wide and destructive nerve changes and a toxæmia which is by no means negligible.

Tuberculosis. The most common form of tuberculosis seen is that of Phthisis which is only second to Typhus and the bowel diseases as a cause of death. Among children there is a great deal of Tubercular peritonitis and next in incidence comes Hip joint discase and other bone and joint Tubercle. Three or four cases of Tuberculous meningitis have been seen during the past year.

Syphilis. It is not easy to estimate the amount of Syphilis as a very large number of local practitioners use some form of arsenobenzol. The incidence must be very heavy. Although the Quarternary forms are not rare it seems to the writer that they are much less common in proportion to the total number of Syphilitics than in England and it would be of interest to know whether the prevalence of Malaria is the reason for this. Very few cases of Locomotor Ataxia are seen and still fewer G.P.I. cases.

Rheumatism Group. Acute Rheumatic Fever is not uncommon and a number of such patients have been treated in hospital, while a greater number reach hospital with Mitral disease. Mitral stenosis has been found and many cases develop aortic lesions as well.
Sydenham's Chorea has only been seen twice.

**Diseases of the Internal Organs.**

**Nephritis.** Acute Nephritis is not common and perhaps less than 12 cases acute and subacute were seen during the year. Chronic interstitial Nephritis is rare and one has met with very few cases with hyperpiesis due to any cause. Perhaps the difference of diet accounts for the lesser incidence of renal trouble.

**Hepatic Cirrhosis.** Alcoholic cirrhosis is seen but is uncommon. Quite a number of cases of Jaundice are seen, of these two only were due to Cholecystitis, the rest being painless. In one of these, a man who had come from Canton, Distomum Hepaticum was tentatively diagnosed and Antimony injections given. The patient, feeling much better, went out before there was time to find the actual parasite. The diagnosis rested upon the very numerous ova found in the stool but these bear too great a resemblance to those of Fasciolopsis Buski to make the diagnosis certain, though the fact that the jaundice rapidly cleared up under Antimony supports it.

**Deficiency Diseases.**

**Gout.** One case of classical Gout came under observation. Sodium Urate was proved microscopically in the discharge from the ulcer of the toe, and tophi were present in both ears.

**Rickets and Beriberi** are both uncommon here—a few cases of each have been seen during the year.

**Osteomalacia** has never been seen in Yunnanfu but Dr. Killmier of Hueili just over the border into Szechuen reports cases.

**Pellagra.** This was diagnosed in one woman patient though there were no nerve symptoms.

**Malignant Disease.** It is the impression of the writer that the incidence of Cancer is not a great deal less here than it is at home. During the year three cases of Sarcoma of the Orbit in little children were seen. Among adults the following have been diagnosed: Epithelioma of the extremities, Carcinoma of the breast (many cases), Epithelioma of the Penis (6 cases) and Cancer of the Uterus, Rectum and Liver. A 20 year old Lipoma of the neck which was excised proved to have malignant change present and although X-ray treatment was given the disease gained ground and had a fatal issue within six months.

**Diseases of the Central Nervous System.**

**Anterior Polimyelitis.** Two children were seen, very typical cases.
Notes on Medical Practice in Yunnanfu

Posterior Poliomyelitis. Many cases of Herpes Zoster were seen and two of the cervical roots.

Petit Mal. Two typical cases were seen, one of which had an uncinate aura.

Grand Mal. Major epilepsy appears to be very common, more than 50 patients were treated for this complaint.

Meniere's Syndrome. A single case has been seen.

Meningitis. The tubercular and acute infective forms have already been noted.

Cerebral Tumour. Very recently a case of Cerebellar Tumour has been diagnosed with Optic neuritis of the left disc, nystagmus, vomiting, headache and very typical gait. No other cerebral tumour has been met with.

Disseminated Sclerosis has not been seen nor Syringomyelia.

Mental Disease. It is difficult to estimate as few cases reach hospital. Several cases of Dementia Praecox in boys were seen. Mania, Melancholia and Delusional Insanity were among the cases brought to the hospital.

Outside one has seen several cretins and a few idiots (amentia).

Encephalitis Lethargica. During 1927 up to September twelve cases of post encephalitic parkinsonianism have come to the hospital. All were male and except one tribesman all were Chinese. The youngest was 9 and the eldest 34, while the time which had elapsed from the initial attack varied between 18 months and 12 years.

The appearance of these patients is most striking with the pathetic expressionless face—the Parkinson mask—and the curious effect which the more or less general muscular rigidity gives to the gait and general appearance.

All had myoclonus of some group of muscles, generally an arm, or athetosis affecting the pronator and supinator muscles of arm or leg. Choreiform movements and tremor were also present and once seen there is never any doubt as to the diagnosis.

The interest of these cases is that they come from such out of the way parts; only two or three were in Yunnanfu at the time of onset and as there was one with a history of 12 years it follows that the disease was present in the province in the year 1915 which is two years before the disease was described for the first time in Europe (Vienna 1917). It seems evident that this disease is endemic in China, at all events in this province, as it is so cut off from the rest of the country.
Obstetrics. It may be of slight interest to refer to this subject. Before coming to Yunnanfu the writer spent over two years in Pakhoi, Kwangtung where there was an unusually large hospital maternity practice (430 cases in 1915). Labour was almost always easy. Forceps were used only in 5 cases out of 800 labours.

In Yunnanfu the maternity practice is much smaller (about 140 per annum) but difficult labour is much more common. Instrumental aid has been necessary in more than 20 instances. Facts like these remind one of the danger of generalising in China and help one to preserve a sense of proportion as to the extent that an experience of any one district is representative of the whole vast country.

In Yunnan Footbinding is still the rule rather than the exception even now, and little girls grow up here, without the healthy romping out of doors which their foreign sisters and one hopes the majority of their other Chinese sisters enjoy. There can be but little doubt that this is one of the chief reasons why difficult labour is commoner here than in Kwangtung where footbinding has long ceased.

This review of the diseases met with in the province of Yunnan is necessarily of an incomplete character and is the result of the repeated solicitation of the Editor, rather than any feeling that such a catalogue would be of general interest. If it is the intention of the Editor to publish similar reviews from the respective provinces or districts, the net result will then possess a very real interest and perhaps be of permanent value in the near future when Preventive Medicine in China is undertaken with real vigour.

Since writing the above a case of acute Encephalitis Lethargica has been seen, this was on Sept. 30th a Chinese girl aet. 13. The attack commenced with fever and a tendency to sleep. There was a temporary strabismus. She was seen on the 15th day of the attack and was at first making athetoid movements with the arms and then would subside to a condition of coma. The reflexes were normal but the sphincters were not under control. There was no rigidity of the neck. The pupils were dilated and equal. It was stated by the father that an elder child, a boy of 15, had a similar illness two months before and had recovered. This statement was confirmed by a very intelligent Annamese practitioner (French trained) who later paid a visit and who had treated the case* i.e. the boy by the method of fixation abscess.—These people live in the centre of the city of Yunnanfu.

*He did not realise the precise nature of the disease and looked upon the boy as cured and was unaware of the after parkinson symptoms which might follow. Also he did not agree that it was an infectious disease, but believed both children had hereditary syphilis, and so accounted for two cases in one family. I suspect he thinks it is a specific meningitis of sorts.
Sporadic, endemic and epidemic outbreaks of malaria occur in almost all parts of China. Some idea of its prevalence in one endemic area may be gained from the reports of Soochow hospital. In 1924 32.1% of 296 medical admissions and 14% of 3067 dispensary cases were malaria. In 1925 20% of 313 medical in-patients, comprising 40% of the infection group of diseases, were malaria. In the same year 27% of the 500 students who visited the school clinic came also for malaria. If we consider the fact that only the severest of the cases came to the hospital for treatment, and that for every severe case there must be quite a few mild ones, we shall at once realise the high morbidity from this disease in Central and South China as a whole.

Although we are appalled at the great complexity and magnitude of the malaria problem, both on account of the extensive area involved and the large population affected, yet we must not forget that malaria is a disease the etiology of which is definitely known and the cure and prevention of which is already a proven possibility. Although, at present, the magnitude of the malaria problem in China seems appalling, yet we can not afford to dismiss this question by the mere prescribing of quinine. It lies with the medical profession of China to bring into realization in this country what the scientific knowledge of disease prevention has meant to other parts of the world where malaria once prevailed heavily but is now under control. It is mainly in the early stages of the fight against malaria that the medical forces of the mission hospitals have a great contribution to make. Individual initiative will furnish the greatest stimulus to the development of antimalarial measures on a large scale in the future. The later work will have to be taken up by forces organized especially for that purpose.

The object of the present paper is to indicate a few practical lines of study along which the mission hospitals could well direct their efforts without essentially encroaching upon the already heavily taxed time and energy of their staff-members.

The following are the suggested lines of study:

1. The more exact delimitation of the endemic area of malaria:
Dr. Faust has already given you a bird’s-eye view of the malaria situation as revealed by his questionnaire. His data show that more exact and extensive information is needed in order to get as near as possible to the approximate distribution of this disease in China—especially the exact localities where malaria is endemic. Since the mission hospitals are the only medical institutions which are fairly well distributed throughout the country, they can contribute most to the collecting of this information.

In order that this information shall be of highest statistical value, an accurate record of the residence of all malaria patients is most important. This can be done in one of two ways. The first is to insist on the registration of each patient’s residence in full when he presents himself for admission, especially in the out-patient department. I have often noticed that the registrar in his hurry, writes down the address of a patient by listening to the dialect with which the patient answers his questions. In this way the name of the patient’s birth-place is recorded as his residence, although he may have been living in another region for years. To increase the accuracy of the initial registration the examining physician should inquire of each malaria patient just where he has resided for some time previous to the present illness, and then chart it on a special map provided for this purpose. In this way the endemic or epidemic regions which brought these patients to the particular hospital may be exactly mapped out in the course of time.

2. Accurate differentiation of types of infection by microscopic examination:—

Too much emphasis cannot be laid upon the microscopic diagnosis of all cases of malaria coming to our hospitals. It should be done preferably before treatment is given in every case. The technique for the examination of plasmodia by the thin smear method is simple and could be trusted to a well-trained and conscientious technician with some measure of supervision on the part of the physician himself. In case of subtertian infection repeated blood examinations are necessary before malaria can be excluded. The thick-drop method of examination can also be mastered by proper training, and when once the technique has been perfected, the chances of detecting plasmodia in difficult cases will be increased. This method is now advocated as the most accurate and most rapid one by all authorities on malaria.

3. Spleen index:—

This is of great value in ascertaining the approximate prevalence of malaria in any endemic region, especially among the children under fifteen years of age. The opportunity for such investigation is pre-
sented when the physician makes his annual physical examination of the pupils of the schools on the mission premises. In certain regions, however, care must be taken to eliminate other causes of splenic enlargement such as kala-azar, schistosomiasis and hook-worm disease.

The method of palpating the spleen is so simple and requires so little time that with small effort the investigation could be extended to the school children of the local government institutions, thus making resultant information still more valuable.

4. Parasite index:—

As a check on the spleen index blood examinations of the school children and older students could be made by means of a little persuasion. The objection of students to being pricked with a needle can be largely overcome and, in addition, their cooperation elicited, if the examination include an estimation of the hemoglobin. This gives them immediate information and arouses their interest. A large number of blood smears or thick drops thus collected, if stained at once, will keep indefinitely for later examination. In case a well organized survey of this kind were undertaken by any individual, it might be that arrangements could be made in advance with some interested institution like the Peking Union Medical College to examine such specimens.

5. The collection of anopheline mosquitoes and the search for their feeding grounds:—

The study of malaria is so intimately bound up with the anopheline mosquitoes that it behoves medical men to make careful observations on the mosquitoes which are prevalent in malarious communities.

Even though the greatest care is used in screening any building, it is very difficult to keep out mosquitoes. Therefore the collection of mosquitoes might well begin in the hospital itself in order to detect those which are most eager to bite man. The characteristics of anopheline mosquitoes are so prominent that they are easily distinguished even by a novice.

Every person in the hospital, including the ambulant patients, should be urged to collect live mosquitoes. They are best caught in a dry test tube. Such tubes, with a cork or cotton plug, could be distributed about the hospital and returned like other specimens to the laboratory for examination. Daylight searches in other hospital buildings, houses of the staff, latrines, cattle sheds and the houses of inhabitants of endemic towns and villages, can usually be examined incidentally if an interested person will keep a few small test tubes in his pocket at all times. The daily routine of life, as well as walks for
exercise, out-calls, or even hunting trips may thus be made more interesting and may add to the sum of scientific knowledge and the solution of a great health problem.

Mosquito larvae may also be collected with a dipper and pail, often in or close to hospital compounds. Anopheles larvae, which usually lie flat at the surface of the water, are easily distinguished when once recognised, and can be preserved in 70 per cent alcohol or reared into adult mosquitoes in small test tubes.

The cooperation of teachers of science in local schools should be solicited to study mosquitoes and the insertion of such a subject in the science courses of middle schools and colleges would undoubtedly contribute greatly to the accumulation of valuable information and would also form a part of the health education of the students.

Specimens collected by those not trained in their exact identification should, of course, be sent to a central point in China for classification. Such a central collecting laboratory for mosquitoes as that already planned by the P. U. M. C., which will be in touch with mosquito experts elsewhere in the world, can ultimately acquire a representative collection of the mosquitoes of China and add greatly to information needed to combat malaria in the future.

6. Observations regarding the incidence of infection in relation to such factors as rainfall, temperature, season, and the prevalence of anopheline mosquitoes:—

In many places where meteorological statistics can be easily obtained from the customs or post office the securing of this information will not tax the physician and yet the aggregate statistics will be of great value in understanding malaria as a whole. The seasonal prevalence of the three types of malaria can be compiled without difficulty from hospital records if these are carefully kept.

The seasonal prevalence of different species of anopheles mosquitoes is known to vary somewhat. Since some anophelines are efficient vectors of the malaria parasite while others are not, it is important to correlate the incidence of the true vectors with that of the parasite in order to focus attention on the species which should be attacked. The modern method of malaria control aims to eradicate only those species of anopheles which are proven to be efficient malaria carriers.

