NOTES ON THE SURGERY OF TUBERCULOSIS.

By E. H. Home, M.D., Yale Mission, Changsha.

Living as we do in a land where tuberculosis is the cause of an unspeakably large percentage of all deaths, and where its surgical manifestations are probably more frequent than in Western lands, we cannot give too careful attention to the recent developments in the surgery of that malady. In the present paper an attempt will be made to show the practical bearings of modern research on surgical work in China, as well as to point out some lines along which investigations ought to be pursued in order to correct or confirm the conclusions reached in Western laboratories. These inquiries are especially needed along the lines of the etiology of lymphatic tuberculosis and the general diagnosis of tuberculosis by modern methods.

INCIDENCE.

For the sake of comparison, the records of the Yale Mission Hospital in Changsha are given beside those of the Johns Hopkins Hospital in Baltimore, U. S. A. In the former, out of a total of 2,207 medical patients there were 83 with pulmonary tuberculosis, and out of a total of 500 surgical patients 94 had tuberculous conditions. This gives for Changsha, in the out-patient department of one hospital, over a short period, 3.7 per cent. of medical cases as definitely shown to have pulmonary tuberculosis. Probably a much larger proportion of cases had it, but as they came to the hospital but a limited number of times, the diagnosis was not definitely recorded. And of surgical cases, 18.8 per cent. were found to have surgical tuberculosis.

In the Johns Hopkins Hospital, on the other hand, 193 out of 14,489 medical patients, or 1.3 per cent., were diagnosed as having pulmonary tuberculosis. And of 25,912 surgical cases, 0.61 per cent. were found to have surgical tuberculosis.
Koch’s utterances at the British Medical Association meeting in 1901 gave rise to one of the most interesting disputes in medical history. Little by little, however, it has become perfectly clear that the tubercle bacillus of the bovine type is certainly not as frequent a cause of human tuberculosis as might have been expected in a milk-consuming race. Nothing less than a Royal Commission was appointed in England to study the differences between human and bovine tuberculosis, and its reports are still in process of publication. The differences emphasized between the two types of bacilli as worked out after extended investigation are morphological, cultural and toxic. The bovine bacilli are short, straight, plump and stain solidly. The human bacilli are longer, frequently curved, thinner, and when stained are often beaded. Grown on glycerine bouillon, human bacilli grow as a thick wrinkled membrane, spreading slowly and thickening as rapidly as it spreads. A good bovine culture will spread rapidly as a thin translucent membrane over the whole surface of the medium. When inoculated, the disease from the bovine bacillus in cattle always tends to become general. Human bacilli are apt to give rise to a local chronic disease.*

Lewis reports a study of cervical tuberculous adenitis which is of the greatest importance as showing that at least in a milk-consuming population there is danger to human beings from bacilli of the bovine type. The readiness with which bovine bacilli can be differentiated from human bacilli makes it possible to judge with great accuracy the extent of the danger from bovine sources. In fifteen consecutive cases of primary tuberculous cervical adenitis, nine yielded cultures of the bovine type of bacillus and six those of the human type; the classification being made on the basis of adaptability to artificial cultivation, character of growth in glycerine bouillon, virulence for rabbits and, in three instances, virulence for calves. That tuberculous glands of the neck in China, whose people seldom consume milk, could show anything like the above proportion of infection with the bovine bacillus seems exceedingly unlikely. Nor is beef so common an article of diet as to suggest that it might be a second source of infection with the bovine bacillus. Here we have a question of etiology requiring full investigation.

A further question of importance is as to the portal of entry of the tubercle bacillus. Almost any part of the body’s surface may admit the bacillus. One child under six months of age has been reported as

* Lewis: Jour. Exp. Med., 1910, xii. 82.
† Lewis: loc. cit.
having a tuberculous inguinal bubo following a scratch with diaper pin at the base of the penis. Cervical tuberculosis can be traced to the gums, nose, pharynx, the skin of face, lips and scalp, and in no small proportion of cases to the tonsil. Mathews has recently shown that while the tonsil is not necessarily always infected in cases of cervical tuberculosis, still out of eight patients with cervical adenitis, he found tuberculous tonsils in five. Hurd found the tonsils tuberculous in eight cases out of eleven with cervical adenitis. The lesson from such experiences is that in cases of cervical adenitis, the tonsils should be removed more frequently than has been done in the past, with the idea of avoiding re-infection of the glands of the neck. That so many gland cases are cured without removing the tonsil is simply another illustration of the fact that surgical tuberculosis is not cured by removing every single bacillus and lesion but by reducing the load of infection with which the body must contend. Bolt in a recent article on “The Baby in the Tuberculous Home” quotes the famous remark of Dr. O. W. Holmes that “children that walk in calico before open fires are not always burned to death; the instances to the contrary may be worth recording, but by no means, if they are to be used against woollen frocks and high fenders,” applying the illustration to the countless babies that are, each year, sacrificed on the altars of the tubercle bacillus. Among 349 tuberculous families examined by him in Cleveland there were found 163 children with tuberculosis under three years of age. These were classified as follows:

- Pulmonary tuberculosis: 90 cases
- Tuberculous adenitis: 7 cases
- Scrofulous babies: 14 cases
- Tuberculous meningitis: 20 cases
- Tuberculous bronchial glands (evident): 7 cases
- Tuberculosis of vertebrae: 1 case
- Tuberculous bone: 5 cases
- Tuberculosis without definite lesion: 12 cases

Still more striking than the above results are those of von Pirquet obtained by the use of the cutaneous tuberculin reaction upon 1407 children seen in Vienna. A positive reaction was obtained in 55 per cent. of children who had reached the age of six, and in 80 per cent. of all cases that had reached their tenth year. One shudders to think of the percentage of children that must be infected with tuberculosis in a country like China where there is so little conception of the nature of the disease. Here again we have a problem demanding detailed inquiry.

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† Hurd: Quoted by Mathews.
DIAGNOSIS.

In the differential diagnosis of conditions suggesting surgical tuberculosis, the tuberculin test can be relied upon in just those cases where diagnosis is of great importance as affecting treatment. Stern relates the striking case of a child of five, who had always been in robust health, but awoke one night screaming with pain in the hip. There were spasm and rigidity of the hip muscles, and attempts to move the limb caused intense pain. A brisk cathartic brought rapid relief from symptoms. Three weeks later the child again screamed with pain and presented the same chain of symptoms as before and was relieved by the same treatment. Two months later a similar attack occurred. Careful examination revealed nothing abnormal except slight weakness of the left hip and a slight limp. The Calmette and von Pirquet tuberculin reactions were negative as were X-ray photographs. It was discovered that the child’s symptoms were due to over-indulgence in roast veal. In this case tuberculin was of inestimable value in arriving at a correct diagnosis. Some of our own cases have been no less instructive. One case was that of a woman over fifty years of age, who came complaining of a tumor in the axilla which was connected with a mass in the right breast. Careful inquiry elicited the fact that the axillary swelling had appeared before the tumor in the breast and that the very first symptom of all was pain with tingling down the right arm. There was no cervical adenitis whatever. The swellings had been present for about a year before admission. The von Pirquet reaction was unusually vivid, and subsequent operation disclosed an axilla filled with tuberculous nodes. The disease had evidently first invaded glands along the outer border of the axilla, whose involvement had brought pressure to bear on the brachial plexus. The nodes on the thoracic aspect of the axilla became involved later, and by blocking the lymphatic stream, had caused a secondary swelling in the breast, which subsided after the removal of the diseased tissue. Since this paper was commenced a second case of axillary tuberculosis without any involvement of the cervical glands, has come into the hospital for operation. Another case was that of a merchant, presenting a lesion of the skin of the face, whose appearance and development were characteristic of lupus vulgaris. The man positively denied any venereal history. The von Pirquet reaction was negative, and the man is rapidly responding to anti-syphilitic treatment.

Notes on the Surgery of Tuberculosis.

PREVALENT MANIFESTATIONS OF SURGICAL TUBERCULOSIS.

We are day by day so surrounded by tuberculosis of bone, joint and gland, that we seldom stop to take stock of the actual proportions of these several manifestations met with. Our own figures for 1910 are as follows: Out of 500 analyzed surgical cases we saw

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<tr>
<th>Manifestation</th>
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<tr>
<td>Tuberculous adenitis, cervical</td>
<td>49</td>
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<td>Tuberculosis of vertebrae</td>
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<td>Tuberculosis of skin</td>
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<td>Tuberculous adenitis, inguinal</td>
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<td>Tuberculosis of wrist</td>
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<td>Tuberculosis of ankle</td>
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<td>Tuberculosis of breast</td>
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<td>Tuberculous adenitis, mesenteric</td>
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<td>Tuberculosis of shoulder</td>
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<td>Tuberculous adenitis, axillary</td>
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<td>Tuberculosis of testicle</td>
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TREATMENT.

Of Joints: Emphasis ought to be laid on the importance of radical treatment of joint tuberculosis, especially at elbow and shoulder. Complete removal of the elbow joint with every bit of involved tissue may be looked upon as one of the most satisfactory operations we can do. Case after case has left our hospital in about two months after operation with a strong flexible joint. These same cases seen at the end of half a year have been found able to lift heavy weights and to do with the modified joint nearly all that was possible with a normal joint. A remarkable case recently sent out cured from our hospital was that of a young cowherd who had been injured by falling on his elbow two years before admission. There had resulted a fracture at the elbow, and the boy gave a history of inflammation following the accident, during the course of which, fragments of bone came away. He presented himself at the hospital with two or three sinuses suggesting tuberculous disease. Complete excision of the elbow was performed and the joint presented the unusual combination of

- A badly united fracture.
- A pyogenic osteomyelitis going from the point of fracture some distance up the shaft of the humerus.
- Definite areas of tuberculous necrosis superimposed upon the two earlier conditions and involving chiefly the condyles and posterior surface of the olecranon.