In the diagnosis, treatment and pathological anatomy of malaria there are many points of interest. These, however, do not enter the scope of this paper, whose purpose is to point out the lines of study in which mission hospitals can help most in the ultimate control of the
disease. If progress is to be made toward this goal, the attention of the medical profession must be shifted from its present emphasis on treatment, which is usually insufficient among an uneducated populace, to an emphasis on prophylaxis. The results of this change of emphasis will not be apparent at once, but it is the first step, without which progress will never be made in the diminution of what is one of the scourges of China.

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ETHYLENE ANAESTHESIA: ITS INDICATIONS IN SURGERY AND OBSTETRICS*

H. W. MILLER, M.D., Shanghai.

Anaesthesia, asepsis and absorbable ligatures are the three discoveries that have contributed most in the development of modern surgery of today, and have made surgery a most certain and safe line of work. Whether a patient recovers from a surgical operation today is not a mere matter of chance, but depends upon accurate technique, careful diagnosis, and sound surgical judgment. Each advancing year has shown a marked improvement in methods of asepsis and antisepsis; also the reliability and dependability of ligatures have improved with each succeeding year. However, in anaesthesia we shall note possibly the greatest advance within the last decade.

It was a remarkable discovery when Morton, or possibly Davis, demonstrated that the inhalation and absorption of ether produced an unconscious condition whereby surgical manipulation could be carried forward without pain to the patient and without the inconvenience of muscle rigidity and the throwing movements which formerly disturbed the operator. In fact, so satisfied has the medical profession been with the result obtained in ether and chloroform anaesthesia that indeed little attention has been given to the improvement of the method of administration for nearly three-quarters of a century following their discovery as anaesthetics. Nitrous oxide as an anaesthetic was known even before ether or chloroform, and yet it has been only at a comparatively recent date that its use has reached any considerable proportion.

The extension of modern surgery into new fields has demonstrated both ether and chloroform as unsuited for certain cases, and when used they are attended by grave surgical risk. This is particularly true in the management of Basedow's disease, or exophthalmic goiter.

*Read before the Shanghai Medical Society, 28 October 1926.
Nitrous oxide, having been the only other available anaesthetic, was turned to as a much safer anaesthetic, and widespread attention of the medical profession has more recently been given to the matter of gas anaesthesia. However, the metabolic rate is increased during the period of induction of nitrous oxide anaesthesia in toxic thyroid patients, and in order to still further minimize the subsequent reaction to operation, local anaesthesia by means of novocaine infiltration and nerve blocking has in some clinics become the anaesthetic of choice, either used singly or in combination with gas anaesthesia.

It is the purpose of this paper to bring before the Society a comparatively new anaesthetic which from our experience, and the enthusiastic support that is being given it in the clinics in which its use has been introduced, promises, we feel, to be one of the safest of anaesthetics; also an anaesthetic having a wider field of application than nitrous oxide or even local anaesthesia, and possibly than ether or chloroform.

It was while experimenting with plants in an endeavor to determine the toxicity of ethylene gas on plant protoplasm that Dr. Luckhardt, of Chicago, conceived the idea of determining what effects ethylene would have upon animal protoplasm, and to his surprise he found that while this substance was poisonous to vegetable protoplasm, it seemed to be apparently harmless to animal protoplasm. Numerous and very extensive experiments were carried on with various animals, from which investigations it was determined that ethylene possessed remarkable properties as an anaesthetic and also as an analgesic. So certain did Dr. Luckhardt feel about this agent that he permitted himself to repeatedly undergo anaesthesia with ethylene, as also did his associate.

On the 14th of March, 1923, Dr. Arthur Dean Bevan of the Presbyterian Hospital of Chicago, performed the first operation upon a human being by the use of ethylene gas, and from his and Dr. Lewis's observations in their first series of cases reported, has made the statement that physiologically and pharmacologically, ethylene is less toxic and dangerous than any other anaesthetic, judged by the post-anaesthetic effects and also its effects during administration. The early results of some other surgeons were not quite so satisfactory, which was found to be due to the fact that they used an imperfectly refined gas which contained some carbon monoxide, following which there was prolonged nausea and cyanosis, which conditions have entirely disappeared since we have obtained a refined gas from the manufacturers.

During the past three years ethylene has been used extensively in the clinics of the United States and Canada, France, Switzerland, and
other European countries, and may be said to have at least safely passed the experimental period, and has gained the confidence of the surgical profession; as well as in communities where it has been used, it has rapidly claimed the confidence of the laity. Dr. M. Papin of Paris reports its use during the past two years in 700 urological cases and claims that it is safer than ether or chloroform and that it has no effect upon kidney function, can be safely given in cases of pulmonary lesions and nephritis, and that he used it in grave cardiac lesions. He precedes its use by the administration hypodermically of morphine 1/6 gr. and atropine 1/150 gr.

In my visit to a number of clinics during the early months of this year in the States, I found it being used as the anaesthetic of choice in the Mayo Clinic and in many of the hospitals in the eastern and western part of the States. Having employed it in a considerable number of cases of exophthalmic goiter, as well as in abdominal surgery, I feel convinced that it is the anaesthetic of choice in the great majority of cases where its cost is not prohibitive to the patient. We have also been using it routinely at the Shanghai Sanitarium, and in a few cases at the Country Hospital. Its chief advantages are:

1. The brief period of time required for the induction of anaesthesia.
2. The absence of any irritation to the air ways.
3. The apparent normal color with the absence of a marked asphyxia and jactitation.
4. The dry warm condition of the patient which continues usually to the end of operation—(its use has been reported for three hours without any noticeable hyperidrosis such as is noted in nitrous oxide and ether anaesthesia).
5. The more complete relaxation than with nitrous oxide gas—a great majority of abdominal operations can be performed without the addition of any ether.
6. Its wide range of application, having been given to infants as young as two months and to adults as old as seventy-seven, and there are no contraindications to its use.
7. It has a slightly depressive action upon the respiration which makes it the anaesthetic of choice where the metabolic rate is high, as in toxic thyroids.
8. There is no disturbance of the function of the heart, kidneys, and lungs.
9. It combines well with other anaesthetics and can be used in conjunction with ether or novocaine, can be preceded by nitrous oxide and the anaesthesia maintained by immediately switching on ethylene gas.
Recovery from the anaesthetic is prompt, the patient regaining consciousness with just a few breaths of oxygen or air, even where ether may have been turned on for a few seconds during the anaesthetic.

Post anaesthetic effects are very slight. In many cases there is an absence of nausea, while in the majority of cases the patients wake with a slight nausea which takes place with recovering consciousness and is seldom remembered by the patient.

Regular pulse all through period of anaesthesia and a noticeable absence of gas pains follows its administration.

The expense is less than with nitrous oxide, it is easier of administration, and has a wider margin of anaesthetic safety than nitrous oxide.

It shortens convalescence through the absence of severe nausea, gas pains, loss of sleep, and consequent fatigue.

Analgesia is very much greater under ethylene than under nitrous oxide anaesthesia. The reflex to operation is less.

It, however, has two disadvantages:

1. Its odor. However, this odor is perceptible to the patient or operator for a few seconds only. Some anaesthetists have preferred to begin the anaesthetic with a few breaths of nitrous oxide and then switch off to ethylene for this reason. However, we have found the objection so slight that we do not regard such a procedure as practical or essential.

2. This is the more important consideration—the explosibility of ethylene gas. Ethylene gas with a mixture of a high percentage of oxygen, especially in proportions of 20 per cent ethylene and 80 per cent oxygen is explosive in the presence of oil, cautery point, and static spark. A few explosions have occurred; only one, however, has proved to be serious. Dr. Luckhardt in collecting data on the explosibility of ether in the presence of oxygen has shown, however, that ethylene is no more explosive than ether. However, ethylene must always be combined with oxygen and ether is only rarely thus combined. So this danger must be borne in mind and necessary precautions taken, to close off ethylene gas in the presence of a cautery point or any flame. The accumulation of ethylene gas in a well ventilated operating room has had no noticeable effect upon the operative staff nor has any general conflagration or explosion been noted. The explanation of the few cases of explosion recorded have been that of the static spark, and these have occurred during either the time of initial contact of the anaesthetic mask with the patient's face or upon removal
Ethylene Anaesthesia

of the mask. In certain clinics to avoid danger of the static spark the metal of the mask is connected with the anaesthetic machine by wire, the machine being grounded and the patient having a chain around the arm coming in contact with the metal table. This is always a safe precaution against any dangers from the static spark. Undoubtedly the improvements made in anaesthetic apparatus during the recent months have to a very considerable extent obviated this risk.

Ethylene in Obstetrics

Ethylene finds a wide range of service to the obstetrician. Its use can be commenced with the beginning of severe pains in normal labor, when analgesia may be maintained up to the time of actual delivery, at which time ethylene may be pushed to the anaesthetic stage, the delivery accomplished, with quick recovery of consciousness immediately following. Its use during labor has been continued for as long a period as nine hours. In case of long use of the gas, the question is not so much concerning any untoward effect upon either the mother or infant, as this seems to be apparently negligible, but rather the expense of the gas. There is a perceptible decrease in the amount of uterine bleeding where ethylene is used as compared with ether. It has also to be noted there is very prompt contraction of the uterus following its administration.

Ethylene administration does not give the patient the depressed feeling of nitrous oxide. It is the anaesthetic of choice in all obstetrical operative procedures, in the presence of bronchitis, nephritis, myocarditis, valvular heart trouble, high blood pressure, and eclampsia, which are such frequent complications of childbirth, in which cases ether is contra-indicated because of its being an irritant to the pulmonary, liver, and kidney tissue. It is more highly valued for Caesarean section than either spinal or local anaesthesia, for these anaesthetics have the fault of causing psychic fatigue due to anxiety and fright. It does not produce asphyxia of either mother or infant, and there is no subsequent disturbance of peristalsis. It will also be found very convenient for short obstetrical procedures such as version, extraction, difficult forceps deliveries, manual removal of placenta, vaginal Caesarean operations, etc.

In Urological work it will also be found a very convenient adjunct to satisfactory examination of the bladder and ureters through cystoscopic procedures since analgesia is secured that gives the necessary relaxation for catheterizing the ureters without any disturbance of the kidney function. Many of the patients requiring surgery of the prostate gland, dilation of strictures, are old men with arterio-sclerosis,
hypertension, myocarditis, auricular fibrillization, bronchitis, and emphysema, in the presence of which ethylene may be given while other general anaesthetics are contra-indicated. Besides, ethylene is very convenient for the setting of fractures, application of casts, or office examinations and manipulation of painful joints, or for making examinations of pelvic and rectal conditions, that are so often unsatisfactory because of discomfort to the patient and attendant rigidity during the time of examination.

The Technique of Administration

For the administration of ethylene, three tubes of the following gases are required: pure oxygen, carbon dioxide, and ethylene gas. The anaesthetic bag is filled with a mixture of about ninety per cent ethylene and ten per cent oxygen, after which the anaesthetist makes contact with the patient first by placing one hand to the patient's forehead, applying the mask to the face with the other hand, and after a few inhalations should the respiration quiet down a small amount of carbon dioxide is required to increase the depth of respiration which will cause a greater intake of ethylene and more marked relaxation. The oxygen is then increased to approximately twenty per cent. In the case of adults, it is usually advisable to precede the anaesthetic with the administration hypodermically of 1/6 gr. of morphine and 1/150 gr. atropine sulphate forty-five minutes before operation. A period of about five minutes is required to induce complete analgesia. After a few moments following complete anaesthesia the ethylene is gradually held down to the minimum, and the patient gets his carbon dioxide by re-breathing.

Considerable experience is required in gaining an acquaintance with the proportions of these gases to meet the needs of the operator and in the cases of a certain few individuals, especially in operations upon the upper abdomen, it is necessary to add a little ether vapor which can readily be done by running the gas through a small quantity of ether. This, however can be shut off in a few moments, sometimes a few seconds being all that is required to carry the patient clear through the operation. At the close of anaesthesia which should be maintained until the operation is completed and the dressing placed over the wound, the mask is removed and just a few breaths of air are all that is necessary to cause returning consciousness. Experience gained in the administration of this anaesthetic enables one to reduce the cost of anaesthesia as one learns the proportions of ethylene and oxygen to use in order to get the results. Ordinarily the expense is about ten tael cents per minute.
In the beginning of her work in Shanghai, China, Dr. Elizabeth Reifsnyder, of the Margaret Williamson Hospital, began to record the pelvic measurements of all obstetrical cases, and for forty years this was continued using her method of measuring.

The measurements taken were the Inter-spinous or the distance between the spines of the ilia. The Intercristal, or the distance between the crests of the ilia, always taking the inner lips in both the Interspinous and the Intercristal measurement.

The External conjugate, or the diameter of Baudelocque. This according to her method was taken when the patient was erect. The posterior branch of the pelvimeter was placed in the dimple or depression just under the last lumbar spine. If a line should be drawn between the two posterior superior spines, this point with dimple is one inch above this line. Anteriorly the pelvimeter rested upon the most prominent point of the bony pubis. If the patient was not able to stand erect, the measurement was taken with the patient lying on the side with the lower or under leg drawn up against the body and the upper one straight. The diagonal conjugate was taken by the middle finger tip against the promontory. If the perineum was very rigid a steady pressure was kept up for several minutes until relaxation occurred. As soon as the tip of the promontory was felt the hand was raised against the ligamentum arcuatum. The point where the hand touched the ligamentum arcuatum was noted, and the hand removed from the vagina. With a tape measure or pelvimeter this length of the diagonal conjugate was obtained.

The true conjugate was estimated by deducting 1½ or 2 cm. from this diagonal conjugate.

During forty years, 7837 Chinese women were measured at confinement.

By her method of measurement, the averages for the different measures were as follows:

- Interspinous: 22.975 cms. or 9 inches
- Intercristal: 25.35 cms. or 10 inches
- External conjugate: 18.27 cms. or 7½ inches
- Diagonal conjugate: 11.52 cms. or 4½ inches

Associated with Dr. Reifsnyder in this work, there have been several physicians, among them Drs. Emily Garner, Mary Newell, Julia Wood.
The last six years of the work was carried on by Dr. Clara B. Whitmore, and these averages of the total number of cases were worked out by Dr. Whitmore in the fall of 1920.

**DISCUSSION**

Dr. J. Preston Maxwell pointed out the similarity between the figures now given and those published in Dr. Garner's review of 2000 cases some years ago. He said it was highly desirable that an agreement should be reached as to a standard method of measuring the pelvis, and suggested that the one in most general use was one which measured the interspinous from the outer edge of the anterior superior spine, and the intercrystal from the exterior edge of the iliac crest.

He also urged that in future statistics, especially in the case of the Chinese in whom the interschial diameter is probably smaller than in the European, that this diameter and the posterior sagittal should also be taken.

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**Clinical Notes**

**TWO OBSTETRICAL CASES**

P. Cheal, M.R.C.S., L.R.C.P.

1. A woman sent in for her third confinement. History of normal pregnancy but an attack of pain about fourth month which gradually wore off. No sign of menstruation during the whole term. Complained of uneasiness in back, etc. but no real labour pains. Her pulse rapid and weak.

   *On examination.* Abdomen normal in size for full term but foetus unusually easily felt and very free in its movements. Per vaginam the os was soft and partly open. A bulging, soft mass was felt behind it but the body of the uterus could not be felt.

   Foetal head about level of the umbilicus but seemed to move about.

   *Operation.* Abdominal incision and child removed from the sac which was adherent to abdominal wall. There was a considerable rush of blood from the placenta, which was adherent over the back of the uterus (which was drawn up into the abdomen and appeared to be
full of blood), and completely enveloping the left tube which could not be tied without a great deal of manipulation. The bleeding stopped almost at once and the condition of the patient was so critical that I merely sewed her up quickly. She died after two hours leaving a very fine girl baby.

2. A woman was brought in with the history that the head of child had been born and pulled off by doctor. On examination this proved to be correct and it was also found that one arm had been pulled off. The end of the spinal column was presenting and was so loose that it came away with the examining finger right down to the pelvis. A leg was seized with great difficulty, as the foetal abdomen was greatly distended, and the whole was rolling about in the uterus freely. The leg proved to be flattened and very easily detached and shared the fate of the head, arm, and spine, without the expenditure of any force at all. Scissors were then introduced and the abdomen of the foetus opened releasing a very large quantity of fluid. At the end of this flow the rest of the child came out—just an empty bag of skin. There was a fair-sized liver present in it and about 2 inches of intestine but no other signs of any organ. The heart and lungs may have been pulled off by the outside doctor—the condition of the skin made it hard to say, but I incline to the view that they had not been present at all. I did not see the head but the husband said it was "rotting"—the rest of the body certainly was not as bad as that, and I should think he either did not see it or exaggerated.

The mother has made a perfect recovery so far, with only the usual slight rise of temperature the first day.
CEDAR OIL AS AN AID IN FINDING PARASITIC OVA IN FECES

Gordon E. Hein, M.D., San Francisco, California.

(From the Journal of Laboratory and Clinical Medicine, August 1927)

For several years at the San Francisco Hospital, we have been using a method in searching stool specimens for parasitic ova which we feel deserves a more widespread application.

It depends upon the property of cedar oil in clarifying smears of dried feces so that very thick smears may be utilized in looking for ova, with greatly increased probability of finding them.

An extremely thick smear of the suspected feces is made upon a slide and allowed to dry at room temperature. The thickness of the smear is about from five to ten times as heavy as ordinarily would be used, and a few trials will show the approximate thickness necessary.

Cedar oil is dropped upon the field and covered with a cover glass.

The feces are rendered transparent and ova are greatly accentuated by the clear background.

The slides may be kept for some time and we have ova of trichocephalus trichuria which are unchanged after three years.

By this method we have found ova in feces without difficulty where repeated search of fresh smears without concentration methods failed to show them and without doubt it could be used to supplement other concentration methods such as centrifuging or the brine flotation method of Kofoid and Barber. The simplicity and ease with which ova are revealed seems to us to advocate the method strongly.

We were so much impressed by the possibilities of this method that we requested Dr. Tyau at the Pathological Laboratory of St. Luke's Hospital to have it tested out for us. Through the kindness of Dr. U. K. Koo this was done. He reports that the results of the tests amply bear out the statements made in this paper.

Editor C. M. J.
To the I. H. T.—Can you tell me what are the latest developments in the
treatment of well-developed Locomotor Ataxia? B. T.

Answer,—1. Symptomatic improvement does occur even in well-
developed cases. Occasionally under training a man who can scarcely
stand or walk learns to do both quite steadily.

2. Whether it is worth while to treat active syphilis or not is
a moot question. If the Wassermann of blood or spinal fluid is
positive, we offer to give up to one or even two years of treatment
in the hope of curing the active syphilis and preventing continuous
damage. It is, however, not a hopeful outlook, for, it is difficult to
get them "Wassermann negative". Dr. de Vries thinks that the
anti-syphilitic treatment allays irritative symptoms; and that mercury
seems better for this purpose than salvarsan. Tryparsamide or tetro-
phen are said by some authorities to give good results.

3. Systematic training in walking and standing, keeping the eyes
fixed upon a line in walking, or a point in standing, makes the patient
less dependent upon the damaged spino-cerebellar tracts, and teaches
him to coordinate his muscles by visual impulses. The patient can
proceed from simple walking and standing exercises to more compli-
cated running, balancing, dancing, and even acrobatic exercises.

4. For crises of pain, antipyrin sometimes is useful. For sciatic
pain, epidural intrasacral injections of salt solution with novocaine are
helpful. Resection of sensory roots is difficult. If we could be sure
of cutting exactly the right roots, the procedure would be legitimate,
but I do not recommend it.

5. Trophic joints call for rest and later for fixation, to prevent
attrition. Surgery in tabetic joints is theoretically dangerous, though
I have not seen bad results in the few cases of removing detritus by
operation that have come under my notice.

6. General hygiene is of much more importance that we can get
most doctors to realise. The whole fight depends upon the vitality
of the patient's general protoplasm. Its conditions will determine the
rapidity and the degree of breakdown of the fundamental intoxication.

A. H. W.
We print in this issue some notes by Dr. A. J. Watson of Yunnanfu of diseases met with in Yunnan. We have particular pleasure in publishing the paper as our knowledge of the diseases of this province is remarkably scanty. We earnestly hope that some of the doctors from other provinces where western medicine is still in its infancy, will follow Dr. Watson's example and give us the benefit of their own experiences.

The value of such papers is really very great and we should like to dwell for a moment on some of the points brought out in these notes.

The prevalence of the Opium Habit as Dr. Watson describes it is simply appalling. We had no idea that any province could give such a terrible record.

The absence of Plague for a couple of years is a fact of very considerable interest. Formerly Yunnan had the reputation of being the birth-place of Plague but of recent years some doubt has been thrown on this statement. There appears to be a growing opinion, the basis for which we do not know, that the extremely fatal form of subtertian malaria which is known to be common in the jungles of the southern valleys of Yunnan was in the old days mistaken for Plague and the fact of its being endemic there had given rise to the belief that this was the endemic home of Plague.

Dr. Watson's remarks on the rarity of Locomotor Ataxia and General Paralysis of the Insane are particularly interesting in view of our remarks on these diseases in a reference to a paper by Dr. Wei in the August issue of the Journal.

The statements with regard to Acute Rheumatic Fever are of the greatest importance. There seems no doubt that over the south of China generally the disease is rare and in some areas would seem to be absent. The question therefore arises as to whether the climatic conditions associated with high altitudes are the determining factors which make this condition prevalent in Yunnan. In this association Dr. Watson reports two cases of Chorea. These are the first typical cases of this disease reported, as far as we know, from China.

Perhaps the most interesting of all the information given in this paper is that relating to Encephalitis lethargica. The year 1918 has been authoritively given as the year of the first appearance of this
disease in China. We must confess that we have always been a little sceptical about this as we thought we had seen one case at least before that date, and the evidence here given suggests that the disease is of much older appearance if it did not actually begin in Yunnan.

Dr. Watson has not been able to touch on the Metazoal parasites in the paper we publish, but we hope that he will be able at a later date to give us some information about these. The presence of aboriginal tribes with feeding habits different from the Chinese makes this a subject of special interest in the provinces of Yunnan and Kweichow. We already know that in some of these tribes cestode infestation is relatively common and fuller information from one on the spot would be most valuable. Lastly the doctors in these provinces of whom there are painfully few would render the cause a real service if they would give us a paper or two on the relative incidence of disease in general in the Chinese and aboriginal inhabitants.

PLASMOCHIN (PLASMOQUINE)

The treatment of Malaria has suffered of recent years by the very serious rise in cost of Quinine, a condition we believe brought about by the artificial means of combinations to keep up the price. As we are none of us likely to live long enough to see an end put by governments to such abominations we very heartily welcome the promise of synthetic drugs that will eventually hold all such machinations in check.

The latest of such synthetic drugs comes like Salvarsan from Germany and has been produced in the Elberfeld chemical factory.

Under Current Medical Literature we print considerable extracts from the report of the Kuala Lumpur Institute for Medical Research on the use of this new drug—Plasmochin.

A further and even more enthusiastic article is published in the Indian Medical Gazette of August, 1927.

We may take it therefore that the value of Plasmochin as a destroyer of the plasmodium is amply proved. The question of safe administration is not however on quite such a sure footing. A number of observers have recorded toxic symptoms following its use and the report from Kuala Lumpur advises its administration under medical care only.

Remembering the history of salvarsan this is only to be expected and remembering also the subsequent history of that drug we may be sure that improvements on the formula of the present preparation of Plasmochin are sure to follow in due time. There are reasons also to
suggest that any toxic effect of Plasmochin is more apparent than real. However to obviate the possibility of such toxic results the makers of the drug suggest the following scheme of dosage:

**Tertian and Quartan Malaria**

1st. week. 7 days 0.02 Gm. (½ grain) 'Plasmoquine', 3-5 times daily

2nd. 4 "pause
3rd. 3, 0.02 Gm. (½ grain) 'Plasmoquine', 3-5 times daily
4th. 4 "pause
5th. 3, 0.02 Gm. (½ grain) 'Plasmoquine', 3-5 times daily
6th. 3, 0.02 Gm. (½ grain) 'Plasmoquine', 3-5 times daily

With this treatment by 'Plasmoquine', it is advisable to strictly adhere to the scheme with pauses, thus avoiding as much as possible the occurrence of cyanotic symptoms.

**Aestivo-Autumnal Malaria**

In aestivo-autumnal malaria it is advisable to resort to a combined treatment of 'Plasmoquine' and quinine, for which purpose 'Plasmoquine' Co.* will be found to be most suitable. In this connection, the following scheme has proved best:

1st. week. 7 days 2 tablets 'Plasmoquine' Co., 6-8 times daily

2nd. 4 "pause
3rd. 3, 2 tablets 'Plasmoquine' Co., 6-8 times daily
4th. 4 "pause
5th. 3, 2 tablets 'Plasmoquine' Co., 5-6 times daily
6th. 3, 2 tablets 'Plasmoquine' Co., 5-6 times daily

We are hoping to make arrangements with one or two hospitals in China to test out the action of the drug here and reports of their findings will be given later in the Journal. In the meantime we shall be glad to publish reports from any physicians in China of their experiences with this new preparation.

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*Tablet Plasmoquine Co. = 0.005 gm. (½ grain) Plasmoquine with 0.0025 gm. (1 grain) Quinine.*
THE CONTROL OF MALARIA

In regard to new drugs for diseases like Malaria there is a tendency to doubt whether the enormous amount of work involved in their preparation is worth while. Why should not this energy be expended on the eradication rather than on the cure of the disease?

The reply to this is very ably given in the findings of the Commission on Malaria appointed by the League of Nations Health Committee. The Commission has made a prolonged and very detailed investigation of Malaria in Europe and the conclusions come to are very striking. We print in this number of the Journal extensive extracts from the Commission's report and they are well worth careful study.

The fact has to be faced that planned measures for the eradication of malaria on a large scale have not met with any great success. There are striking exceptions to this statement, but they are very few. Success has however very obviously attended extensive curative efforts combined with systematic diagnosis of carriers of infection and has also frequently resulted from the improved economic status of the working classes of the affected areas. Of the two the latter seems to be the more important. This is very strikingly brought out in the history of a country like England where malaria was never in sufficient amount to profoundly affect the health of the country. Malaria has now for practical purposes disappeared from England, yet from time to time there are very minor outbreaks and occasional isolated cases. The interesting point is that it has been shown that anopheles are still common in certain areas; that these areas are the same as those where malaria used to be prevalent years ago; that malaria still occurs in minimal amount over the same areas; and that the reduction of the disease from one of considerable prevalence to an absolutely negligible quantity has not been due to treatment or planned preventive measures, but solely to the improved economic status of the population.

ANTIDOTES TO ACUTE POISONING

Mr. Cameron of the Peking Union Medical College has sent us a sample of a sheet giving the names of the commonest poisons in use in this country in English and Chinese and a brief note of the antidotes required.

The sheet measures only 11 inches by 4 and, though the type has of necessity to be small, it is remarkably clearly printed. The paper is strong and Mr. Cameron suggests that the sheets might be useful to hang up on the walls of admitting wards or out-patient departments. They appear to be admirably adapted for this purpose and can be obtained from him at the Union Medical College, Peking.
Graduate Courses in Medicine

Special courses in all of the departments of the Medical College are offered to graduates in medicine. These courses are open to medical graduates of all nationalities, but instruction is entirely in the English language, unless announcement to the contrary is made. The courses include lectures and laboratory work in the medical sciences, and practical work in the inpatient and outpatient departments. Opportunities are afforded for special work in any department desired.

A limited number of fellowships for graduate students has been placed at the disposal of the College by the Rockefeller Foundation to be granted to physicians in China. Applications should be addressed to the Peking office of the Rockefeller Foundation. Those seeking opportunities for graduate study now available should write to the Registrar, Peking Union Medical College, Peking.

Department of Anatomy

Opportunities for advanced work in anatomy are open to qualified individual students desiring special training in any phases of work being carried out in the Department.

Department of Biochemistry


Hours to be arranged.

This course deals with the principles of nutrition with especial reference to the vitamins and the biological value of proteins. Students will be given the opportunity to carry out feeding experiments with laboratory animals.

Department of Physiology

Students may elect any of the divisions of Physiology for advanced work. It is desirable for two students to work together. Applicants for such special work should interview the Head of the Department regarding choice of problems and arrangement of schedules.

Special opportunities for advanced work in digestion, metabolism, and endocrinology will be available during the year 1927-28.
DEPARTMENT OF PHARMACOLOGY


Three hours a week, first trimester.

Pharmacology 102. The Detection of Poisons.

Five hours a week, first trimester.