The wound healed without difficulty and the patient left the hospital with considerable power in the forearm.
Although the bayonet-shaped incision of Ollier and the method by two lateral incisions suggested by Ollier and Hueter have been found to possess merit in certain cases, still I have come to rely on the single vertical incision at the back of the joint as the method of choice. In no case has the triceps attachment been injured to such an extent as to interfere with function. It is our rule to put up the elbow in fairly acute flexion rather than at a right angle. Drainage is dispensed with as early as possible.

In tuberculous arthritis of the knee in adults, I have used the method of radical excision in every case, opening the joint by an anterior semilunar incision, removing the patella without exception. Even in cases where at operation, numerous chronic sinuses were present, and where, after treatment, suppuration persisted for a time, we have had no case fail to recover completely with a strong ankylosed joint. Suture of the bones with silver wire has been found a desirable method to use to facilitate union.

The most satisfactory non-operative result in a case of tuberculous knee was that of a boy of nine years, admitted with a swollen knee, flexed to a right angle. Any attempt to straighten the leg caused intense pain. The boy was put to bed and the leg suspended on a simple splint of heavy wire covered with cloth. Day by day the leg was extended a little further, and at the end of a month, it was entirely straightened. The leg was then put up in plaster and kept extended for many weeks. After leaving the hospital the patient was not seen for six months, when he returned with two other little patients with tuberculous joints and proudly pointed to the cure in his own case. The knee joint was flexible, free from pain and tenderness, and differed from its fellow only in being slightly larger.

If the wound can be kept clean, drainage of hip abscesses ought to be as satisfactory as drainage of abscesses elsewhere in the body, but they ought to be left alone unless thorough aseptic precautions can be observed. In a recent case 21 ounces of pus were evacuated from the hip of a little girl of three; the skin surface being prepared as for major operation. The temperature which had been over 102 Fahrenheit for days continuously, fell to nearly normal and the wound soon filled up. Even in long standing cases of hip-joint disease, splendid results can be obtained by persistent extension, and in cases with chronic sinus by the injection of bismuth paste. Very few tuberculous hips with fistula have been radically cured by irrigation or swabbing with iodine or silver solution. Beck's method of injection with bismuth paste

*Beck: Transactions of International Congress on Tuberculosis, 1908, Oct. 15.*
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(bismuth subnitrate, 33 per cent.; vaseline, 67 per cent.) has proven to be of great value in chronic cases. Of 83 cases reported from the North Chicago Hospital, 60 per cent. were radically cured. We have used the paste with success both in tuberculosis of joints and in cases of bone necrosis.

In the treatment of tuberculosis of the ankle, no method has given us such good results as Bier's method of passive hyperemia. The patient, who usually complains of pain at the first application of the bandage, soon learns to be grateful for the relief it brings and to welcome its snugness. In a recent case a boy of twelve was admitted with tuberculosis of both ankles. Passive hyperemia was faithfully used for several weeks and the patient is entirely well.

Of Lymphatic Glands: Ripeness of surgical experience can only be his who has many times trodden the weary way of dissection of axilla, neck or groin for the removal of tuberculous glands. Of the 800 lymphatic glands in the entire body about 300 lie in the neck. It is important to remember that this "glandular collar" drains into the venous system of every other group of glands, and that, as Judd* independently has recently pointed out in a critical article reporting 649 operative cases that direct extension from the cervical glands into the mediastinal glands is impossible, and therefore that inflammations and tumors of the cervical lymphatic system are local until they pass into the general circulation. The chief point which I wish to emphasize in this connection is the imperativeness of a complete operation in all cases, except those with discharging sinuses. In the latter the radical operation is to be undertaken after the sinuses have healed, following suitable curetting and swabbing with equal parts of tinct. iodi and pure carbolic acid. At one time many separate incisions for the removal of separate glands were recommended. The main desideratum is to remove the gland-bearing fascia in one piece with as little scar as possible. The operation I describe below is one that I have used in a large number of cases without experiencing the slightest danger in any one however thickly matted the tissues were or however closely connected with the jugular vein. The incision begins a little below and behind the mastoid process, extends almost vertically downward and a little below the middle of the neck curves forward, terminating at the middle of the clavicle, or a little nearer its sternal end at the junction of the sterno-mastoid muscle and the bone. The platysma and skin are turned back widely. If this incision does not give enough

exposure, an additional incision is made outwards along the upper edge of the clavicle nearly to its acromial end. The dissection should be begun at the lower angle of the wound at or near the pulley of the omo-hyoid. In many cases it will be of great advantage to cut the omo-hyoid muscle (as suggested by Mitchell*), and, using its inner end as a retractor, pull the sterno-mastoid muscle back. The internal jugular vein can be found, even in the most matted cases, directly below this inner end of the omo-hyoid. The glands are all left in the fascia as far as possible and the fascia dissected upwards with gauze or the edge of the knife according to the looseness or density of the tissues. Accident to the internal jugular vein can always be prevented if it is well exposed early in the operation. In some cases provisional ligatures may be slipped around the vein to be tightened in case of accident. In other cases it will be sufficient to partially occlude the lumen by a gauze pack. This will keep the vein full and prevent sucking of air if the vessel is torn. Tedious as the dissection upward along the vein may prove, it should be done thoroughly, ligating the branches as they are reached. It has been suggested that if caseous material should soil the wound during operation, infection may be prevented by mopping the wound for an instant with boiling water. Only two structures of importance, other than the jugular vein, are apt to be encountered during an average dissection, namely, the spinal accessory and the chyle duct. The duct on the left is not infrequently seen and may attain considerable size. Though injury to it may lead to much wasting still packing with gauze where suture is found impossible regularly leads to healing. The spinal accessory nerve is met with a little more than half way up the border of the sterno-mastoid muscle. It frequently runs through thickly matted bunches of glands and will require patience and time to set free. The other nerves met with are purely sensory and should only be spared so far as is convenient, judging by the condition of the patient and the density of disease-bearing tissue. In high operations the seventh nerve may be reached and the facial paralysis resulting from injury to it rather overbalances the good accomplished by a radical operation. I have once had the misfortune to cut some of the main branches of the seventh nerve in a case where the tuberculous tissue deeply invaded the parotid gland. The internal jugular vein I have twice found it necessary to resect, although it seems in every way desirable to preserve this vessel, even by lateral suture. Drainage at the end of the operation is provided through a small stab incision.

using either a small rubber tube, or a roll of rubber tissue. Pulmonary tuberculosis is not a contraindication to operation for cervical adenitis. In fact definite improvement may be looked for in the pulmonary condition if a radical operation is done. In Judd's series of 649 operations there was no mortality due directly to the operation.

The operation for axillary tuberculosis should be correspondingly radical, the incision being the same as the outer part of Halsted's incision in the complete operation for cancer of the breast. The greatest difficulty to be met with will be the overlapping of the pectoral muscles, and the man who attempts to really clean out the apex of the axilla invaded by tuberculous tissue will quite understand why Halsted recommends the removal of both pectoral muscles in order to facilitate exposure (purely aside from the need, in cancer cases, of removing possible cancerous infection from the thoracic surface.) Care should be taken to remove glands well down on the thoracic wall at least as far down as the "tail of the mammary gland." Tuberculosis of the inguinal glands has been somewhat more frequent in our experience than axillary tuberculosis, but is very likely to be overlooked on account of the frequent occurrence of other inflammations of the glands in this region. I need only repeat that a cure depends on radical excision, removing the glands thoroughly along the course of the femoral vein. A vertical incision directly over the course of the vein will, in a large number of cases, give as good exposure, leave less scar, and involve less danger to the vein than the ordinary one parallel to Poupart's ligament. The tuberculin reaction will be of special use in just this class of cases.

Yet another group of glands will require our attention occasionally, namely those in the mesentery. Here again the assistance to be derived, in obscure cases, from the tuberculin reaction is obvious. Abdominal incision and "ventilation" of the contents, even where tissues are so matted together as to give little opportunity for freeing things, is apt to result in a cure of peritoneal tuberculosis.

With the modern methods of diagnosis at our disposal, with the dangers of operation minimized by familiarity with the region to be traversed, and with a conscientious determination to couple with radical excision, the preaching of the Gospel of wholesome living in houses open to air and sunlight; this generation ought not to pass away without having been of service in reducing by a large percentage the incidence and mortality rate of surgical tuberculosis.
THE ROUND WORM (ASCARIS LUMBRICOIDES).

By J. Preston Maxwell, M.D., F.R.C.S.

It is the fashion in some quarters to regard the presence of this parasite, which infects about 80 per cent. of the general population of the Fukien province, as a matter of trivial importance. In other quarters it is urged that it is the cause of a large amount of suffering and disease, and the writer agrees with the latter view.

In an earlier paper* founded on his Changpoo experience he quoted the case of two schools where every member was infected with this parasite. And in the investigations carried on at that time he was able to incriminate certain vegetables as the chief source of the infection. Of these leek and garlic are the most important. They are often eaten practically raw and are manured as there described both with matured faecal material and with fresh urine which frequently contains quite an appreciable amount of fresh faecal material.

Further research leads me to doubt whether the embryos seen at that time on those vegetables were really those of Ascaris lumbricoides, though there is no doubt about the ova, and I am now of opinion that the ova are probably swallowed entire, the embryos emerging from them in the human intestinal canal. But whether the ovum or the embryo is ingested is probably a matter of little importance.

The Chinese themselves blame the sugar cane for the infection of children, but this is not manured for a long time before it is cut, and never, as far as I am aware, with fresh urine and faeces. It is probable that the children, who are very fond of the sugar cane, supply in this way more nourishment to the parasite than it gets at other times, hence it flourishes and often makes known its presence when the sugar cane is ripe. That it is the Chinese vegetables that are mainly responsible for the trouble is borne out by the fact that if they are well cooked no infection results, and as I have proved in my own person, one may eat any amount of Chinese food at the eating houses on the roads without getting infected with Ascaris lumbricoides, provided that one avoids the half-cooked vegetables at these places. It is possible for food to be infected by dust, etc., but it is probably very uncommon.

How many round worms may be passed at a single evacuation? One has counted eighty-seven from a man of 54, and this is not an out

*The Aetiology, Symptoms, Diagnosis and Treatment of Round Worm Infection. Journal of Tropical Medicine, October, 1900.
of the way case. One has known a child have six evacuations in the 24 hours practically composed of worms, but the number was not counted.

The text-book descriptions of the fertilized and unfertilized ova and of the worms themselves are ample, but it is not yet clear why when male and female worms are present in the intestine, numbers of unfertilized ova should be passed.

Its normal habitat is the upper part of the small intestine, but it can live in the stomach, large intestine and in abscesses connected with the intestine. It has also been found in the peritoneal cavity of persons who have died of acute peritonitis in which it may have been a prime factor; the persons being otherwise in fair health.

As many as 100 have been vomited up by a single European patient in the course of a day. Some have been ejected from the nose, and the worm has been withdrawn by the fingers from the pharynx and has been known to make its way into the air passages.

In the A. D. 1900 paper I stated that opium smoking did not influence the incidence and number of the worms. Larger experience has led to a reversal of this opinion. Opium smokers suffer less than ordinary individuals from round worm infection, and those that are infected rarely harbour many worms.

Quinine has apparently no effect on them unless given in large doses in acid, when it generally disturbs and dislodges them. This may, however, be partly due to the fever or sepsis for which the quinine is administered. Chloroform disturbs them greatly, and it is not uncommon for a patient recovering from chloroform to vomit a worm or two, or to pass them in his next evacuation. This disturbance may be expressed also by a temperature, not due to sepsis from the wound, which may refuse to fall till the patient has had his worms cleared out.

To turn now to the pathological conditions which may be connected with the presence of the parasite.

1. The presence of ova in the stools.—As a rule these are easily found by the microscope. A small portion, say a pin's head, of faecal material is put on a slide, mixed up with a little distilled water, covered with a cover glass and examined under a 1" or 1½" objective. The ova are easily seen and readily differentiated from other ova. Their colour varies from a darkish brown to a very pale brown or almost colourless tinge. If only unfertilized ova are seen, it may be surmised that there is only a female worm present. This one has proved after the administration of santonin more than once.
But the ova may not be found under the following circumstances:—

(a) If there is only a male worm in the intestine.
(b) If the worm, though present, is dead.
(c) When there is only one female worm, the ova, for some unknown reason, even though the worm be apparently mature, may occasionally fail to be found.

(a) The writer has seen a child in the hospital to whom santonin had been administered, and in whose stools there were no ova, subsequently pass a single male round worm.
(b) A European patient whose stools were frequently examined for other reasons, and whose stools had been free from ova for months, and who had taken santonin some two months before, passed a macerated female round worm which had evidently died in the intestine and been retained a considerable time.
(c) The writer's own little girl, whom he suspected from other signs to have round worm infection (she had been fed surreptitiously on Chinese vegetables by her nurse) had her stools examined carefully three times in a week without result. A few hours after the last examination she passed spontaneously a full-sized female round worm, alive and apparently quite mature, and her symptoms ceased from that time.

2. A large flabby protuberant abdomen in a child, looking as though the child had a huge spleen, is quite pathognomic. The writer has often pointed this sign out to his assistants and has never found it to deceive him. It is not always present.

3. Discomfort in the region of the stomach, unconnected with the ingestion of unripe fruit and the like. The discomfort may be so great as to amount to actual pain, and four or five cases of this kind have been seen where the patients were rolling about in agony, and at first it looked as if something very serious were present. But the rigidity of the abdomen was more apparent than real, the pulse practically normal, and santonin in castor oil worked wonders. In some cases, both severe and non-severe, the patients have complained that they could feel the worms moving about in their stomach. In so many of these cases santonin has produced the vomiting of one or more worms that one is inclined to believe that these patients were correct in their supposition.

4. A craving for food coming on about an hour after a good meal is an almost certain sign of round worm infection. It does not amount to pain, but the sensation is evidently from the description of the patients very unpleasant. In the south of Fukien a word "hui," meaning
The Round Worm (Ascaris Lumbricoides).

"green with hunger," is used. In the centre of Fukien it is not used, but the symptom is well known, and the Chinese themselves attribute it to round worm infection.

5. A train of reflex symptoms due to gastro-intestinal irritation.— These are commonly seen and include convulsions, grinding of the teeth during sleep, which may be noted amongst adults as well as children; preputial irritation leading to manipulation of the organ and night terrors.

Usually the patient, a child, has a combination of these, is restless in sleep, often moaning or crying out; has perhaps twitching of the muscles or grinding of the teeth; amongst these symptoms many place nosepicking, though the writer is doubtful on this latter point. The Chinese say that children affected with round worms are specially prone to sleep on their face.

6. Perversions of appetite are frequently noted, especially anorexia in children. Voracious feeding may be noted in children less frequently, in adults more commonly. In many children the presence of round worm infection may be suspected if they are to be found scraping off the plaster from the walls and eating it. In some cases the infected individual seems to have a craving for earth, and picks up pieces and eats them with apparent pleasure.

In some cases the presence of worms causes nausea or actual vomiting. In one case, a small boy of six, persistent vomiting had occurred for many days, and he was quite emaciated. The vomiting ceased spontaneously after the evacuation of a large number of round worms and did not recur.

7. In many cases in children the irritation of round worm is sufficient to set up diarrhoea with dysenteric stools. Quite a marked amount of blood and mucus may be passed, generally mixed with ordinary faecal material. That it is not a true dysentery is proved by the fact that it rapidly clears up under dosing with hydrarg. c. creta and santonin. No amoebae are found in the stools, and although the case may have gone on for some time, it never passes into chronic dysentery.

In this connection the question of damage done by parasite to the intestinal wall may be considered. Of course the irritation we have been discussing is a matter of the large intestine, but in considering the action of Ascaris lumbricoides the question presents itself.

In ordinary cases of heavy infection with Ascaris lumbricoides is occult blood to be found in the faeces? The answer is, No! In
examining with the aid of the benzidin test the results were invariably negative. That it may lead to or aggravate inflammatory processes in the intestinal canal is proved by the next two sections.

8. _Worm abscess._

H. M., aet. 5, presented himself at the Changpoo hospital with a swelling in the middle line above the umbilicus which was manifestly fluid. The writer cut down on it and found it to be an intra-abdominal abscess between the stomach and transverse colon which was firm and distended. Santonin and _hydrarg. c. creta_ brought away masses of worms per anum and the child made a rapid recovery.

H. M., aet. 27, presented himself at the Yungchun hospital with a sinus above the umbilicus and resistant intra-abdominal swelling above and to the outer side. The history was that the trouble began a year before with pain and hardness above the umbilicus. The swelling pointed and a small opening formed, through which pus was discharged. There was no faecal discharge at any time as far as he knew. There being many ova in the stools, santonin was given, and, in the course of the next 24 hours, 6 live female round worms were extruded from the fistula and many more passed by the bowel. About ten days after this a small quantity of faecal material passed by the sinuses. This only happened on two occasions, and the man left hospital well, with a tiny fistula discharging a small amount of mucoid fluid. The probe passed about two inches to the left, outwards and backwards.

The writer has previously spoken* of a case in the Changpoo hospital where the dead body of a round worm was extracted from an abscess over the lower part of the sternum, and many such cases have been described. Landsborough † describes a case of this kind in a Fukien Chinaman in the island of Formosa. In this case there was a sinus in the lumbar region, and a dead round worm was extracted from a cavity which extended up in front of the 12th rib. Bloody fluid was occasionally discharged at stool. The exact pathology of these cases in unknown. That the worm may sometimes traverse the intestinal wall is known, and cases of acute peritonitis may be set up in this way.

The following case is probably of this nature. A European in the island of Formosa coast was seized with acute peritonitis and died. He had previously been in fair health. A round worm was found free in the abdominal cavity. But the post mortem notes of this case are unavailable, and there may have been an ulcer in the bowel, the bursting of which was precipitated by the round worm.

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*The Aetiology, etc., of Round Worm Infection. _Journal of Tropical Medicine_, October, 1900.
†_China Medical Journal_, May, 1907.
9. A faecal fistula due to the worm may be caused in two ways:

(a) The opening up of a patent Meckel's diverticulum by the obstruction of the bowel below with a mass of worms.

C. F., 5 years of age, was admitted to the Yungchun hospital with a faecal fistula at the umbilicus. All the faeces passed this way. The history was obscure, but it in no way pointed to the formation and bursting of an abscess, and the skin around the fistula, though irritated, seemed fairly smooth. She was dosed with \textit{hydrarg. c. creta} and santonin, and passed masses of worms per anum and a few by the fistula. Faeces immediately began to come by the proper road, and ceased coming by the fistula, and in a short time the child was fat and well.

(b) By the formation of a worm abscess and subsequent opening of the abscess cavity into the bowel and exteriorly and the formation of a track.

The case of H., previously quoted under worm abscess, seems to fall under this category, and although this case seems to be practically cured, the writer had one man under his care with an exactly similar history and the extrusion of worms from the fistula who did not improve much under treatment, and in spite of his discomfort he refused any operation. In this case also the opening was near the umbilicus.

10. A tumour may be formed of worms inside a dilated piece of the bowel which may closely simulate an intussusception. When on the road one day to see an urgent case at a distance, the writer was met by another sedan chair, whose inmate was a girl of 9 with an abdominal facies, constant vomiting, and the history of having passed a little blood from the rectum. In the region of the transverse colon was a sausage-shaped tumour, but there was something about the feel of it which made him hesitate to diagnose an intussusception. She was sent on to hospital with directions to at once give her a good dose of santonin and a little castor oil. Worms soon began to pass, and in 24-36 hours the child was practically well and the tumour entirely gone. She was directed to come regularly for medicine (santonin), but failed to do so, and in another three months the writer was again called to see her. She was not so acutely ill, but the symptoms were the same, and the tumour this time was in the region of the descending colon. Persistent santonin treatment resulted in complete cure.

Another similar case has been seen by the writer in a boy of 7.