A laboratory course dealing with common poisons and their detection in foods and tissues.

Pharmacology 103. Chemical Methods in the Analysis of Drugs.

Four hours a week, first trimester.

A laboratory course of standard methods of assay, and chemical methods for original investigation.

Pharmacology 104. The Pharmacology of Chinese Drugs.

Four hours a week, first trimester.

DEPARTMENT OF PATHOLOGY

Pathology 101. Advanced Pathology.

Hours to be arranged.

An opportunity is offered advanced students and graduates for further study of autopsy material, routine pathological technique, or tissue diagnosis. In selected cases facilities will be supplied for research upon suitable problems.

Pathology 102. Advanced Bacteriology.

Hours to be arranged.

Advanced students and graduates will be given an opportunity to study any group or groups of bacteria in which they are interested under the guidance of members of the Department. Research in bacteriology or immunology may be undertaken by those suitably prepared.

Pathology 103. Parasitology; Advanced Helminthology. Dr. Faust.

Hours to be arranged.

Semi-independent work, under direction, on the biology and epidemiology of human helminths in China and adjacent areas. Experimental study of these parasites with reference to environmental conditions and reservoir hosts. Field work may be arranged in heavily infected regions and prophylactic measures planned.
Pathology 104. Parasitology; Fecal Diagnosis. Drs. Faust and Yao.

*Hours to be arranged.*

An elective for students in the fourth and fifth years and for special students properly qualified. This is an intensive course in the diagnosis of parasitic and coprozoic protozoa and of helminth ova found in feces. Special attention is directed to the identification of cysts and their differentiation from anomalies and artefacts by studying temporary and permanent stained preparations. Methods for concentration of ova are likewise tested out in the laboratory and their relative efficiency determined.

**Department of Hygiene and Public Health**


*Hours to be arranged.*

In co-operation with the Peking Police a demonstration area has been established where students will be given facilities for acquiring practical experience in community methods of disease prevention.

The Department also contributes to the instruction in the correlated courses in the Department of Medicine.

Public Health 102. Graduate Course in Public Health Nursing. Miss Hosmer and Miss Kong, assisted by the medical staff.

*Hours to be arranged.*

In co-operation with the Peking Police a demonstration area has been established where graduate students possessing an N.A.C. diploma and a knowledge of Mandarin may register for training in generalized public health nursing. Enrollment, except in unusual circumstances, is for a minimum of one year.

**Department of Medicine**

The facilities of the Department of Medicine are available to properly qualified graduate students. No special course is offered in 1927-28. A limited number of graduates will be admitted to courses in General Medicine in the third and fourth years. Attendance at daily ward rounds and Friday clinics is suggested. Arrangements to suit individual cases will be made for special clinical work in any of the Divisions or for special work in any of the laboratories.

**Department of Neurology**

Special courses will be arranged in clinical and laboratory work for individual physicians and for groups. Physicians desiring to take advantage of such courses can make arrangements by correspondence or conference with Dr. Woods.
DEPARTMENT OF SURGERY

Properly qualified graduates in medicine will be admitted to the undergraduate courses in general, special, and operative surgery. Special courses may be given from time to time. In general, however, graduate students desirous of taking advanced work in Surgery are advised to apply for positions as Assistant Residents.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Obstetrics 101. Research.

Opportunity will be given to advanced students and graduates to engage in research work. The staff will give every possible assistance in the prosecution of such studies.

An intensive course for graduate students is given each year at the beginning of September. Recent work in obstetrics and gynecology is discussed, and by means of ward rounds, operative clinics, and tutorial work the members of the class are enabled to refresh and increase their knowledge of the subject.

DEPARTMENT OF OPHTHALMOLOGY

Ophthalmology 101. Refraction, including Retinoscopy and Ophthalmoscopy. Dr. Lee.

_Three hours a week during the second trimester._

Lectures and demonstrations in elementary physiologic optics are followed by practical work in the refraction clinic. Special emphasis will be given to retinoscopy and ophthalmoscopy. Opportunity for observing the principles of frame fitting and lens grinding is offered. _Textbook:_ Thorington’s “Methods of Refraction.”

Ophthalmology 102. Diagnosis and Treatment of the Motor Anomalies of the Eye. Dr. Ling.

_Two hours a week during the second trimester._

A course devoted chiefly to clinical demonstrations and practical work. The study of the normal action of the individual eye muscles and of eye movements is followed by instruction in methods of diagnosis of the various anomalies of muscles and movements. Ample opportunity is given to each student to apply all the tests diagnosis on normal individuals as well as on patients suffering from eye muscle anomalies. _Textbooks:_ Duane’s “Motor Anomalies of the Eye”; Landolt’s “The Ocular Movements”; Worth’s “Squint”; and an outline of “Motor Anomalies of the Eye”, prepared by Dr. Howard.
Ophthalmology 103. Annual Intensive Course. Dr. Pi and Staff.

*A full-time course of four weeks' duration, to be given in the Chinese language, March 5 to 31, inclusive, 1928.*

The mornings are devoted to ward rounds, operations, refraction, and laboratory work; the afternoons to lectures, lantern slide demonstrations, and clinical work, with special study of interesting cases in the dark and refraction rooms. It is the intention of the instructors to make the course of practical value to Chinese physicians who already have had some experience in the treatment of eye diseases and who are obliged to devote all or practically all of their time to clinical work. Twelve students only will be enrolled for this course.

**DEPARTMENT OF OTOLARYNGOLOGY**

Otolaryngology 101. Laboratory Course. Dr. Liu and Staff.

*Hours to be arranged.*

An advanced laboratory course in surgical anatomy will be offered to students who have already completed the required undergraduate work. Aside from affording an opportunity for more detailed study of the special anatomy of the parts concerned, the course will provide a limited amount of material on which to practise the technique of the more common operations.

Otolaryngology 102. Clinical Course. Dr. Liu and Staff.

*Hours to be arranged.*

An advanced clinical course will be offered to students who have completed the required course. This course will be given in the outpatient department of the Hospital and will involve the careful study of new and old cases. Students will be required to follow selected cases from day to day and to assume the responsibility of their treatment.

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**REPORT ON THE CANADIAN MEDICAL ASSOCIATION MEETING**

*Held in Toronto, Canada, June 18th to 18th.*

W. H. Birks M.D.,
Fraternal Delegate to the Meetings of the Canadian Medical Association

Dr. T. C. Routley, the very able General Secretary of the Canadian Medical Association extended a very cordial invitation to the Fraternal Delegate of the China Medical Association to attend, not only the regular sessions of the Canadian Medical Association meeting but also to attend the meetings of the Council.
The meetings of the Council took the first two days of the meeting and at these meetings, everything pertaining to the medical men of Canada was discussed. The Canadian Medical Association is still a growing Association for there are still large numbers of the medical men of Canada who are not members, but more are joining every year.

One of the committee reports to Council was of more than general interest. The doctors of Canada have raised a fund of $5000.00, which is known as the Lister Memorial Fund. The proceeds from this fund are used to defray the expenses of a speaker who gives the Listerian Oration before the C. M. A. every third year. This year was one of the years when the lecture was given and your delegate had the pleasure of hearing Professor Sir Charles Scott Sherrington. His name will be familiar to all physiologists.

The Programme of the Association Meeting was divided so that Sectional Meetings were held in the mornings and General Sessions in the afternoon, while the evenings were usually given up to dinner parties.

Just to mention briefly a few interesting points that came up at various times.

At one of the dinners the General Manager of the Bell Telephone Company of Canada gave a report on the results of their compulsory Periodic Health Examinations for Employees in their company. During the period over which he reported (over ten years) the staff of the company had greatly increased in size but the number of cases of illness had shown but very little increase, so the percentage of employees who had had to lay off work for sickness had shown a very large decrease.

Dr. B. P. Watson, of Sloan Lying-in Hospital, New York (formerly of Edinburgh) spoke on Post-partum Care. He emphasized the necessity for greater care of the post-partum patient over a period covering almost the whole of lactation. He pointed out the great value of proper exercise to restore the tone of the abdominal muscles.

Dr. J. Strickland Goodall of London, England gave a paper on the myocardium as well as contributing to the discussions in the medical section.

There was an exhibition of Art. The paintings were all by members of the C. M. A. There was also an exhibit of technical drawings.

One cannot close without a mention of the large exhibit put on by the various drug and instrument companies and by the publishing houses. This more than filled two large halls and was a small education in itself.
The writer wishes to thank the members of the China Medical Association for the honour done him in appointing him as their Fraternal Delegate to Canada.

SWATOW MISSION HOSPITAL

The Recent Troubles

N. D. FRASER, M.B., Ch.B., D.T.M.

On September 25th the "Red" Army under Generals Ho Lung and Yeh Ting reached Swatow, from which General Wong Tsun had withdrawn his forces.

During the following week the "Reds" were engaged by General Hsieh's armies both in the Chieh Yang district and above Chao-chow-fu, and in both battles suffered crushing defeats.

The "Reds" were extremely insistant that the Swatow Mission Hospital should undertake the treatment of a large number of cases, and accommodation was stretched to its utmost to find room for them. Some 80 cases were treated as in-patients, and an equal number came up daily for surgical dressings.

A sum of $300 was paid over to cover expenses, and a further sum of $300 was promised.

After the battle in the Chieh Yang district large numbers of wounded poured into Swatow, and three "dressers" went from the hospital and attended to some 200 cases in temporary quarters found for them.

The same night the "White" forces advanced on Swatow and the majority of "Red" troops—wounded and all—disappeared.

Wounded "Whites" now began to pour into the hospital and it was impossible to find any authority with whom to discuss satisfactory arrangements. Some cases did not require hospital treatment, and their presence merely added to the work, and interfered with the treatment of more serious cases.

All the available private wards and two public wards were put at their disposal, and cases requiring X-ray examination and operation were treated accordingly.

On Friday, October 7th about 1 o'clock the hospital was visited by General Hsieh, several officers and a bodyguard armed with revolvers.

General Hsieh found the senior hospital assistant in one of the wards occupied by his soldiers, and immediately complained of the accommodation provided, and, on hearing that the surgical dressings had
C. M. A. Section

not been done, of the hospital system whereby the ordinary surgical cases are dressed during the afternoon. The assistant explained that the hospital was already full, and that the staff was occupied all morning with out-patient work and operations. The General then demanded that the dressings be done immediately. The assistant replied that the dressings would be done at two o'clock in accordance with the doctor's arrangements, and was answered with the words "You know the sound of a gun. My orders are the only orders to be obeyed in this hospital, and anyone who does not obey will be shot." He then ordered his guards to arrest and tie up the assistant, calling him a traitor to his country, and a "running dog" of Foreign Imperialists.

The hospital door-keeper came and reported to me that the assistant had been arrested and bound by a military officer, so I went over to hospital and found him in ropes, guarded by two Cantonese soldiers armed with revolvers.

The General meantime was inspecting the wards upstairs, where he cleared a ward full of surgical cases—farmers and country folk—to make room for his soldiers.

On his return I was treated to a thorough dressing down in Cantonese and thought it advisable to send for Dr. Wallace, Mr. Gamble and Mr. Smith.

The General's attitude was most overbearing and threatening, and with his jaws quivering with anger he continued to rage at the hospital and hospital employees. He declared that the hospital was not taking the treatment of his troops seriously, that the work, was being done inefficiently, that the accommodation provided was not satisfactory. He said that the "Gospel Hospital" was a name only, and that its works did not uphold its name. He then gave orders that in future all surgical dressings were to be done in the mornings, and that everything must be done to his satisfaction. If on the morrow his orders had not been carried out, he would arrest and shoot several of the hospital staff. He had already driven off two hospital dressers to search for the second and third hospital assistants, but at the time they were not on the spot.

During his discourse he several times threatened me, and informed me that, should he so wish, he would have no difficulty in disposing of me, and he would then "take back" the hospital and use it for his own purposes.

After the arrival of Mr. Smith and Mr. Gamble the General suddenly countermanded his orders that the assistant should be led away, ordered his release from his bonds, and attempted a dignified exit down the wrong path.
As soon as I had heard the details from the assistant I reported to H. B. M. Consul, Mr. Kirke, who happened to be aboard H. M. S. Wild Swan, and pointed out that while it would be impossible to refuse to take in soldiers for treatment or to insist on the removal of those already in the hospital, it was equally impossible to continue treating them after having been so threatened that I could not expect any of my staff to remain. In the event of the staff leaving, the hospital would certainly be taken over by the military, and once they were in it would be extremely difficult to negotiate the return of the property.

Mr. Kirke said he would send immediately a strong letter of protest to the Commissioner for Foreign Affairs: and after consultation with Commander Hamilton agreed to land a party of sailors to guard the hospital, until a guarantee that the work and organisation of the hospital would not be interfered with had been received.

An officer and 12 men were landed, and marched down the main road to the hospital. Sentries were posted at both hospital gates, and at the compound gate, with orders to admit no soldiers carrying arms. From this time there was always one section on the spot, and sentries were maintained day and night.

Soon after the arrival of the sailors a junior official came from the Head of Police to enquire into the reasons for the landing of an armed force, and to demand their immediate withdrawal. The situation was explained to him, and shortly after his departure the Head of Police himself called to protest against the landing of sailors, instead of first calling on him for protection. In the event of his failing to protect us, it would be time enough to land an armed party. To him it was again pointed out that the next move was in the hands of the Commissioner for Foreign Affairs, and that until we had a satisfactory reply from him, the sailors would remain to protect the hospital. The Head of Police then went to interview the Commissioner and the General himself. On his return he reported that he had seen the Commissioner, and that the Commissioner would interview the General. He requested that the marines might be withdrawn, or in the event of that being impossible, that they should remain within the boundaries of our property and not appear in the public road. Orders had however already been given to this effect—sentries were within the gates, and guards were changed by the compound, and not by the road.

On October 8th there was no incident, and hospital work went on as usual, soldiers continuing to come up for dressings.

On Sunday Mr. Kirke received an unsatisfactory communication from the Commissioner for Foreign Affairs, but on reviewing the
situation came to the conclusion that nothing would be gained by maintaining the guard for any longer period of time. Also it seemed clear that the General alone was responsible for an unseemly display of bad temper, and that on the part of the people and of the soldiers there was no ill will.

Therefore as a gesture of friendship to the Chinese people the guard was withdrawn on Sunday evening, and a second letter sent by Mr. Kirke to the Commissioner for Foreign Affairs.

There was at this time some feeling amongst the Chinese staff in the hospital that the presence of sailors might tend to create unpleasant incidents during the processions to be held next day to celebrate the foundation of the Republic and the General’s victory. It was hoped that withdrawal at this point would be appreciated as showing a desire on our part to avoid marring the celebrations of the day.

The procession on the 10th showed no enthusiasm and was devoid of any suggestion of feeling against the hospital, or against the British. In the Chinese newspapers there was no word of the incident, other than a report of the Commissioner for Foreign Affairs’ letter to the Consul, and it was evident that word had been passed to them that no anti-British agitation was to be worked up.

There has been no trouble with the soldiers in the hospital, though the demands they make upon us are sometimes unreasonable. So far nothing has been received towards the expenses in connection with their treatment. A bill was drawn up covering ward rents and food only, on the understanding that medical and surgical treatment would be covered by a donation to the hospital. The officers who came to pay over the money refused to accept our figure, offered us $60 provided we would give them a receipt for $80, and then produced notes which in Swatow are not worth the value of the paper they are printed on. Since their departure there has been no further word of settling expenses.

It is reported that General Hsieh, on the morning of Oct. 7th visited a Chinese hospital occupied by his troops and there treated his own medical staff in much the same way as he treated our assistant. To each of his noble soldiers he presented $10 and two boxes of biscuits.

General Hsieh is now said to be in charge of 10,000 troops—all in the neighbourhood of Swatow,—and forces of even larger numbers are said to be closing in on him from all directions.
The following doses are recommended in the treatment of benign tertian and quartan fevers:—One tablet should be given three times a day; that is 0.06 grammes or about one grain daily. After five days treatment, there should be an interval of three days and then four days further treatment, and so on. "With due observance of these intervals the treatment may be continued for four or six weeks."

In the treatment of subtertian malaria, the administration of quinine and plasmochin together is recommended because quinine acts more promptly on the schizonts while the plasmochin attacks the crescents. For this purpose the makers supply a sugar-coated tablet containing 0.01 gramme of plasmochin and 0.125 grammes of quinine sulphate (about one-sixth of a grain of plasmochin with two grains of quinine). The dose recommended is two of these tablets three times a day; that is, about one grain of plasmochin and twelve grains of quinine daily. This dose should be continued for one month without interruption; in the second month it should be reduced to one tablet three times a day.**

Plasmochin is more poisonous than quinine. It should not be given on an empty stomach nor should it be administered to persons suffering from disease of the heart or liver. "It should not be left to the patient to take the medicine himself but its administration should be always under the control of the nursing staff." Cyanosis occasionally appears in patients who are undergoing treatment. When it does so, treatment should be stopped until it has disappeared, which it does in a day or two without leaving any ill effects. Large doses may cause cramps and pain in the stomach. The maximum daily amount for an adult is three doses of two and-a-half tablets: that is 0.15 grammes or two-and-a-half grains in a day. Even 0.1 gramme daily, occasionally causes cyanosis and it is advisable never to exceed that amount.

"When convulsive pains of the stomach or cyanosis of the lips are noticed after administration of plasmochin, it should immediately be stopped and only be given again when the symptoms have completely disappeared."

*Extract from the Annual Report of the Institute for Medical Research, Kuala Lumpur, 1926.

**For latest instructions as to dosage see Editorial in this issue.
The Treatment of Malaria in Kuala Lumpur with Plasmochin

This inquiry is not yet complete; the action of the drug in subtertian malaria must be followed in a much larger number of cases before we can reach trustworthy conclusions in that respect, and the combined treatment with plasmochin and quinine remains to be tested, but a sufficient number of benign tertian cases has been treated to make it worth while presenting this interim report.

Plasmochin in Benign Tertian Malaria

Thirty-one men with benign tertian infections were given one-and-a-half tablets of plasmochin, twice a day, with the result that none of them had a temperature over 100°F after the third day of treatment, and, in every case, with the exception of a man who was suffering from bronchitis, it was normal after the fourth day.

The effect of plasmochin upon the parasites was equally striking. No parasites were found, later than the fourth day of treatment, in any of the thirty-one patients with the single exception of a man in whose blood one trophozoite was discovered in a thousand fields examined on the morning of the fifth day. In twenty-two of these men, no parasites were seen later than the third day.

It is evident from these results that the immediate action of plasmochin is quite equal to that of quinine.

Plasmochin in Quartan Malaria

Only three cases of quartan malaria have been available for treatment up to the present time. Here again the action of plasmochin proved equal to that of quinine. The parasites disappeared after two days treatment, in one case; and after five days, in the other two. The temperature was normal after the fourth day in two instances; in the third case, there was slight fever until the sixth day, but this was not due to malaria.

Mixed-Tertian Malaria

Plasmochin was administered to eight men who were suffering from mixed infections with *P. vivax* and *P. falciparum*. The benign tertian parasites quickly disappeared but the subtertian parasites, on the contrary, did not. They were found in seven of the patients later than the fourth day, and, in three cases, as they were still present at the end of a week's treatment, we were obliged to give quinine.

Subtertian Malaria

Only four cases of subtertian malaria have been treated with plasmochin. In one, there were only crescents; in the other three, trophozoites were present, and, in two of them, it became necessary to
give quinine at the end of a week's treatment, because the fever
continued, the patients were getting worse, and parasites were still
present in large numbers.

It is evident from these results that plasmochin, given alone, is
not suitable for the treatment of subtertian and mixed tertian infections.

Subtertian Gametocytes

Plasmochin was given to four patients with crescents in their
blood. The first had an average of five crescents in a hundred fields; none was found after three day's treatment. The second had an average of six crescents; none was found after five days. The third had twenty-five crescents; none was found after four days. The fourth had thirty-five crescents in a hundred fields; they gradually disappeared and none could be found after the seventh day of treatment, though thick and thin films were searched for five days.

It would be wrong to base conclusions upon so small a number of cases; but the results, such as they are, support the claim that plasmochin destroys the gametocytes of *P. falciparum*.

Toxic Symptoms due to Plasmochin. Plasmochin is not unpleasant to take because it is tasteless and the dose is small. No toxic symptoms or by-effects were observed. There was no instance of nausea, vomiting, diarrhoea, deafness, vertigo, amaurosis, tremor or headache due to the drug. The urine was examined daily. Albumen was present in the urine of six patients when they were admitted to hospital; this cleared up as the malaria parasites disappeared, except in two of the quartan cases. The plasmochin did not cause albuminuria. It is difficult to detect a slight degree of cyanosis in people with very dark skins. One man became slightly cyanosed; but this was not necessarily due to the plasmochin, as he was very ill with subtertian malaria. Records of blood-pressure were made during the course of treatment in thirty-seven cases but there was no evidence that the plasmochin had any effect upon it.

Objections to Plasmochin. The makers state that plasmochin is more poisonous than quinine, consequently it would not be safe to supply it (as quinine is supplied in the Malay States) to police stations and to Malay head-men for free distribution.

Plasmochin is as powerful as quinine in its action upon the parasites of benign tertian and quartan malaria. It is far more pleasant to take than quinine; but there is the drawback that its administration must be controlled by microscopical examination during treatment.
Many malarial fevers are due to mixed benign and subtertian infections. In these cases the subtertian parasites may escape notice at the beginning of treatment and there is the risk that they may multiply without detection, while the patient is taking plasmocbin, unless the blood is examined repeatedly during the course of treatment. It is therefore not a suitable remedy for outpatients who live at a distance from a hospital where their blood can be examined.


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LEAGUE OF NATIONS

HEALTH ORGANISATION

PRINCIPLES AND METHODS OF ANTIMALARIAL MEASURES IN EUROPE

SECOND GENERAL REPORT OF THE MALARIA COMMISSION

Summary of the Commission's Views on Measures for Dealing with Malaria in Europe.

It is not part of the Commission's mandate to suggest appropriate antimalarial measures for countries or localities in which malaria is to be dealt with at any cost as a matter apart from the other public health needs and expenses of the country concerned. Our task is quite different. It is to ascertain what measures are most appropriate in countries where the cost of public health measures is an important consideration, and where, in consequence, the antimalarial measures that can be taken are limited financially in accordance with the relative importance of the disease as compared with the importance of other diseases and conditions which affect the public health. This adds greatly to the interest of the subject, but also makes the task of giving advice more difficult. When the discovery of the mosquito cycle of the parasite was made, it was almost universally believed that a single simple method had been put within our grasp, capable of application in all malarious districts. Since then nearly three decades have passed, and such a method is still to seek.

1. In the first place, we should like to explain that, in our view, the present mandate of our Commission is not concerned with the problem of converting malarious areas into non-malarious ones.
financial limitations, to which we have already referred, justify us in this view. We regard the mandate as being concerned only with the measures to be adopted in order that malaria may cease to be an important cause of sickness and death. There is, of course, a great difference between the two aims.

Those who are dissatisfied with this limited aim may derive comfort from the knowledge that it is all that has been accomplished even in countries like England, the Netherlands and Denmark, which geographically and in every other respect are much more favorably situated for obtaining success in the "eradication" of malaria than is any affected country in Central and Eastern Europe.

The geographical distribution of the areas in England which are still liable to the occurrence of locally contracted cases of malaria is very much the same as it was six decades or more ago. This means that in England, except as regards London and similar large cities, we are not able to cite an indubitable example of real disappearance in the sense just defined. The rural towns and villages of England which formerly were malarious are still potentially so, as is proved, for example, by the fact that in Queenborough town in 1917, when a large number of malarial patients and carriers were introduced from abroad, a sharp and widespread epidemic of new cases among the local inhabitants occurred. Therefore, we are obliged to admit that what has happened in those areas is not an eradication of the causes of endemity and of the sources of malaria but a significant reduction, and in some instances a complete cessation, of observed cases of the disease and in particular a cessation of severe and fatal cases. Thus the disease has come finally to be of little or no importance as a cause of sickness and death. This, in our view, is a sufficient aim to strive for, and, indeed, in the present state of knowledge, it is the only aim which is possible of accomplishment, except in a small fractional proportion of the numerous localities where malaria prevails.

Conclusion.—In Europe, having regard to the present state of knowledge, the correct antimalarial practice is an endeavour to reduce the incidence and severity of the disease. Measures designed to accomplish more than that (particularly measures aiming at "eradication") are not a wise proposition and can be justified only in very exceptional circumstances.

2. Secondly, we wish to remark upon the belief (which we found to be common in Eastern Europe) that it is always necessary to deal with malaria by a method arising directly out of the knowledge of the evolutionary cycle of the parasite in mosquitoes. Our opinion is that it is very desirable in certain circumstances to throw off the tyranny
which that belief has exercised over men's minds during the last thirty years. It is safe to say that in some countries of Eastern Europe with very limited financial resources hardly anything has retarded the effective control of malaria so much as has the belief that, because mosquitoes carry malaria, their elimination should be the object of chief concern and expenditure. We have seen some extreme instances in which so much of the time of the available medical men was taken up by antilarval measures in the field that little or no treatment of the people who were ill in their homes could be carried out. Since the advent of the new knowledge of the transmission of malaria by mosquitoes, there has been a tendency to forget that there are many methods of dealing with the disease, and that some of them are effective even without any attempt being made to reduce mosquitoes. Indeed, it is wise not to forget that some of them were effective long before the malaria parasite and its vital association with a mosquito of any sort had been discovered. In this connection, we may repeat that England, the Netherlands and Denmark are examples of countries in which malaria was robbed of its importance as a cause of sickness and death, without any knowledge of the epidemiology of the disease and without any reduction of anopheles having occurred. In various other parts of Europe this is happening to-day. Quite recently, during our tour in Sicily, we were shown a locality (Rotondella) in which a quite similar change had been effected under the same conditions of absence of measures based on epidemiological knowledge and absence of anopheles reduction.

Conclusion.—It is not always necessary to deal with malaria by a method arising directly out of the knowledge that the disease is transmitted by mosquitoes.

3. A result of our enquiries which is closely related to the conclusion just stated is the recognition that there is not yet a method of malaria control which can be described as being superior to all others and, therefore, to be adopted in every country. There are (as we have already said) a number of methods of control, and some of them are constantly being improved. Each or any of them may, either wholly or in part, render valuable service in a country if it is a method well suited to the local conditions. This suitability or adaptability to local conditions is one of the most important matters to be considered in a choice of methods and it is essential to the success of the method chosen. Local conditions differ from place to place, and the differences constitute secondary or auxiliary factors which, as we noted in the beginning of this Section, play an important part in the epidemiology of the disease. They may be concerned with the inhabitants (e.g., race, social status, habits and customs, housing, work, etc.) or with
the anopheles (e.g., species, habits, abundance, etc.) or with the soil and environment (e.g., reclamation and clearing of land, character and extent of breeding places, primitive or intensive agriculture, farming or industries, state of general sanitation, etc.). The necessity of employing a method which takes these secondary factors and their differences in different places into account makes malaria control a local problem to a much greater degree than is the case with the control of other infectious diseases.

Conclusion.—In every country and very largely in every area, there must be preliminary examination to ascertain what method is best suited to the local conditions. At present, it cannot be said that for malaria control there is a method of choice superior to all others.

4. It is usual to classify measures into:

   (1) Direct;
   (2) Indirect.

We adopt that classification, but we give to the terms a more precise definition than is usual. For instance, we do not regard antilarval measures, nor even measures against adult anopheles in the general environment, as being direct antimalarial measures. In our view, there are only two direct antimalarial measures, namely, killing the malaria parasite in man and killing the malaria parasite in mosquitoes. The first is to be done by treating malaria-infected persons with quinine, the second by killing malaria-infected mosquitoes in the houses. In comparison with these two measures, anything else that can be done to control malaria is necessarily very indirect. For example, no one who thinks seriously on the matter can doubt that general antilarval measures in the field are a very indirect method of trying to deal with the disease—that they are a line of action which takes us very far away from the rather exact knowledge of the etiology and epidemiology of malaria which we are fortunate enough to possess at the present day. They were rightly regarded as a direct measure twenty-five years ago, when it was believed that what was called the epidemiological chain could be expressed in the simple formula:

   [formula]

   mosquito + malarial patient = malaria.