11. Prolapse of the bowel in children may be the result of infection with round worms. In these cases, of which several have been seen,
a cure is brought about in a very short time by the removal of the worms.

K., a boy of 5, is an example of this. He came in with prolapse of the bowel, no dysentery, and had a severe round worm infection. He recovered completely as soon as the worms had been got rid of by santonin.

12. *Diarrhoea coming on soon after midnight* is occasionally a sign of round worm infection.

Chhiap, a young man of about 30, came into the hospital in 1907 with this symptom. Every night, shortly after midnight, he had a sharp attack of diarrhoea. There were many round worm ova in the faeces. Santonin effected a rapid and complete cure, and he has remained well since.

One or two similar cases have been noted by the writer, but this symptom of round worm infection is distinctly rare.

13. *Anaemia often profound* may be the result of round worm infection. Especially is this seen in children, and they react to treatment in wonderful way. It is probably due to a complex cause. The presence of the worms disturbs digestion and absorption, whilst at the same time it is possible that they produce a poison of their own which helps on the morbid process.

There is no special blood picture attached to round worm infection, but the haemoglobin percentage may sink very low. And in a malarial region the differential blood count is apt to show vagaries.

In one case, a man of 24, with 124 round worm ova in a single slide, the differential leucocyte count was:

<table>
<thead>
<tr>
<th>Leucocyte Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymorphonuclear</td>
<td></td>
<td>42.0%</td>
</tr>
<tr>
<td>Eosinophiles</td>
<td></td>
<td>29.3%</td>
</tr>
<tr>
<td>Large mononuclear</td>
<td></td>
<td>8.5%</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td></td>
<td>20.0%</td>
</tr>
</tbody>
</table>

but the writer does not regard this as in any way typical, although no other cause for the eosinophilia could be found.

In other cases there was practically no eosinophilia; this may be the normal state of affairs. It is stated, however, to occur in many cases. As a rule, under santonin treatment, the state of anaemia rapidly improves, even if no iron be given and the diet of the patient remain unaltered.

Before one considers the question of treatment, a protest may be made against the practice nowadays so common of attributing diseases to certain causes on the most flimsy evidence. Round worm infection has been quoted more than once as a cause of appendicitis. In 10
years with an infection of the general population with round worm of about 80 per cent. only six cases of appendicitis out of say 30,000 patients have been seen. In two of these the attack definitely started with ptomaine poisoning, and in none was there any special evidence pointing to the round worm as the originator of the attack.

**TREATMENT.**

There is only one treatment for *Ascaris lumbricoides*, and that is santonin.

The best method is a dose of castor oil with 4-5 grains of santonin suspended in it for an adult, and the same drug in a smaller dose for children, followed up by systematic dosing with a powder of *hydrarg. c. creta* and santonin, or calomel and santonin. The writer prefers the former powder, and gives it to adults in doses of a grain of each twice a day till all evidence of infection has disappeared.

When one is satisfied that the worms are dislodged, a course of iron and nourishing diet, especially in the case of children, rapidly sets the patient on his feet.

White or yellow santonin may be used. The writer’s impression is that the latter is the more efficacious, but intoxication symptoms are often seen when it is used. He has seen an adult patient quite dazed, and with hallucinations, a few hours after a dose of 6 grains, and in some cases it will produce a transient but alarming delirium.

It is not uncommon for the first few doses of a course of santonin to make a patient feel very wretched, both from the stirring up of the worms and the influence of the santonin, but tolerance is rapidly established. A patient should be warned as to the possibility both of feeling wretched and of zanthopsia.

Occasionally a sharp attack of vomiting will follow a dose of santonin, but this is very rare, and in the only case I have met small doses of thymol proved an effectual substitute.

In some cases the disturbance of the worms will set up a smart attack of fever, especially in those who already harbour the malarial parasite. But in other cases it is independent of malarial fever, and is due to some unknown cause, possibly absorption of some toxin from the bowel.

In the case of children, even if ova are not found in the stool, if worms are suspected from other symptoms, it is well to give a few doses of santonin. No other method of treatment is mentioned, for this method is sure and simple. The treatment of complications has to be carried out on general principles.
THE MISSIONARY SIDE OF OUR WORK.*

BY GEORGE A. HUNTLEY, M.D. Hanyang.

At the great Missionary Conference held not long ago in Shanghai sixteen resolutions were passed bearing on the status and efficiency of medical mission work. By the first resolution we see that medical missions are at last rated at their proper value. It runs thus:—

That this Conference recognizes medical missions as not merely an adjunct to, but as an integral and coordinate part of, the missionary work of the Christian church.

Formerly a medical mission was looked upon as a kind of trap in which to catch the unwary patient and preach to him. At best it was looked upon as an adjunct to missionary forces proper of the Christian church. This is probably the first time on which a great Christian conference, representing all the churches and composed in largest measure of ministerial brethren, has recognized medical missions as an integral and coordinate part of the missionary work of the Christian church. This being so it behoves us to take steps and adopt methods which shall make us effective as missionaries as well as medicals.

In the first place I think we shall do well to remind each other that the first essential to effective missionary work in the hospital is for the medical missionary himself to maintain at all costs a high level of spiritual life. In these matters we are in greater danger than our clerical colleagues. Let us remember that we "are laborers together with God;'' there must be fellowship with Him in all our service. We must walk with Him. There may be a great deal of activity without walking with God. Peter was active when he amputated the ear of the servant of the high priest, but Christ was not with him in that action. In every operation let us seek to realize His presence and in every detail of service may we feel His love constraining us and His strength sufficient for every emergency.

Much has been said about the relative value of preaching and healing in the work of a medical mission. I think that it would be very difficult to place a greater value upon the one than upon the other. "When the greatest of all prophets sent forth a despairing enquiry as to whether the Gospel of glad tidings had indeed come into the world, he was told that he was to know not more by the fact that the poor had the Gospel preached unto them than by the fact that the blind saw, the lame walked and the deaf heard." I take exception to the wording

* Read before the C. C. M. M. A.
of the subject announced for this meeting, "The missionary side of our work". It is all missionary. Whether we distribute tracts or dress an ulcer, converse with patients about things spiritual or bathe a fevered sufferer, whether we preach to the gathered patients telling of Jesus the mighty to save, or perform an operation for cataract, remove a malignant tumor or amputate a limb. It is all missionary if the doctor is constrained by the love of Christ and filled with the Holy Spirit, a revelation to the heathen of Christ's mission to save.

We are, however, met to discuss to-day the spiritual aspect of our work as distinguished from the part which is distinctly professional.

What part should the foreign doctor take in the spiritual side of our work? It is impossible to lay down a definite rule for all. There are some who would make the medical missionary three-fourths a preacher and one-fourth a doctor, who think that the ideal is reached by the man who travels around with the Bible in one hand, a few tracts in the other and a bottle of pills in his vest pocket. Others again suggest that his time should be equally divided between preaching and healing while some reverse the first order and make him three-fourths a doctor and one-fourth a preacher. Figuring of this kind is based on a misconception as to the way in which a medical missionary's work tells for Christ and the spread of His Gospel. To quote from a recent missionary magazine: "The medical missionary should be, Re his medical and surgical work, an earnest, enthusiastic and continuous worker, whose time and strength are given to the healing of the sick. Re his spiritual work he should be rather a powerful spiritual influence than a much occupied direct worker, the creator of an atmosphere which affects his students and other fellow-workers in the hospital, his servants and his patients and which should pervade every ward and room in his hospital."

Beyond providing this "powerful spiritual influence" and creating "an atmosphere" the character of our spiritual work must depend upon the gifts of the individual worker. To some of us preaching is a delight, a recreation, a tonic and an inspiration. Woe unto us if we preach not the Gospel. To others it is simply impossible. I hold in my hand a letter from a medical missionary who writes me about preaching. He says: "Personally I am as incompetent as a new born baa-lamb. I don't preach. I would rather be hung than preach. I would give anything in the world to be able to preach."

Each one will have to act here as he feels it to be his duty before God. But there must be no mistake in our minds as to what we aim
at as consecrated servants of Jesus Christ, nor must we give our colleagues, our employees or our patients occasion to think of us as other than a whole-hearted worker for Jesus Christ, whose earnest desire is that each of his patients may not only get healing but get eternal life.

We shall do well to keep the organization of the spiritual work in our own hands. At the last Decennial Missionary Conference in Madras the following resolution as passed: "The medical missionary should personally organize the spiritual work in the hospitals and dispensaries under his charge and should take an active part in it." This is the unanimous opinion of clerical and medical workers in India, and I believe it applies to us here in China with equal force.

Now as to suggested methods, and let us discuss these not from the academic but from the practical standpoint. We are all busy and want the practical rather than the theoretical.

**OUR METHODS IN THE HANYANG MEDICAL MISSION.**

1. We have a service for all our helpers at 9 o'clock each morning, except Sundays. A few of the patients attend this service, but it is not intended for them. We sing, read a passage of Scripture verse about, have a short address and prayer. The service lasts from twenty to thirty minutes. I conduct this service myself and find it a means of grace and that it sets the key-note for the work of the day. If the medical missionary is unable himself to conduct this service his presence will do much to ensure regular and prompt attendance, inspire the leader with encouragement and help to create "the atmosphere" referred to in a previous paragraph.

We have no service for in-patients in the morning. It is far more important to give the time to the assistants and nurses and other helpers. Their ministrations will be more careful, more sympathetic and perchance some will be led to pass on the message which has just helped them.

2. We have preaching to out-patients by the hospital evangelist and occasionally by a volunteer preacher every morning, except Sunday. I suggest that you provide such workers with the means of reaching the patients through "eyegate" as well as through "eargate." A picture, a scroll giving on the separate sheets a seed thought, or even a written text will do much to help the patient to understand and the preacher to stick to his point.