But we have long known that the formula, even in its simplest form, must be represented figuratively by at least three chainlets, each consisting of links of different shapes and sizes to indicate various circumstances and conditions of unequal influence, joined together rather loosely by larger and stronger links, which, as we now know, are almost unbreakable with the means and materials usually available in malarious places.
Adopting this restricted definition of direct and indirect means of controlling malaria, we may begin our recommendations as to direct methods by referring to the "brief conclusions" with which we prefaced our former general report on malaria in Europe (C. H. 273). In those conclusions, we stated the general considerations of which account should be taken in framing suggestions for dealing with the disease, and we indicated in general terms the line of policy which we thought should be adopted. This was to the effect that, in the malarious countries of Europe, certain "primary measures" for dealing with the disease are practicable, and give prospects of very favourable results, without it being necessary to undertake those comprehensive anti-mosquito measures which are so closely associated in the public mind with malaria prevention, but are impossible of employment, save in quite exceptional cases, on account of their enormous expense. We defined primary measures as being measures which are limited to malaria-infected individuals and the interior of the houses in which they live, and we stated that, in the opinion of the Commission, these measures are always indispensable, whether or not any other direct or indirect means of controlling malaria are employed.

Conclusion.—The Commission defines what it understands by the terms "direct" and "indirect" measures, and suggests that in every malarious locality certain direct methods, called "primary measures", which have to do with malaria-infected individuals and the interior of the houses in which they live, are indispensable.

5. First let us consider the measures relating to malaria-infected individuals,

We think that, whatever else it may be possible to do in malarious localities, the first and most important thing to do is to arrange for the treatment of the disease by quinine. In certain parts of Europe the gratuitous distribution of quinine is the only antimalarial measure which the countries concerned can afford to carry out. We are persuaded that the wide distribution of quinine is a public duty which, whenever and wherever necessary, should be organised and paid for by the State. Without going into detail, we would merely state that in this measure, as in others, the plan which succeeds best will usually be the plan which is best suited to the ideas, customs and prejudices of the people.

In organised communities something more than the gratuitous distribution of quinine to all who appear to be suffering from malaria must be attempted. In communities which have attained the status of a town or municipality, there will usually be at least one resident or visiting private medical practitioner, and the Commission is of opinion
that in such localities it is advisable to appoint and pay him for the specific duty of treating malaria patients in their own homes and of discovering and treating new cases and carriers. A further advance consists in the organisation of a definite system for the satisfactory diagnosis and efficient treatment of the disease. In our opinion, this duty is one which, wherever possible, should be in the hands of private medical practitioners who can visit patients in their own homes; but it is essential that the practitioner (who will be appointed "part-time special malaria officer") should undergo a post-graduate course of malarial study. In the investigation of malaria in Europe, nothing is more striking than the difference between the manifestations of malaria in a locality where the practising medical men have full knowledge of its diagnosis, clinical course and treatment (and where, consequently, patients are properly treated) and the manifestations in a similar locality which is without that expert medical aid. The difference may be so great that, in places in the former category (as the Commission was able to observe personally on several occasions during its tour in Europe), modern methods of enquiry for ascertaining the "splenic index" or the "parasite index", as a test of the incidence and endemicity of the disease, may give entirely negative results. We have observed in North Holland some excellent instances of what private practitioners, working entirely on their own initiative, can do to keep the effects of malaria in check and to provide information of its incidence and epidemiology. We refer particularly to the work of Dr. Korteweg in the Zaan district, Dr. Honig at Nieuwendam, Dr. Horst at Zaandyk and Dr. Faber at Sloten. These private practitioners have made it their rule to take and examine thin and thick blood preparations from any of their patients in whom malaria is suspected, and to keep a card-system record of the positive cases, separately for primary occurrences and relapses, with details of age, sex, residence, parasite and splenic findings, symptoms and effects of treatment. In this way there has become available for four or five separate communities, each of about 3,000 inhabitants, an epidemiological and clinical record which, for accuracy and fullness of information, appears to the Commission to be of great value. It is understood, of course that these practitioners did not intentionally take any steps to control malaria; their action was limited to the diagnosis and treatment of cases as they arose among patients who sought their advice. The good which they did is chiefly evident from a study of the clinical records. These show, in the first place, that the discovered cases were cured within a few days and seldom or never suffered from enlarged spleens or other appreciable after effects of the illness, and, secondly, in marked contrast, that there were found, from time to time, persons who had never been treated
and in consequence were in a cachectic condition and with greatly enlarged spleens, so that they presented an appearance quite similar to that of untreated patients in the Tropics and in some parts of Eastern Europe. No one who was cognisant of the existence of such cases could fail to appreciate what might be the condition of a large number of the inhabitants of those malarious districts in North Holland if early diagnosis and effective treatment were not readily available.

We should like also to point out that the Commission during its tour in Spain observed, notably in the province of Caceres, a system being developed whereby medical practitioners were entrusted with the duties of official malaria doctors.

Conclusion.—The Commission considers the treatment of malaria-infected persons to be one of the most important measures even from the point of view of prevention. It considers that, in rural areas and localities under primitive conditions, the State must make arrangements for the treatment of patients according to the means available, and that at least an arrangement for the gratuitous supply and distribution of quinine in such areas is indispensable. In organised communities in which the sanitary authorities consider it expedient, the Commission considers that satisfactory diagnosis as well as treatment should be arranged for, and recommends that, wherever possible, private medical practitioners already established in the locality, and having undergone a special training with this end in view, should be appointed to undertake the work.

6. The other primary measure which we recommend was described in our former report as follows: 'The instruction of the inhabitants, in their homes and in the schools, as to how malaria is spread from member to member of the same family by the agency of particular mosquitoes, which find the house a safe resting-place, and how to catch and kill these mosquitoes daily; teaching the use of mosquito nets and other means of personal and house protection against mosquitoes, the advantages of cleaning and whitewashing rooms, ceilings etc.'

In Europe, the majority of infected anophelines are found inside houses; their destruction is a measure the importance of which it is impossible to exaggerate. We think that it should be a duty of the special malaria officer and his assistants at each visit to a household to explain this matter to the occupants, and to demonstrate to them how to find and to kill the adult anopheles mosquitoes which are present in the house. He should explain also how to make a house inhospitable to anopheles by removing cobwebs and dirt, clearing out cupboards, recesses and other dark corners likely to harbour mosquitoes, as well as by whitewashing etc., wherever suitable. He should try to persuade
the occupants to search for and to kill anopheles mosquitoes in their houses every day. At each periodical visit he should ascertain to what extent the occupants carry out his advice. The aim should be to teach them to have the same dislike and objection to the presence of these gorged and sluggish mosquitoes in their houses as cultured people already have to the presence of bed bugs, lice and other harmful and disgusting vermin. The measure has the advantage of costing nothing. It has also the merit derived from the results of experimental laboratory work showing that one infected mosquito can give malaria to as many as from twelve to thirty persons. Therefore it is difficult to praise too highly any person who succeeds in killing even one of these infected mosquitoes. We are aware, of course, that organised arrangements can be made by local authorities for killing mosquitoes in houses by periodic fumigation or other means, but we think it preferable from the beginning to place the responsibility for the work upon the householder and particularly upon the housewife and children. Thus we hope that in time it will become a part of the housewife's daily task, just as much as sweeping, brushing and tidying the living-rooms and bedrooms. Female health visitors and health nurses, who have been properly instructed and trained to deal with the particular items of house-cleaning which are important from the point of view of preventing infectious diseases, can do a very great deal of good by instructing housewives on those matters. Effective help can also be given by school-teachers who are in a position to interest the children in the destruction of mosquitoes in houses and in schools.

Conclusion.—The Commission strongly recommends that, in addition to making the best arrangements possible for the discovery and effective treatment of cases and carriers, an active and energetic endeavour should be made, wherever possible, to induce householders, especially housewives, to make the killing of adult mosquitoes found within the house a part of the daily cleaning task. The Commission is convinced that that measure, if it could be effectively carried out, would have very remarkable results.

7. Indirect Measures.—The Commission has carefully considered in what circumstances any other measures than those dealt with should be recommended, and what those measures should be. As a result of this consideration, we desire, in the first place, to refer to the problem of what should be done in certain regions where the conditions in which the people live and work are so primitive, and their economic position and social status and culture are so poor, that it is not possible in practice to apply direct measures in a manner which enables them to be brought to the standard which we call 'minimal effective degree of perfection'. In several European countries there are large or small areas in this class and, like similar regions in the Tropics, they are
very malarious. We are of opinion that, except the free distribution of quinine, no direct antimalarial measure can be applied to them until the land has been brought into such a condition that it is worth the while of the inhabitants to settle permanently upon it and until those permanent settlers have reached a fair standard of housing and living. Nothing is more favourable to a high incidence and severity of malaria than frequent movements of a population hither and thither in search of a bare living, or of a place where the conditions of life are less hard; and very few things have a greater effect in reducing malaria than the stability of the population which comes when such a place is found. Agricultural reclamation of the land, so that people may be settled permanently upon it with a fair prospect of gaining a livelihood and perhaps a decent house and moderate comfort, is, therefore, a measure which tends indirectly to produce a great reduction of malaria incidence and severity. In general, the better the agricultural reclamation is carried out from the point of view of increasing its productivity, the quicker will malaria seem to disappear as an important cause of sickness and death—provided always, of course, that the people themselves share in the improved prosperity by being able to adopt a higher standard of housing and living. It is hardly necessary to say that when—as sometimes happens—reclaimed land is worked by hired labourers, who receive only a small fixed wage and live a life of great hardship in temporary huts and hovels, there is no improvement of malaria among them. Indeed, in the Tropics, highly cultivated areas where these conditions obtain continue to be among the most malarious in the world. This proves that the actual measures necessary for reclamation (drainage, etc.) are not the factor which causes the health of the people to improve, but that the good result is due to the better conditions of living and housing which the increased productivity of the soil enables the people to obtain. The Netherlands is the country where the people as a whole have benefited most from land reclamation, but, among the countries of Central and Eastern Europe, Italy is in the forefront as an exponent of schemes and systems of "bonification" as an antimalarial and general sanitary measure.

On a smaller scale, Palestine has recently provided some excellent examples of the benefits which have followed the general scheme of "bonification", which is gradually being applied as far as possible throughout the country. There the scheme begins with arrangements for rectifying the existing confusion in regard to the land system of the country and the state of undetermined or scattered ownership to which the bad cultivation of much of the land was due. Various departments of the Government are concerned with the matter, and
(as in Italy) the Department of Health takes an important share by urging the claims of bonification as an anti-malarial measure, by collaborating with the engineers during the progress of the work and by seeing that the work is accompanied and followed by measures of housing, education, general welfare and higher standard of living which are rightly regarded as the primary aim and purpose of the scheme.

Conclusion. Of all indirect methods of reducing malaria, the Commission attaches most importance to general schemes of bonification which aim at improving the economic and social condition of the people and their general well-being, and standard of life.

The stabilisation of the population, following on its settlement on the land, may not only improve its economic conditions but may also influence favourably its educational standard—and consequently its sanitary condition—by making school attendance more general and more regular.

16. It is interesting to know that the changed conditions of life just referred to, and the consequent reduction of malarial incidence and severity, have often been brought about in the absence of any measures intentionally based on modern knowledge of the aetiology and epidemiology of malaria. We may illustrate this by describing briefly the following small scheme of bonification which was demonstrated to the Commission during its recent tour in Sicily. The locality was a dairy farm comprising 50 hectares of land near Simeto, on the plain of Catania. The situation was described to the Commission as being so malarious that it was uninhabitable. At the time of our visit, there was no village nearer to the estate than 20 kilometres. The proprietor commenced his project of bonification by building a road to the area, by bringing from 8 kilometres' distance the electric current which was required for lighting and power at the farm, and by constructing the necessary buildings, including a house for himself and houses for the staff and farm workers. The land was gradually brought under cultivation, irrigation being used where required. The slopes were planted with fruit-trees, but the greater part of the land was used for growing lucerne and cereals. During the first year, the labourers and farm hands slept in tents and temporary shelters. They suffered so much from malaria that the proprietor feared it would be necessary to abandon the enterprise. They were treated regularly with quinine, but no antimosquito measures were taken. By the end of the second year the malaria situation had ameliorated considerably and it continued to do so year by year. At the end of six years the community comprised about 100 persons, and, according to the information given us, the amount of malaria among them was inappreciable.
We found considerable numbers of *A. maculipennis* and *A. superpictus* in the stables, but none in the living-room of the only labourers' house which we examined. Many anopheles larvae were present in an irrigation canal near the buildings. We found no enlarged spleens among the few children whom we saw, and the people generally looked strong and well.

The interest of this example is that no antilarval or other methods of mosquito destruction were tried and that both larve and adult insects are still present in the area in quite sufficient numbers for malaria to spread; the place is now an instance of "anophelism without malaria".

*Conclusion.*—*An example is given which shows that bonification as defined in this Section may be effective without expert measures based on modern knowledge. It illustrates the importance of the auxiliary factors in the epidemiology of malaria.*

**THE PASSING OF MALARIA**

*Bass (C. C.)*

This historical survey, with no intention of being complete, points out how Morton, in 1697, accurately described the malarial fevers epidemic in London, as also in England and Wales, while Sydenham, in 1726, gave a most complete description of the intermittent fevers prevalent throughout England and part of Scotland, the infection continuing in parts of England until 25 to 50 years ago. Nevertheless anopheles were sufficiently abundant to reproduce indigenous infection when the disease was reintroduced in mass during the great war. At the beginning of the nineteenth century Holland was scarcely less notoriously malarious than the Agra Romana; now the infection is strictly and mildly focal. A hundred years ago, Rochefort and the mouth of the Gironde in southern France were intensely malarious; today the disease is practically unknown. The same holds for Wurttemberg and the Harz Mountains in Germany, and, in North America, for low-lying valleys in Minnesota and Michigan and round the Great Lakes. Between 1800 and 1850 New York and Philadelphia and their surrounding country was intensely malarious. Twenty years ago the infection was serious round Baltimore. At the time of the Civil War it was the largest single cause of death in the Southern United States, haemoglobinuria and coma being common. The recent decline has been most marked. In New Orleans 30 or 40 years ago large numbers of malaria cases were treated. Twenty years ago cases were always to be found in every ward of the New Orleans Charity
Hospital with which Bass was connected, and, less than that period since, he remembers seeing 16 quinine abscesses in that hospital at the same time. At the present day, not only are there no cases originating in New Orleans, but very few come in from the surrounding country. Since in many places malaria is no less or has increased, for what reasons has it receded in the areas mentioned? The causes are put in this sequence. First, advance in civilization, that is in clearance and drainage of land for agriculture and industry; the diffusion of knowledge of the part played by mosquitoes and the increased protection employed against them; and finally the extensive and intelligent use of quinine particularly in reference to disinfestation and not merely to the elimination of clinical symptoms. Such a line of treatment is typically exemplified in the United States Standard Treatment—with which the name of Bass himself is so closely connected. In reply to a discussion and speaking of the proper use of quinine Bass said.