3. It is our custom to have a brief prayer before each operation and at the commencement of each clinic.
4. At 2.30 the evangelist holds a service in the ward which has most of its patients confined to bed. Seats are arranged so that patients from other wards can attend. A systematic arrangement of subjects, covering the essential Gospel truths, is a prime necessity for the instruction of in-patients. We have thirty daily readings covering the life, death, resurrection and coming again of our Lord. If a patient is with us a month (they average more than that) he gets a fairly comprehensive knowledge of the Gospel. If he is with us two months he receives the same lessons over again. These daily services are followed up by

5. A magic lantern service on the tenth, twentieth and last days of each month with pictures illustrating the daily lessons. On the last day of the month, when the subject is the passion and death of our Lord, we use only the Scripture pictures; on the other two evenings, however, in addition to the regular Scripture slides, a few general slides, chromotropes and even a few comic pictures have their place and are much appreciated.

6. Bedside teaching by the evangelist and visiting Christian brethren.

7. Colporteur at gate sells Christian books and we give a Scripture portion to each patient.

Only sixty per cent. of the hospitals in China engage a native evangelist full time. Six per cent. have part of the time of a native preacher, while thirty per cent. do not employ a native evangelist at all.

Some get considerable help from native assistants and students. In a letter addressed to me, Dr. Macklin says:—

My students this year have taken hold and have regular services morning and evening with patients. They are doing a fine work, one especially is an enthusiast. Such volunteer work from Christian students is more telling than the work of a paid evangelist. I am doing very little direct work myself, as my energies are very limited, and it is all I can do to keep up my medical work. I have had over 900 in-patients the last year.

The out-patients get Scriptures and tracts and are preached to, but the in-patients get the greater attention. I am having the most spiritual turn in the history of my hospital thanks to the volunteer services of my students.

Fifty per cent. of our hospitals employ only Christians, even for the most menial positions. A good many encourage the native Christians to take part in the evangelistic work of the hospital. Some prepare a schedule. In one hospital this is assigned to a single volunteer worker. It is a good object lesson to show that what the evangelist is paid to teach, others are willing to teach for nothing. Some find Sunday-schools helpful in the work.
Perhaps the most difficult problem with which we have to deal is that of following up the patients after they have left the hospital. Nearly fifty per cent. of the medical missions in China have no plans for this work, and the greater part of those who have plans confess that their methods are defective and inadequate.

I hope that the discussion to-day will throw some light upon this difficult problem.

In conclusion let us seek to cultivate a closer bond of union between the hospital and the church, between the doctor and the pastor. I quote from an able article which appeared in our Medical Journal for January, 1904, and which I heartily commend to your careful perusal. "Several physicians write that their fellow-missionaries do not appreciate the good opportunities to be found in the hospital wards and at the homes of the patients. In a number of hospitals, however, the clerical missionaries have charge of the evangelistic work. Perhaps our brethren hesitate through fear of interfering with our work. Let us invite them again and give them much opportunity. Come, fellow-workers, there is a cry from Macedonia. Help us doctors out. We want to teach the Gospel truths, but we cannot do much more than preach by our actions while holding our own in the struggle against disease. Our fields are too broad: indeed the harvest is great, but the laborers are few. Here you will not need to go to the heathen, but they come crowding to our doors and are living beneath our roofs."

THE PHILANTHROPIC WORK OF FOREIGN MISSIONS IN CHINA.


The object of this paper is to enquire into the function and aim of the philanthropic work done by foreign Protestant missionary societies in China. No endeavour will be made to review all that is being done, nor to comment on the work of the Roman Catholic missions.

Philanthropic work includes all benevolent work done for the benefit of our fellow-men, especially those who cannot help themselves. In its widest sense it covers religious teaching, education and practical work to improve the physical welfare of the poor, the sick and the destitute. In what follows it will be chiefly used in the last sense.
In China the philanthropic work of foreign missions has, for the most part, consisted of medical missionary work, a work which has the advantage of coming into touch with people of all ages and classes. Other forms of philanthropy found in Western lands have been more sparsely reproduced, so that hardly any institutions for the blind, the deaf and dumb, the insane, the incurable, etc., etc., are to be found in the land.

Much has been said about the function of medical missions as a pioneering agency. Instances innumerable can be given to shew that by their means communications have been established with heathen people; they have proved to be a key that would unlock doors otherwise fast closed to the representatives of Christianity. Communities and individuals have been won over by their means. Now this is due to the fact that they present an all round Christianity which takes an interest alike in man's physical and spiritual welfare. The physical help is not a mere lever to bring patients within range of the oral proclamation of the Gospel: it is an actual part of the Gospel. And as actions speak louder than words, it has often followed that the physical help has brought spiritual truth home to people more effectually than the oral preaching did. In this connection one may quote what a native said many years ago about Mrs. Griffith John: "I had heard a great deal about the love of God before, but I never felt it till I saw Mrs. John dressing a patient's foot." So great indeed has been the value of medical missions as a pioneering agency that this view has largely obscured other views of their place and aim.

Philanthropic work, however, is also part of the church's permanent duty. We find that it occupies a prominent place in the New Testament. We see Christ and His disciples performing deeds of mercy broadcast on vast crowds of people. He acted thus because being what He was—the brightness of the Father's glory and the image of his face—and coming here to reveal the love of God, He could not do otherwise than by deed and word show forth the life that was in Him. The Word was made flesh and dwelt among us, living a life full of deeds of grace as well as works of truth. The evangel He brought was this, that God takes a loving and infinite interest both in the spiritual and physical well-being of men. It is true that Christ pointed to His miraculous acts as a credential of His mission, and also that they were of great value in drawing forth the allegiance of His followers and in founding the kingdom. We must, however, remember also the prominent place which the practice of philanthropy takes in His parables and teaching. We can hear Him telling the
stories of the Good Samaritan, of Dives and Lazarus, and saying how at the last day those who befriend the destitute will be rewarded. "I was hungry, and ye fed me . . . . naked, and ye clothed me . . . . sick, and ye visited me. For inasmuch as ye did it to one of the least of these my brethren, ye did it unto me." Thus not merely did Christ practise philanthropy Himself when first introducing Christianity, but He also enjoined the practice of it on His followers in perpetuity. And so it remains part of the church's duty in seeking to represent Christianity not to neglect the exercise of a Christ-like philanthropy. It is indeed a poor maimed un-Christ-like Christianity that does no benevolent deeds. When the church takes no part in philanthropic effort, the world says: "The church talks at men's souls and lets their bodies rot away"; the truth being that one of the Christ-like characteristics of Christianity is gone. While to have hospitals and asylums apart from Christianity, this is to pick the fruit and reject the tree from which it grew. There must be pari passu the verbal explanation of the Gospel truth and a practical exhibition of it in the form of loving care for the sick and destitute. The two methods of showing the double scope of Christianity may not be omitted so long as the church exists and human need remains. It may be fairly maintained that the churches in Great Britain do far too little direct philanthropic work. The great hospitals and asylums for the sick, the blind, the deaf, etc., have usually no organic connection with the religious bodies. Many fever hospitals are supported by the rates, some have not even a chaplain or any regular visitation by ministers of religion. The churches in America seem to realize more the importance of this branch of the service. In New York, Chicago, San Francisco, Philadelphia and elsewhere some of the finest hospitals are definitely supported by the churches. In some countries and some parts of the mission field it may be that medical missions are less needed than in China, because of the efficient government hospitals which relieve a vast amount of suffering. It does not follow that they are not needed at all in these countries; for take our great cities at home with their fine hospitals, there is still ample scope in them for medical mission dispensaries and out-patient visitation. Still less does it follow that in these countries the church is absolved altogether from her duty of undertaking philanthropic work. In again taking our home lands there remains a vast multitude of sufferers, whose cases lie outside the scope of hospitals to relieve and who cannot be much helped by any medical treatment; the poor, the incurable, the maimed, the helpless are ever with us and will never cease to have a claim on our sympathy and help. Much less in a land like
China, where every form of destitution exists unrelieved, can the church abstain from philanthropic work.

But further, the church needs to do it for her own sake. Apart from the objective value of philanthropy, great though it is, the subjective value is even greater. Not without good reason did the Master say: "It is more blessed to give than to receive." The full meaning of these words we cannot fathom, but this is clear that the reflex effect of giving assistance to our suffering fellow-creatures is an upbuilding of character and a closer fellowship with Him who "came not to be ministered unto but to minister and to give His life a ransom for many." In China, then, where every form of philanthropy is needed alike, from the side of the destitute and for the sake of training the young native church, how important it is that foreign missions should rightly plan for this branch of the service! Very heartily do I agree with a remark made by a senior missionary "that no head-station in the mission field should be without some object lesson in Christian philanthropy." Thus may the heathen see the beneficent scope of Christianity and the growing native church be trained to realize its duties and privileges.

Now all will admit that foreign missions in China can never do the whole work of presenting the Gospel to the Chinese. As in other fields they are to be regarded rather as temporary agencies, whose function it is to set the native church firmly on its feet. From this it is clear that the function of the benevolent work done by foreign missions is rather that it should be an example to the Chinese church of the benevolent work in which she should engage. The Chinese have their benevolent halls, etc., but the Chinese church should do better, and out of love to Christ, should organize medical missions and every form of asylum and refuge that is needed. The missions, however, must lead the way and help the native church to undertake the task. To this end certain things are necessary. Amongst them are the need to familiarize the Chinese church with this idea, the need to foster and educate the personnel required to take charge of the institutions, the need to provide model institutions which the Chinese church may take over and enlarge or may imitate.

Firstly, then it is necessary to familiarize the Chinese church with the idea. This is of prime importance, for when once the idea has taken root, it will in due time bear fruit. The church members should be instructed as to the sphere of philanthropy in the Christian life and the objective and subjective value of it. They should be encouraged to regard the philanthropic work now done by the mission as part of the
church's work and to take a real interest in it. They should be encouraged to visit the work where this is possible, thus where there is a hospital they should be welcome to come and visit the patients at the proper hours, and as at home, do for them deeds of kindness. Their presence and help at the ward services should be encouraged. Regular collections should be taken in the churches and medical missionary sermons preached. Even the poorest churches could manage an annual collection, and though at first the amount raised might only be small, the subjective value of the offering would be great. Further, reports of the work of the institution should be prepared in the Chinese language and not confined to English.