"There is probably no country in the world where quinine is used to as good advantage and where there is as little misuse of it in the treatment of malaria as in this country. Unnecessary hypodermic or intravenous administration of the drug is limited to the work of a comparatively small number of enthusiasts and the unreasonably excessive doses are also not used by a great many physicians."


INVESTIGATION ON THE VITALITY OF VIBRIO CHOLERA ON CHINESE PAPER MONEY

(From the Laboratory of the North Manchurian Plague Prevention Service, Harbin.) by Dr. H. M. Jettmar.

It is of practical interest to know, how long vibrio cholerae may live on coins and banknotes.

The vitality of the vibrio cholerae on coins has been already studied. Uffelammn stated that the cholera vibriones perish on coins very quickly, already after 10-30 minutes. On silver or copper coins they disappear, apparently on account of some chemical influences, much quicker than on gold coins.

The vitality of cholera vibriones on banknotes has not yet been systematically investigated so far as I know.

This, however, is a question of some importance for North China with its almost exclusive paper currency. Therefore, during the small cholera epidemic in Summer 1926 at Harbin, some experiments were carried out which may be described here.
In these experiments the leading idea was to imitate natural conditions as far as possible. Almost all of the upper mentioned authors had used pure cultures of vibrio cholerae for their investigations. Thus the concentration of the bacilli on the contaminated objects was a far higher one than generally occurring under natural circumstances. For this reason no cultures of bacilli were used in the following investigations but exclusively fresh stools, obtained from cholera patients. These excrements were used for contamination of 5-cent banknotes, which are frequently in circulation and, therefore, very dirty. For that purpose, 20 banknotes were cut into slips and used without previous sterilisation. The method of contamination, referred to later on in detail, tried to imitate likewise natural conditions as far as possible. After contamination the slips were either directly exposed to diffuse daylight, or rolled up in paper.

CONCLUSIONS

1. The cholera vibriones when dried on banknotes, touched by fingers infected with cholera stool, remained alive up to 4 hours.

2. Vibrio cholerae, cultivated from banknotes 4 hours after contamination showed the same cultural and serological qualities as the original strain.


VITAMIN B.

The sequel of prolonged insufficiency of a vitamin in diet is definite pathological change which in due course becomes clinically apparent as one of the deficiency diseases. Extensive animal experimentation has been successfully employed for the elucidation of many problems in this branch of medicine, and it has been found possible to recognise no less than five different vitamins, viz: the fat solubles A, D, and E and the water solubles B and C.

In this country, "B" is a vitamin of outstanding importance. We are not at the moment concerned whether or not the onset of beriberi is determined by deficiency alone or if the attack is precipitated by some specific toxin or infection acting on soil previously prepared by vitamin B starvation. The essential fact remains that the deficiency of this vitamin from diet as the primary cause of beriberi in Malaya is based on evidence too definite to be gainsaid. Of the many sources of vitamin B, rice polishings and yeast probably have the highest content. The value of polishings has recently been shown to be much greater relative to yeast than was indicated by the original experiments of
Chick. At the Institute for Medical Research Kuala Lumpur, a concentrated extract is prepared and we believe that supply is well able to keep pace with all reasonable demands. Recent research has achieved the separation of this vitamin in a practically pure state and we are doubtless on the threshold of its identification as a chemical compound and subsequent synthesis.

Though the exhibition of vitamin B appears necessary for the cure of beriberi, it is followed by no dramatic improvement in the condition of the patient if symptoms have been present for some time. In the very early stages of the disease however a rapid amelioration usually results and for prophylaxis this vitamin is of marked value. It was recently imperative to organise rice distribution in the flooded areas Pahang and urgent necessity doubtless resulted in the dispatch of polished rice to some districts. An alarming rise in beriberi incidence occurred which was immediately checked by the supply of rice polishings extract. A promising prophylactic application of vitamin therapy is also seen in some of the local maternity hospitals. Beriberi not infrequently follows labour if the mother has previously lived on a diet dangerously low in vitamin content. By means of a diet rich in vitamins or the prescription of extract from the moment of admission to hospital it appears possible to avert the onset of symptoms.


ISOLATION OF M. MELITENSIS FROM PATIENTS IN CHINA

C. K. Lim

The author reports that there is no authentic record in cases of undulant fever in China of the diagnosis having been made by isolation of the specific organism or specific agglutination. He describes an epidemic among Sikh watchmen of a coal mining company at Chiaotso, Honan. These were from the Punjab. In 1924 four cases occurred, recognized clinically and by agglutination (1/400-1/600). The Sikhs kept a small herd of Chinese goats for milk. Was the disease introduced from the Punjab to the goats by "carriers"? Since the goats were quickly destroyed this cannot be determined. It is stated that a small outbreak followed the arrival of new watchmen from the Punjab. The Micrococcus was obtained from the blood of one. No cases occurred among the Chinese.

The author holds the view that text books are in error when they state that undulant fever is endemic in the Yangtze area, but it must be remembered that an increasing quantity of goat's milk is used by
foreigners and "carriers" are possibly present. A survey of the incidence of infection among the native goats is desirable.


The Author's statements above are a little too sweeping. In 1916 (C.M.J. xxx p. 100) a case was reported from Fukien giving agglutination tests with _Micrococcus melitensis_. Cases of what was almost certainly undulant fever have also been reported from Shanghai and Chungking. It is of course possible that all these cases were due to _B. abortus_ and not _M. melitensis_.

_Editor. C. M. J._

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**Hospital Reports**

**CHURCH GENERAL HOSPITAL, WUCHANG**

**MEN'S DEPARTMENT**

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**WOMEN'S DEPARTMENT**

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As might be expected the report for 1926 covering the period of the siege of Wuchang is exceptionally interesting. An epic such as this should not, we feel, be spoilt by any attempted review and in place of this we propose to reprint a large part of Dr. James' fascinating account of this terrible period. She writes:

In the kaleidoscopic environment of early 1927, it is difficult to focus one's attention on even as eventful a year as 1926, so absorbing is the immediate present. Our very siege begins to fade into relative insignificance, and the events of last January seem to have happened years ago. In that far, far away period—those first weeks of 1926—life was running along in the same old way as for ages past, and we were calmly going about our usual business as though the world would forever run on in its well-worn groove. But with February things began to happen. First our Military Governor, Hsiao Yao Nan, died very suddenly, and we soon heard that we had six new Governors: a Military and a Civil Governor, each, appointed respectively by Wu Pei Fu, by our Provincial Assembly, and by the Chamber of Commerce.

A week after Hsiao's sudden demise, while the world was agog with gossip about the political implications connected with our guber-
natorial changes, the Telephone Building burned down, one very windy day, and all telephonic communication came abruptly to an end. Not so with rumors regarding the cause of the fire.

By this time Wuchang was filling up with the Military of the new regime, and the city electricity was petering out to such a degree that 32 candle power bulbs gave hardly the light of one feeble candle. The blame for this was placed on the new "Military," who were said to be tapping the wires even more than was the wont in the past. Hence, a week after the telephone service came to an abrupt halt, the city was swathed in darkness except for a few official buildings. The following week our cash notes depreciated in value (the currency used very extensively in this and other native cities) and we began to wonder what next would happen. Someone jokingly suggested that the ferries to Hankow would cease running—those battered old wooden tubs, always so overcrowded, on which we risk our lives to visit the great metropolis,—but this surmise proved incorrect. For a while life became rather tame again, except for the big parade when we buried our Governor, a month after his decease. In the course of the spring we even began, gradually, to get back telephone service, and late in July the electric lights reappeared for a brief season. Cash notes also passed again for face value.

Meanwhile the hospital ran on as usual, with more in-patients than in any previous year. Likewise, our Training School went on as before.

As the warm weather advanced, so also did the Nationalistic Army from the South. By the middle of August the Southern Forces were up in the north-central portion of the adjacent province of Hunan, and by the 24th they were reported to have taken Yochow, the last city along the line before reaching Wuchang. This news reached us in Kuling on Wednesday, August 25th, and after a consultation with Bishop Gilman, I packed my baggage for Wuchang and started it on its journey the next morning. The following day saw many of us footing our way down the mountain to the humid plain, and thence up river by the crowded steamers that put out from Kiukiang that day. Bishop Gilman, Dr. Bliss, and I were all in the number that steamed hurriedly up river and back to the city that awaited we knew not what. We found Wuchang astir with all sorts of rumors. Civilians were excitedly pouring out of the city gates in all directions, fleeing from the advancing army. To quell the panic, people were forbidden to take baggage with them, those last few days, but foreigners and officials were an exception to this rule. Life was cheap those days, at least the life of any thought to be in league with the South, and many was the student given short shrift, if we are to believe a quarter of what
was said. Heads of such victims were suspended from the telegraph poles, etc., at the site where the two main streets of the city cross, as a warning to others. The sight was indeed gruesome. I had often heard of this custom in China but had never before seen it with my own eyes. Since the weather was still hot and the flies abundant, it was a menace to health as well as to feelings. By Monday, the 30th, it was obvious that the city gates were not likely to stay open much longer. Three members of our foreign staff were not yet back from Kuling. Yet, since Dr. Richey and Miss Brown were still due their second month of summer vacation, we got them to hurry their baggage across to Hankow by servant that Monday, and to hasten off themselves, under the gallant escort of Mr. Miller, the following day. It was about their last chance, for although Mr. Miller was able, the next morning, to escort to the Women's Departments of the hospital Miss Steward, Miss Ravenel and a bag of flour, it is doubtful whether he could have taken two women safely through the crowds, in the opposite direction, by the Wednesday morning. That night the firing began, and we became a besieged city, although it was not until the following night that bullets began showering about the hospital compound and into our wards.

Our siege family in the Women's Department consisted of our two nurses, Miss Cabot and Miss Ravenel, our Business Manager, Miss Steward, and myself, augmented by Miss Buchanan (who had stayed on lest the last two should not be able to get into the city and we be left strapped) and the Rev. Edmund Souder, of whose gallant services we were indeed glad. There was enough and to spare for everybody to do, whether professionally trained in hospital matters or not. Some very responsible person was needed at the gate all day long, to exclude undesirables and to see that the wounded, and others really in need of our help, were promptly admitted. This was particularly necessary after each air raid, when every moment counted. Nor was the task of the Guardian of the Gate—generally Miss Buchanan—confined to this. She needed hawk's eyes to see that none of our precious grain was smuggled out and to make sure that any food brought in was turned over to the nurse in charge, for recooking, to kill cholera germs, etc. Then the morale of servants, patients and nurses had to be kept up by personal contacts, and their feelings appeased as the rations became gradually less and less, and their flavor more uninteresting. Then, because the world always contains some selfish souls in every locality, somebody had to stand guard over the supply of rice gruel or millet mush, to see that it was evenly distributed to the patients. During the month of September we averaged over a hundred and twenty In-patients a day, in the Women's Department, so this food
guarding was no small task. The forcible thinning out process, begun the latter part of that month, reduced the numbers by October, but even then we could not turn out into those streets helpless women and children who had become homeless or who lived beyond the city walls. With looting, and worse, going on it was better to let them stay under our protection, even though they starved, than to turn them out weak and half sick, to face such probabilities. Those who could, provided their own food, which we cooked or re-cooked. Our Senior Graduate Chinese nurse gave her whole time to the commissary department, and I personally climbed over the bins in our store room, counting the grains of rice, millet, etc., as it were, and calculating the rate of decrease of rations necessary. We husked, ground and sifted, by hand, all our own grain, after the rice gave out, and I had the chaff all stored, to fall back upon as food, when the last grain should fail. Many in the city were already subsisting on chaff, but we were more fortunate because the government helped us out. At the outset we had nearly 3,000 pounds of rice on hand, and the Men's Department helped us out with another sack of about 130 pounds, since the government had sent them some half a dozen such before said powers began to take cognizance of us at all. That happened to be the end of rice for everybody, but thereafter the government delivered grain of a coarser nature every two or three days almost to the end of the siege, and they gave to us almost as often as to the Men's Department. Bishop Gilman and a Chinese friend had pleaded in our behalf, besides Father Souder and myself making a personal call at headquarters to beg it. Even so, however, there was just one more meal on hand when the siege was lifted, and Dr. Sherman and others rushed to us the rice they had had in readiness those many days. The gruel served that evening was the most welcome meal I have ever seen received.

Those forty days of siege were indeed an experience. Throughout the time bullets whizzed at intervals, day and night, about us, yet only one of our people, a servant, was injured, and he not seriously—just a bullet through the leg and out again, missing both bones and large blood-vessels. Cannon shells burst about us here and there, but none quite on our compound. Airplane bombs—than which there is nothing deadlier—fell to right and left of us, and one even in the hospital compound between the two houses for foreign nurses, but it merely sizzled away in the ground and did not explode. Had it "burst into bloom," as the Chinese idiom puts it, there would have been two less houses to our credit.

Though I think that the Southerners tried not to hit the hospital, yet the fact that Wu Pei Fu's Commanding General of Wuchang, taking advantage of this probability, tried to shelter himself by moving
next door to us and making the compound across the alley at the rear of the hospital his ammunition dump,—this little fact deprived us of some of the assurance which our Red Cross insignia would otherwise have given us. Bombs dropped from the skies cannot be expected to fall on just the foot of ground planned, and we had two rather close calls. But, except for bullet holes, our buildings remained undamaged, and we ourselves, thinner and somewhat wiser, all emerged from the siege with a new appreciation of the value of food and peace, and some of us at least with a strange sense of the Providence that had so wonderfully guarded us.