With regard to the need of fostering and educating the native personnel required for the institutions—this includes the professional training of natives to be doctors, nurses, etc., and the organization of strong committees from the native church to take general management of the institutions. The former of these leads one to remark on the great dearth of facilities which exists for training native doctors. It would seem that missionary societies, generally speaking, do not appreciate the need and the field for well-qualified natives. A list of the active members of the C. M. M. A. just to hand gives some 420 names, to which may be added others who have not yet enrolled. Now of these it may be doubted whether there are as many as thirty (possibly the number is under twenty) who are giving their chief strength to medical education. While only one, I believe, has been freed from other duties so as to give his time to medical translation work. Societies still believe in sending out foreign doctors to work, often without a colleague, in separate hospitals (sometimes with no hospital at all) all over the country. They have not grasped the fact that if they put five or six suitable doctors together in one place they can run a Christian medical college from which there will issue a stream of native medical missionaries. Growing experience shows that where such a college has been started the graduates are often men of very great usefulness. Not a few spiritually have the same ideals and aims that we have; professionally are almost equal to their instructors, socially have far more points of contact and sympathy with their fellow-countrymen than we have, and in preaching are able to explain the truth more clearly and bring it home to others more cogently than we can. I know of cases where the foreign doctor with whom they work says of them that he would as soon have one of them as a foreign colleague. Give them a few years more professional experience and their foreign instructors may say with confidence: "Greater work than we do shall ye do." Of course we must
be prepared for some disappointments; every branch of the work is liable
to them, and they are not by any means unknown in medical mission­
ary societies at home. Some may fail us altogether, some will go into
private practice, but if they remain Christian, their influence will still
be a strength to the church at large. Such should be invited to assist
in the medical mission work in much the same way that medical men
are attached to hospitals at home. Thus their services will be in a
measure retained to help on the cause. But others will devote their
lives to the service of the native church as medical missionaries. Be­
ginning with the strategic points of the Empire, every big centre should
have a vigorous Christian medical college. This can best be done
when the societies working in the centre who naturally have most to
gain from such work, each shoulder part of the burden. This might
mean a temporary reduction in the medical work done in the country
round, but the gain would soon be apparent; as men to hold house
surgeonships, to take charge of country hospitals and to fill furlough
gaps, would in a few years' time be forthcoming in a steady stream.
If one-fifth of the members of the C. M. M. A. were to concentrate
on such work, a dozen vigorous Christian medical colleges could be
manned. Future recruits sent out from home should be appointed to
strengthen this educational work rather than to multiply country
hospitals. The ultimate goal of such a scheme would be to provide
sufficient well-trained native doctors to take over, on behalf of the
native church, the professional oversight of the hospitals now run by the
missions. The foreign doctor would thus eventually be replaced by his
native colleague, but for many a long year after this has taken place
his help would be invaluable as teacher and professor in the medical
colleges.

Further, in connection with medical literature, cannot each of the
great societies now in the field set aside at least for the present one man
each to prepare the text-books which are so urgently needed!

Now the rearrangement of our forces to procure this much needed
medical missionary contingent can only come about if we medical
missionaries urge it on the field, and, obtaining the support of our
clerical colleagues, urge it on our home boards. It is for us at this end to
start the idea moving; if we on the field are long-sighted enough to see
the need for, and the utility of, the native medical missionary there is
some hope that our missions will change the present short-sighted
policy which uses almost exclusively foreign medical missionaries to
run hospitals and dispensaries, for one which includes training native
agents on a large scale and thus allows the foreign medical missionary
to multiply himself indefinitely. We pass on to think of the general management of the institutions. As a beginning, capable native Christians should be invited to assist with their counsel the committees now engaged in running the work. Their number and responsibilities should be gradually increased, so that ultimately the institutions and the management of them may be transferred to committees of the native church. These committees would have charge of the finances of the institutions, appoint the native doctors on the staff and look after the upkeep and extension of the buildings. Given men of consecration and business ability who will command the confidence of the public generally, contributions will come in readily from the Chinese and foreigners locally. The foreign help that now comes from abroad might eventually be reduced as the natives take up the burden of the work more and more. Some institutions there are now which are practically self-supporting; fees and payments from better class patients cover the cost of a great deal of benevolent work done to the poor and form a source of income that has some hope of permanence. Such a system should be generally adopted.

A good deal of the above may seem utopian, but China is moving fast, and educated young Chinese church members are growing up around us. Their ideas include the hope of themselves doing much to strengthen their own Chinese church. The day is soon coming when there will be plenty of natives capable of becoming the personnel requisite; in the meantime let us work towards our ideal, for the sooner we make a beginning along the right line of development the better.

Finally, foreign missions should provide model institutions for the Chinese church to take over and extend or to imitate. One would like to see the day when the missionary societies in each big centre or in each province would arrange by cooperation or by specialization to have in their midst not only efficient Christian medical colleges but also object lessons of all the chief forms of Christian philanthropy, and for the future instead of multiplying new hospitals, make provision for the blind, the deaf and dumb, the insane, the incurables, the lepers, etc. Of course such institutions as the societies would be able to run, would not be of sufficient size to meet the needs of the locality where they were, but they would show the Chinese church (and the Chinese at large) how such institutions should be planned and run. They would serve as models and the Chinese church, when able to do so, should take them over and extend them. Again the day when this will be possible is not just yet, but it is coming:
in the meantime let us keep the ideal before us and seek to work towards it.

A word may be said about the style of the institutions we go in for. Care should be taken to avoid the "t’ai ko buh chih," "the excess and the defect." By defect I mean inefficiency, a thing we are all trying to overcome. By excess I mean extravagance in buildings and plant, which while not appreciably increasing the efficiency of the work, must deter imitators because of its very costliness. In other words we must study economy as well as efficiency. We naturally like to see a hospital as ornate as what we are accustomed to at home, and to the Chinese such appears simply magnificent, and the Chinese Christian will hardly be willing to contribute to the maintenance of such a style. Once given cleanliness, a vast amount of suffering may be relieved in very humble surroundings. The same applies to the housing of native doctors, students and nurses; their quarters should be thoroughly hygienic, but need not be built in the best foreign style. It may be we can well learn from the Japanese in these matters and should not be tempted into a close imitation of elaborate home buildings when equally efficient and durable plant may be put down much more economically. Let us aim at such institutions that the Chinese seeing their great utility shall be tempted to copy them.

To sum up: Christian philanthropy is not merely a pioneering agency of the church but part of her permanent duty in every age and every land; the growing church in China needs to be trained to her duty in this respect. The chief function of foreign missions is to put the native church firmly on its feet; they should therefore emphasize this as one of her duties, they should familiarize the Chinese with the idea, seek to train the native personnel necessary and provide model institutions which the Chinese may one day take over and extend. In other words we should lay the foundations of Christian philanthropy in China on a permanent basis by making it part of the Chinese church organization.

In other directions such as getting the native church to do her share in education, tract society and other work similar steps to those described might be well employed, but this is outside the scope of the present paper and must be left to others to handle. The writer hopes that the special subject of this paper will be discussed in the pages of the Journal.
It is particularly disappointing that the first year of a new period of research should be so particularly barren of any united effort to deal effectively with the problems that confront us, and that were recommended to the attention of the association by the last general meeting. We had hoped much from the formation of the number of local branches which have of recent years come into existence. There should in each of these be a research secretary to gather in the work done by the individual members, and we earnestly hope that the non-receipt of such material, points only to delay in the somewhat tedious work of tabulating results, not to any slackness of the members in dealing with the programme laid down by the general meeting—a programme surely large enough to meet all individual tastes.

We have ourselves been more than usually busy during the past twelve months and are able to make only a small contribution to this year's report. We believe, however, that the contribution, small as it is, is not without interest, and we venture to think that if only a number of our members will contribute a short report of their individual work we shall not lack plenty of interesting material for our next report.

The present report contains a very valuable contribution from Dr. H. S. Houghton, of Wuhu, in which he reports for the first time from China the presence of Fasciola hepatica as a human infection; some notes from a letter from Dr. Savin, Yunnan; and a few notes from Tainan, Formosa.

FROM THE LABORATORY OF THE WUHU GENERAL HOSPITAL.
—HENRY S. HOUGHTON.

Series of 500 cases; 820 examinations. Total infections 90.6%.

<table>
<thead>
<tr>
<th>Nematoda</th>
<th>Number</th>
<th>Per cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ascaris lumbricoides</em></td>
<td>385</td>
<td>77.0</td>
</tr>
<tr>
<td>Fertilised eggs only</td>
<td></td>
<td>36.4%</td>
</tr>
<tr>
<td>Unfertilised eggs only</td>
<td></td>
<td>11.6%</td>
</tr>
<tr>
<td>Mixed</td>
<td></td>
<td>29.0%</td>
</tr>
<tr>
<td><em>Oxyuris vermicularis</em></td>
<td>5</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Ankylostoma duodenale</em></td>
<td>123</td>
<td>24.6</td>
</tr>
<tr>
<td><em>Strongyloides stercoralis</em></td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td><em>Trichocephalus trichiurus</em></td>
<td>104</td>
<td>20.8</td>
</tr>
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</table>
Research Report.

<table>
<thead>
<tr>
<th>Number. Per cent.</th>
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</thead>
<tbody>
<tr>
<td>Trematoda:</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Fasciola hepatica</td>
</tr>
<tr>
<td>Schistosoma japonicum</td>
</tr>
<tr>
<td>Clonorchis sinensis</td>
</tr>
<tr>
<td>Cestoda:</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Protozoal Parasites:</td>
</tr>
<tr>
<td>Trichomonas hominis</td>
</tr>
<tr>
<td>Amoeba histolytica</td>
</tr>
<tr>
<td>Unidentified ova</td>
</tr>
</tbody>
</table>

General Notes.—The series here reported shows the microscopic findings in 500 consecutive and unselected cases, made up principally of patients entering for surgical complaints. The females examined, however, represent only medical cases, and are to that extent selected. One feels that the clearest idea of the general distribution of helminths is to be had from large series of entirely non-selected cases. But beyond the statistical interest of such a series, we have found it here so useful in diagnosis and treatment to have a careful examination of each patient's dejecta, that we have made macroscopic and microscopic examination of the stools of all patients entering as nearly as possible a fixed routine of the institution. The faces are brought to the laboratory the morning after the patient's admission, in a covered glass vessel—Petri plates are used here—accompanied by a slip bearing only the in-patient number. Careful macroscopic examination with a hand lens is in this way made simple, and not in the least unpleasant. Specimens for microscopic examination are prepared in much the way spoken of by Dr. Whyte in his report (China Medical Journal, July, 1910); a bit of the material is taken up on a toothpick and mixed thoroughly with a drop of normal saline. Large cover glasses are used, and the excess fluid drained off with blotting paper. The use of a mechanical stage makes the examination at once more thorough and quicker. Stools that macroscopically are pathologic, as well as those in which from the history or physical condition the presence of some helminth not demonstrated by routine procedure, is suspected, are as a rule washed and sedimented. Sedimentation has given, for us, results quite as satisfactory as centrifugation or the use of high specific gravity fluids, and the technique is very simple (C. M. J., No. 4, July, 1910, p. 256).

Greater experience in the examination of large numbers of cases has perhaps made the difference between this report and the previous one from this institution. Until this year Fasciola hepatica had not been noted, and as these were practically all local cases, one is certain that they have been present all along and until now overlooked. The one case of Clonorchis infection was, however, an importation.
Three unidentified ova are noted. One was a small thin-shelled oval egg, brownish in color, with no visible operculum. The approximate size was 0.07 x 0.045, and the contents composed of large granular yolk cells. The number was scanty. The patient was a boatman from Hupeh, entered for a diagnosis and prognosis of chronic dysentery and splenomegaly (schistosomiasis). Another egg was one somewhat resembling that of Ankylostoma, but differing in important details. It has been seen here before, but not reported. Further study of some favorable case will likely clear this up. The third noted is probably not a metazoan, but a protozoan parasite. The specimen has been referred to a protozoologist for an expert opinion.

Ascaris lumbricoides.—Percentage of infection 77.0. No cases of ascariasis of special interest have occurred during the time covered by this report, but one is increasingly impressed by the ill effects that may be produced in children by large numbers of the worm.

Oxyuris vermicularis.—Percentage of infection 5.0. In a previous report this worm was said to be uncommon here. It is uncommonly seen in routine examination of stools, but inquiry among the natives shows that it is well known to them and frequent in children, though more unusual among adults.

Ankylostoma duodenale.—Percentage of infection 24.6. Certainly the vast majority of worms in this particular region are of this species, and not Necator. Of the latter, indeed, no worms have been seen, but in a recent case in the hospital there were ova distinctly larger than the usual, and though the ova were very sparse an effort was made to get the worms. Thymol and oil of eucalyptus were both unavailing in this instance, unfortunately, so that one cannot be positive, but there remains the fact that A. duodenale is the common worm of this region.

Such cases as showed a definite anemia, with associated symptoms, have been classed as ankylostomiasis. In the list given below some of the complicating conditions may be responsible for part of the anemia, but it was felt that clinically the hookworm infection was clearly a factor in the patient's physical condition.
In summary, then, separating those cases showing merely the eggs in their stools, without anemia, from what are clinically cases of ankylostomiasis, we have the following:—

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<tbody>
<tr>
<td>15 to 20</td>
<td>Male</td>
<td>Farmer</td>
<td>Acute lobar pneumonia</td>
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<tr>
<td>16</td>
<td></td>
<td></td>
<td>Malaria</td>
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<td></td>
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<td>Schistosomiasis</td>
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<td></td>
<td></td>
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</tr>
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<td>22</td>
<td></td>
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<td></td>
<td>70</td>
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<tr>
<td>23</td>
<td></td>
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<td></td>
<td>70</td>
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<tr>
<td>24</td>
<td></td>
<td>Coolie</td>
<td>Abscess thigh</td>
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</tr>
<tr>
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<td>Farmer</td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td>Typhoid Fever</td>
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<tr>
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<td></td>
<td>Ulcer of the leg</td>
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<tr>
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<td></td>
<td>B. Priest</td>
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<tr>
<td>29</td>
<td>Female</td>
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<td>29</td>
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<td>70</td>
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<tr>
<td>37</td>
<td></td>
<td>Artisan</td>
<td>Opium habit</td>
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<td>Hemorrhoids</td>
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<tr>
<td>41</td>
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<td></td>
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<td>60</td>
<td></td>
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<tr>
<td>43</td>
<td></td>
<td>Boatman</td>
<td></td>
<td>60</td>
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<tr>
<td>43</td>
<td></td>
<td>Shopkeeper</td>
<td></td>
<td>60</td>
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<tr>
<td>46</td>
<td></td>
<td>Farmer</td>
<td>Ulcer of the leg</td>
<td>75</td>
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<tr>
<td>47</td>
<td></td>
<td></td>
<td></td>
<td>75</td>
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<td></td>
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<td></td>
<td>70</td>
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<tr>
<td>49</td>
<td></td>
<td>Farmer</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>50 to 70</td>
<td>Male</td>
<td>Boatman</td>
<td>Gunshot wounds</td>
<td>75</td>
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<tr>
<td>57</td>
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<td>Farmer</td>
<td>Ulcer of the leg</td>
<td>70</td>
</tr>
<tr>
<td>59</td>
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<td></td>
<td>Ulcer of the leg</td>
<td>75</td>
</tr>
<tr>
<td>68</td>
<td></td>
<td>Coolie</td>
<td></td>
<td>70</td>
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</tbody>
</table>
In the treatment of these cases, we use both thymol and the oil of eucalyptus. Both are satisfactory and efficient for ordinary infections, but here we have had little success in the permanent cure of asthenic, highly anemic cases, with general anasarca. A recent post-mortem was had on a patient who had been in the hospital for more than two years and who died in spite of regular and active treatment, of a progressive anemia. On section, no hookworms were found in the intestine (he had had numerous courses of thymol, and the feces had been free from ova for some time), no helminths indeed, except a half dozen whipworms in the caecum. But the most of the duodenum and jejunum was punctate with numerous petechiae, showing very clearly against the waxy white mucosa. There was much fluid in the serous cavities and a moderate degree of fatty degeneration in most of the parenchymatous organs. This, I take it, was a case wherein long continued infection had exhausted the recuperative power of the blood, with an enuing pernicious anemia in the broad sense of the term.

*Strongyloides stercoralis.*—Percentage of infection .4. In the absence of a large series it is difficult to say much as to the pathogenicity of this worm as it is seen here, but in more than half of our cases (including those of a previous report) there has been a severe, protracted and debilitating diarrhoea. But whether, as some authorities state, these worms are found more abundantly in these because of the abnormal condition and contents of the bowel, or whether they are really a factor in the diarrhoeas one cannot say.

*Schistosoma japonicum.*—Percentage of infection 8.2. This is by far the commonest trematode infecting man in Anhuei, so far as my investigations go. Abundant as it is, one cannot but wonder why it is not still more common, and why the distribution in China should be (apparently) so circumscribed, in view of Katsurada’s conclusive experiments to show the life history of the worm (*Centralblatt für Bakteriologie*, February 19th, 1910). In Wuhu neither cats nor dogs have been found infected, but in Kiukiang many of the dogs belonging to Europeans, used on shooting trips, etc., have been found by Dr. Lambert to be heavily infected.
Of our series, all were either boatmen or farmers, except two, who were petty shopkeepers in an endemic area, and without doubt sometimes were exposed to a water-borne infection.

*Fasciola hepatica.*—Percentage of infection 1.8. This series of interesting cases is to be reported separately and in more detail by one of us. Infections have heretofore been overlooked doubtless owing to the usual paucity of ova in the feces and our unfamiliarity with them. The first case, however, was one of a massive infection which ended fatally, and the eggs were very numerous in the stools. Since that time close examination has discovered a total of nine cases. In most of them the infection was clinically negligible, but some have shown symptoms of grave hepatic disturbance.

*F. hepatica* is exceedingly common about here in sheep, cows and water buffalo; the latter being particularly affected.

*Clonorchis sinensis.*—The one case seen was a coolie from Kiangsu Province.

*Cestoda.*—No infections among natives have been seen during the times covered by this series. *Bothriocephalus* is very common here in dogs and cats, however, and will likely be found sooner or later in a human host. The other human tapeworms are certainly rare in this Province. It is very possible that one of the unidentified ova mentioned above was the egg of *Bothriocephalus latus*; it was about the right size and configuration, but no operculum could be made out. It is unfortunate that no attempt was made to rear an embryo from them or that no taeniafuge was given the patient.

*Trichomonas hominis.*—Small flagellate organisms are seen occasionally here in normal stools in small numbers, but these two recorded cases were both infectious, showing frequent loose stools literally alive with the organisms.

*Amoeba histolytica.*—The cases reported are those alone which presented an active dysentery and showed the presence of an amoeba with the morphological characters of the above. A non-pathogenic amoeba (coli, Lösch) is not infrequently seen. It is difficult to say how abundant amoebiasis is here; in a surgical in-patient service of about 700 per year, we see one or two cases of hepatic amoebic abscess, and on the medical side (about 300) the same number, annually, of intestinal infection.
The China Medical Journal.

SOME NOTES FROM A LETTER FROM DR. SAVIN, YUNNAN.

We have pointed out on a previous occasion the extraordinary difference that occasionally occurs in reports from the same province on the distribution of tape-worms. The following note explains this for the province of Yunnan and the same explanation may account for the difference in reports from other provinces also.

Chao-Tong, Yunnan.