As a result of bullets, cannon shells, and air raid bombs, our list of diagnoses this past year includes all manner of wounds and fractures. To you who, at a distance, read that list at the back of the report, it can be only a bit of surgical statistics, but to us it represents human anguish that we can never forget. Though we may be able to jest about the poor woman who was struck by a bomb while taking her bath and who in spite of compound comminuted fractures of thigh and shoulder, and traumatic amputation of most of her right hand, not to mention various contused wounds elsewhere, still was obsessed with the cleanliness idea when she awoke from her anaesthetic (her bones have all knit now); though we can laugh about the two little boys, not much injured, who had been coated with coal dust from head to foot by the force of a bomb explosion, evidently in the neighborhood of a coal dump:—yet we cannot blot from our memory the mother, who, rushing out, in vain, to save her baby, had both legs hopelessly mutilated, nor the courage of the poor husband who brought them both to the hospital and tenderly helped us to lift them. Neither can we forget the woman who arrived already dead, in a rickshaw, her abdomen terribly wounded, nor the many others hideously disfigured, some dead or dying on arrival, and some destined to weeks of suffering before death or recovery. Fortunately, in spite of the very inadequate food supply we were able to give these patients, most of them made a surprisingly good recovery, and only a very few of those not moribund on arrival succumbed. We did not get a single ununited fracture, though we had many very extensive compound comminuted fractures, including such large bones at the femur and the humerus. I certainly have an increased respect for Nature's curative powers when I see how she can grow even an inch or more of new bone, under such unfavorable conditions. Our wards were a grotesque sight, with arms and legs in all sorts of extension devices, but the queer stunts did the trick. Since I was the only doctor for all the work in the Women's Department, Miss Cabot and Miss Ravenel did the very serious dressings for me, and the Chinese nurses the others. Fortunately Miss Cabot
had been in training in England during the World War, so had had experience with such fractures, and knew just how to go about things. How we did hustle, from morning to night, and often in the night, with accidents coming in at any old hour, and cholera patients to vary the monotony in case things got dull. Or, the looters would reach a house next door and our terrified neighbors would scale our wall, or in one case climb down a tree growing in our compound with a branch overhanging the neighboring roof. Fortunately the looters never pursued into our compound, so our task merely consisted in soothing the overwrought nerves of the refugees, and giving them shelter until they felt the marauders were safely out of the way again. I believe that the General who ensconsed himself in our zone of relative safety really gave strict order that the hospital compound was not to be looted, for we enjoyed complete immunity throughout the siege, though all about us we could hear the random shots and the shrieks of the terrified house-holders, betokening the fact that looting was going on near by. This was increasingly frequent towards the end of the siege, when the soldiers were getting desperate. Of course we constantly expected to be looted, and put certain things in particularly inaccessible places. One time I hid the keys to my personal trunks, etc., so successfully that, when I wanted them about a week later, I had to do a bit of searching myself to find them. My hospital keys, of course, I had always with me.

How long ago these days seem now. It is like trying to recall a dream to think back to those noisy nights of bombardment, when we spread our cot beds in the Chapel and hospital hall way—a gregarious lot of Chinese and foreigners, seeking the least exposed site. So, so much has happened since those busy hectic weeks, when we dodged bullets and tried to supply ourselves with enough calories to run our human machinery by supplementing our rather frugal diet with large quantities of molasses, one of the few things on hand in relative abundance. Fortunately both Governments let a little food be passed through the lines to us foreigners. October tenth found us all alive and not seriously the worse for wear.

Throughout the siege we had endeavored to stick as closely as possible to all the usual hospital routine, even to the keeping of proper histories and other records. To let down in the work, I felt, would weaken the morale. I kept referring in my mind, and often jokingly in conversation, to the fact that Charles the First had insisted on having his hair carefully parted even on the day of his execution, and I felt it really did help to carry through if one stuck to the old formalities and did not allow one’s self or others to become slovenly even in little things. The classes of the nurses’ Training School,
however, which should have been resumed for the fall term October first, were forced to give precedence to the Siege. Yet the morning of October 11th found us in the class room, reviewing the seniors for their final examinations, when an excited foreign friend burst in to tell me "they" were looting and burning on the compound of another mission, just outside the city. Through the rest of the year we managed to carry on the school as usual, in spite of fatigue in pupils and teachers, and to send our nurses up, in January, for the regular annual public examinations of the Nurses' Association of China. The Juniors and Seniors took their Preliminaries and Finals respectively, and the Graduates the exams in Midwifery. All came through their practical exams successfully, and we trust that when the returns from their written work come, they will show no less happy a result. These nurses who worked so bravely through the siege worked bravely also at their books, and they certainly deserve to pass.

THE EVANGELICAL HOSPITAL, KWEICHOW, TUNJEN

Dr. D. H. Wang
One foreign nurse

Inpatients 316
Outpatient Attendances 7964

The year has been one of severe famine in the late spring and summer, endless movements of soldiers and bandits, and towards the close of the year decided improvement under a new governor.

The disturbed conditions have adversely affected the number of inpatients and greatly reduced their ability to pay their expenses in hospital.

The report closes with tables of inpatient and outpatient diseases.

THE EVANGELICAL HOSPITAL, LILING, HUNAN

Staff: Drs Niebel, Ulmer and F.W. Chen
Nurses: Two Foreign and two Chinese.

Inpatients 551
Outpatient attendances 23,600

There have been fewer inpatients during the year owing to the tightness of money during the Red regime.

A Hospital Chapel was built this year. At the end of 1926 came the Consular orders for evacuation. The report is therefore a short one but tells of many causes for thankfulness even in the discouragement of the present chaos. Six of the nurses left without completing their course to join the Southern Army.

The report closes with tables of statistics and finance.
Correspondence

Operations for Hydrocephalus

Peking Union Medical College

September 30, 1927.

Dr. James L. Maxwell,
Editor of the China Medical Journal,
23 Yuen Ming Yuen Road,
Shanghai.

Dear Dr. Maxwell:

An article entitled "Some Observations on Chronic Hydrocephalus with Report of a Case", by Chas. K. Fuller, B. D., M. B., was reproduced in your Journal for August, 1927. The writer recommended ligation of both carotids, and, if necessary, one vertebral artery to limit the secretion of cerebro-spinal fluid. I trust that none of your readers have lightly undertaken this procedure as a remedy in any of their cases, and I venture to offer this comment in the hope that it may persuade all surgical adventurers to desist from this form of treatment until they have gone thoroughly into all of its possibilities.

It is bad scientific form to condemn a procedure because of purely a priori objections; but of all the procedures suggested as a remedy for hydrocephalus, this one impresses me as the most surprising. This article gives internal evidence of immaturity: for instance, in its classification of forms of hydrocephalus as "obstructive and communicative (in other words, congenital and acquired)"; and, in pronouncing the case to be obstructive hydrocephalus because methylene-blue injected into a lateral ventricle was recovered afterwards by lumbar puncture. Another incitement to caution was the fact that no references were made to the copious literature on the subject of surgical remedies for hydrocephalus. It seems hardly believable that the writer had not studied the experience of 50 years of surgery in this field.

Sometimes ligation of both carotids is followed by no unfortunate results; occasionally both carotids and one vertebral artery may be ligated and the patient still live. But the operation is a serious one, particularly where abnormalities in the formation of the circle of Willis exist. But aside from the danger of the operation itself, the little that we know as to the production and elimination of cerebro-spinal fluid and of the control of intra-cranial blood pressure, warns us against such an experiment in physiology as this would be, and indicates that the little patient on whom this formidable operation was done was fortunate in escaping disaster. Let us wait for several score of successful repetitions of this procedure before recommending it to our fellow physicians.

Yours sincerely,

Andrew H. Woods

Peking Union Medical College

October 20, 1927

Dear Dr. Maxwell:

Dr. Woods has asked my comment upon the treatment of hydrocephalus as reported by Fuller in the August number of the China Medical Journal on page 745-748. I feel very strongly, aside from the rationale of such treatment, that it is far too dangerous to receive serious attention by the profession. It may be that the one case reported by Mr. Fuller recovered, but the mortality in a series of cases...
would be exceedingly high. If one believed in euthanasia and had in mind the elimination of these unfortunate patients from society the procedure might have some merit.

Yours sincerely,
J. R. B. Branch

Tabes in China

Tabes in China

Correspondence

To the Editor,
China Medical Journal

Dear Dr. Maxwell,

I am interested to note that the question of Syphilis of the Central Nervous System, among the Chinese, has been raised in the August number of the Journal.

My own experience, in the East, is too brief (two years) to have any real significance. But it has for some time been a mystery to me that whilst every O. P. clinique furnishes an excessive number of cases showing various forms of Syphilis, yet we never note a case involving the C. N. S.

My senior colleague (Dr. Landsborough) after over 30 years out here tells me that he, too, has wondered at this clinical phenomenon; and he has been on the look out for cases.

May I suggest two propositions, relevant to the subject?

I. If the experts are correct in regarding Tabes and G. P. I. and possibly other nervous or brain diseases, as being the results of untreated or insufficiently treated syphilitic infection, then there is reason to expect to find more cases of Tabes and G. P. I. out here, than in the West. What a large number of untreated cases must there be! And how many of these who do come to a competent Doctor, undergo the prolonged, elaborate and expensive courses of treatment (perhaps two years or more) which experts tell us give the only guarantee against the terrible sequelae? Perhaps “none” is the reply.

II. There is frequently appearing in both professional and lay literature, reference to treatment of Syphilis, especially involving the C. N. S., by therapeutic malarial infection.

It seems that the exponents of this form of therapy have established “a good case”. I have not any experience of it.

Now, if this practice is indeed founded on sound principles then those areas where malaria is endemic should show a relative absence of G. P. I. and Tabes Dorsalis in ratio to the malarial prevalence.

If contributors would supply even roughly, information as to the relative incidence of C. N. S. and of malaria in their own areas, perhaps more progress could be made in elucidating the problem.

I am,
Yours sincerely,
R. H. Mumford

Mosse Memorial Hospital,
Tatungfu
Church of England Mission, Peking
October 18th, 1927.

Dr. James L. Maxwell:
China Medical Association
Shanghai.

Dear Sir:

I venture to write you, correcting a mis-statement in pamphlet No. 3 dealing with the present position of Hospitals in the Northern Provinces.

In the reference to Hospitals in Shansi it is said that the Mosse
Memorial Hospital at Tatungfu has been largely destroyed and that the damage was not wanton. Both these statements are incorrect. The Hospital fabric suffered surprisingly little damage considering its situation. Until it was occupied by Kuo Min Ch'un soldiers and used by them as the base of their operations in trying to gain entrance into the city by tunnelling from our compound underneath the city walls, practically no injury was received. It then became a necessary menace to the security of the city and was subject to a certain amount of bombardment. Fortunately for us the marksman-ship of the Shansi troops was not good. The great loss we suffered was from wholesale looting by the Kuo Min Ch'un troops prior to their flight.

I think you may be glad to have this correction in case you contemplate reprinting the pamphlets.

Yours faithfully,

S. F. D. Britland
Treasurer
Church of England Mission.

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News and Comments

Dr. Henry Fowler

The news of our President's early departure from China will come as a great disappointment to many of our Members. Dr. Fowler expects to leave Shanghai on December 6th.

Dr. Fowler with his many activities in the interests of the hospitals of China has come to be regarded as something of a permanent institution and his leaving comes to us in the nature of a shock. Our President is a good man to lean on.

It is good to know that his active work for China does not end when his steamer leaves Shanghai. Dr. Fowler is hoping to join our old friend Dr. Thomas Cochrane, in the Dominion Press and Medical Mission activities from the home base.

His continued interest in the Leper Mission work out here is also assured and we shall be surprised if he can keep long away from China, even though his home be elsewhere.

Our warmest wishes for the future will go with Dr. and Mrs. Fowler on their way home.

The Acting President

Dr. Arthur Woo, of Hongkong, Vice-President of the China Medical Association becomes the Acting-President for the remainder of this biennium. Dr. Woo is known to most of our Members. His many gifts and versatile character make him well fitted to ably fill this important office.

Dr. E. M. Merrins

When we lost our distinguished Editor two years ago, a number of his friends among the Members were anxious to present him with something for his new home that would be a constant reminder of the happy associations that they had had with him out here. A fund for this purpose was raised and it was hoped ere this to have used it for this object, but as Dr. Merrins has found it difficult to settle in a permanent home the Committee has decided to forward him a draft for the amount and ask him to use it for something that would keep this end in view. Since
our last issue was printed this little gift has been forwarded to Dr. Merrins.

We should like to assure Dr. Merrins at the same time of the continued interest that is still felt by all of us in his welfare and of our grateful remembrances for all his work for the Association.

Dr. J. L. H. Paterson

Dr. and Mrs. Paterson, L. M. S., formerly of Tsaoshih returned from furlough on 31st. October.

Dr. Paterson is to take charge of the Lester Chinese Hospital (Shantung Road) in place of the late Dr. C. J. Davenport. Dr. Henry Fowler has been taking temporary charge of the Shantung Road Hospital till Dr. Paterson was able to take over.

Causes of Leprosy

The chief direct causes of high endemicity of leprosy in India are dietetic, the poor diet available being supplemented by decomposing fish, meat, rice, etc.


Bamboo Shoots as Export

That bamboo shoots are gaining in popularity as a table delicacy on foreign markets is indicated by the export figures recorded in the Customs returns during the past few years. America seems to be one of the largest consumers of Chinese bamboo shoots, of which 1,023 piculs, valued at Tls. 7,167, were exported in 1925.


Rose Essence

Rose essence is extracted by Kwangtung farmers by a rather crude but effective method. A box is partitioned into many layers with glass plates, each being about two inches apart. Sorted rose petals are placed on each layer of the glass plates the under-surface of which is smeared with lard. The box is then hermetically sealed for about two hours, after which the fragrance of the flower is completely absorbed by the lard, which is then removed from the glass plates and distilled in an ordinary liquor distilling plant. By this method the rose essence can be easily collected. The rose is much employed by Kwangtung manufacturers in scenting face powder, tea, and alcoholic drinks.


NEW MEMBERS PROPOSED

Bennett, Cecil M.R.C.S.,L.R.C.P., Lond. General Hospital Shanghai
Proposers: Dr. J.L.Maxwell
Dr. H. Fowler

Johnstone, I.Lloyd M.B., Toronto C.I.M. Chefoo, Sung,
M.R.C.S.,L.R.C.P., Lond.
Proposers: Dr. B.C. Broomhall
Dr. J.L. Maxwell
NEW MEMBERS ELECTED

Dr. R. C. Riego, M. E. S. Soochow, Ku.