I have only met with two cases of tape-worm during the last eight years. Though I am told that in the independent "Lolo" country three days to the west (on the other side of the Yang-tse) many people have tape-worm. The two cases that I mention have both resided in this aboriginal district; one of these for more than a year. These aborigines eat beef which is scarcely cooked, only warmed through when roasted; cooking is said to destroy the flavour. There are Mohammedans living in this prefecture—thousands of families, but I have never met with tape-worm among them. I think they eat their beef well cooked. The Chinese seem not to have tape-worm; they do not eat beef.

L. Savin.

We have received specimens of tape-worms from Dr. W. T. Clark, Yunnan, but too late to include a report in this paper.

J. L. M.

A FEW NOTES FROM TAINAN, FORMOSA.—JAMES L. MAXWELL, M.D.

Two cases of interest have come to hand during the past year.

1. A case of Tapeworm infection. This is the first case of tape-worm infection we have seen in Formosa out of more than 15,000 in-patients and several times that number of out-patients. The case was a young man of 24 years of age, the worm present was Taenia solium. The patient appeared to be in no way affected by the parasite. One can only account for the infection by the supposition that the man had eaten a piece of infected pork which had not been thoroughly cooked. It speaks volumes for the thoroughness of Chinese cookery that these cases are so very rare. The patient had never been out of Formosa.

2. A case of Fasciolopsis buskii infection. This we believe the first case of Fasciolopsis infection reported from Formosa. Farmer aged 40 admitted to the Tainan Hospital for Ankylostomiasis. Patient was a fairly advanced case of this disease, quite typical. Stools showed abundant eggs of ascaris and ankylostomum and a few Trichoccephalus eggs; no other eggs were noticed. Beta-naphthol was given, and resulted in the passage of a large number of ankylostomes and one Fasciolopsis buskii. A second course of Beta-naphthol brought away a few more ankylostomes only. A course of thymol was then given,
Injuries of Nerves.

but no more trematodes were passed. Patient discharged much improved.

There can be no doubt now that the distribution of Fasciolopsis is a very wide one, though in cases such as the one given above it is doubtful if the infection can really be considered of pathological importance.

The worm appears to be a typical Fasciolopsis buskii, without cuticular spines. The patient had never been out of Formosa.

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INJURIES OF NERVES.

By W. PHILLIPS, M.D., Newchwang.

Having in the course of the last few months had a series of cases of injuries of nerves, it occurred to me that a few points gathered in their treatment might be of interest to the Conference.

The cases included among others gunshot wounds of the median and musculo-spiral nerves; incised wounds of the great sciatic, ulnar and median; pressure paralysis of the brachial plexus and external popliteal and traction injuries to the ulnar and brachial plexus.

An injury to one of the main nerves of a limb is an accident of the utmost gravity, involving as it does the usefulness of the whole limb, and affecting it may be, a man's means of livelihood. Hence the recognition and treatment of such an injury is of the greatest importance.

Classification of injuries. An injury to a nerve causes an interruption of conduction in the nerve. Such interruption may be "complete" or "incomplete" according as function is entirely or only partially lost. Loss of function may be due to actual section of the nerve, when the division is termed "anatomical;" or the injury may leave the naked-eye continuity of the nerve intact, in which case the division is said to be "physiological."

Production. Nerve injuries may be referred to three main causes:—

1. Wounds, accidental or operative, especially in the region of the wrist.
2. Pressure, momentary, as in a blow, or long continued, as by callus.
   Examples are: the pressure of callus on the musculo-spiral in a fracture of the humerus, or the pressure of the head of the humerus on the brachial plexus in an unreduced dislocation.
3. Traction: this affects chiefly the brachial plexus, causing either comactual rupture or physiological division. A few weeks since I saw an old man with lower arm paralysis on both sides, due to having been suspended by the arms for three hours in the course of a village feud.
Fractures, dislocations, and gun-shot wounds may be complicated by nerve injuries.

**Fractures.**—The nerve may be damaged at the moment of the accident, or later on by becoming involved in fibrous tissue, by the growth of callus, or the pressure of the fragments. The musculo-spiral is the nerve most frequently involved in this way. I have seen paralysis of the median caused by the growth of callus from a fractured ulnar coronoid process. It is very easy to miss the nerve injury in fractures; the attention being taken up with the broken bone, and, as early treatment is of great importance and can be combined with mechanical fixation of the bone, a routine examination for nerve injury should always be made.

**Dislocations** are often accompanied by injuries to nerves. Such injuries may be (a) primary, caused by the direct pressure of the head at the moment of the accident, by the violence producing the displacement, or by attempts at reduction; or (b) secondary. Secondary involvement occurs only in unreduced dislocations, and is especially common in China, the land of unreduced dislocations. I have seen several such in unreduced dislocations of the humerus. I remember also causing a paralysis of the ulna while reducing an old dislocation of the elbow. Such injuries, following surgical procedures, are unfortunately not very uncommon. Another example is the so-called "post-anæsthetic paralysis," due to the position of the patient on the operating table.

**Gun-shot** injuries to nerves are of great importance. In Manchuria, owing to the prevalence of Hunghutze, they are not uncommon. According to Japanese military statistics in the late war, the Great sciatic suffers most, followed by the musculo-spiral. Complete anatomical division is rare, except when, as in a case of my own, the bone is shattered and the nerve torn by the comminuted fragments. Signs of complete division may develop later, owing to the involvement of the nerve in fibrous tissue or callus, causing late appearance of pain and tenderness.

**Symptoms** following Complete Division of a mixed peripheral nerve. These are of importance for diagnostic purposes, and an incomplete knowledge of them may readily lead one into errors. One gains the idea from his anatomical knowledge that the division of a sensory nerve causes complete loss of sensibility in the area described in the text-books as inervated by that nerve. This is not the case. There is considerable overlapping of supply, both on the surface and
Injuries of Nerves.

below, so that division of a mixed nerve causes loss of those forms of sensibility which it exclusively supplies, together with paralysis of the muscles to which it sends motor fibres. On more particular examination the following changes are found in the tissues concerned.

1. Changes in Sensibility.—These are a little misleading, if only a rough examination be made. Assuming that no tendons are divided—for if there be, other considerations are introduced—a touch with a finger, pencil, or in fact any blunt instrument that deforms the skin, is readily perceived, leading one to conclude that there is no loss of sensibility. Actually this tactile appreciation, called deep sensibility, is a pressure function due to fibres which run below the skin to tendons, muscles, bone and periosteum. If a sharp needle is used, one finds that over a small area the sharpness of the prick cannot be perceived; the patient recognises that he is touched, but does not know that the point is sharp, and feels no pain. If now a piece of cotton wool is lightly stroked over the skin, it is found that over this area, as well as over a larger territory which surrounds it, there is loss of sensation to light touch. Inside the boundary of this larger zone, the sharpness of a pin-prick can be appreciated, but all stimuli have an unpleasant tingling sensation like pins and needles often amounting to actual pain. This portion is readily affected by changes of atmospheric temperature; it easily becomes blue and cold, causing the patient to complain.

If in addition to nerves, tendons have also been divided, thus doing away with deep sensibility, all sensation may be lost. Some mixed nerves, e.g., the musculo-spiral in its lower third, may be divided without any appreciable loss of sensation. It was a surprise to me to find that that division of the radial produced apparently no change in the skin it anatomically supplies.

2. Motor Changes.—Complete division results in immediate motor paralysis of the muscles it supplies. But this paralysis is not always obvious. Further, in investigating it, the individual muscles, not associated movements, must be examined, e.g., though the musculo-spiral be divided, the fingers can still be extended by the flexors and interossei of the hand.

3. Electrical Changes.—These are of importance both for diagnosis and prognosis. A sound muscle reacts alike to the interrupted and constant current. With the former the muscle remains contracted as long as the current is passing; with the latter a twitch occurs only at the make or break, not while the current is flowing. With a weak current gradually increasing in power a break occurs
first at the make of the kathode, i.e., while the kathodal electrode is used for testing. Still increasing the current, a twitch next occurs at the make of the anodal current. This is expressed in the formula—K.C.C. > A.C.C. After division of the nerve a change in electrical excitability, due to the degeneration of nerve fibres sets in. In from 4 to 7 days the muscle ceases to respond to the interrupted current. In about ten days it is difficult to get any response to the constant current, which to call out a contraction has to be much stronger than what is effective on the sound side. A little later, instead of a twitch, we get a sluggish wave-like contraction, due to the direst stimulation of the muscle substance itself. This contraction, with an increasing strength of current, appears first at closing of the anodal current. Put into a formula this reversal appears as A.C.C., > K.C.C. To this loss of irritability to the interrupted current, in conjunction with the specific alteration in the response to the constant current the name "reaction of degeneration" is given. After a varying period, which may run to years, all contractile substance is lost, the muscles cease to respond even to the constant current, and recovery then then becomes impossible.

4. Changes in the Skin. (a) The affected skin does not desquamate readily; it becomes thick, rough, dry, does not sweat. (b) A prick bleeds easily. (c) It is very liable to injury from slight causes; trophic ulcers are produced, beginning generally as blisters, which may lead to loss of a considerable part of a member. (d) Still later more marked trophic changes set in, e.g., in the hand; the fingers are thin and tapir, the skin is mottled, blue and feels cold.

5. Changes in the Nails and Hairs are also seen.

So far we have dealt only with the symptoms of complete division, but INCOMPLETE DIVISION has also to be considered. Its symptoms from their anomalous nature often make diagnosis difficult. Incomplete division means such interruption or impairment of conductivity as does not lead to degeneration of the whole peripheral end of the affected nerve. Such division may be (a) "Anatomical," due to wound or partial rupture; or (b) "Physiological," the result of pressure by blood-clot, fibrous tissue inside or without the nerve-sheath, bone, growth, or external violence. Although the causation is thus different, the symptoms are identical, and may be discussed together. In this connection it is well to note that at least a third of a nerve may be divided without causing either motor or sensory loss, or at most only of a transient nature. In
accidents such an uncomplicated section is rare; the pressure of blood-clot or of the cutting instrument causing a physiological division as well. When symptoms are present apparent recovery is then due to the passing off of this physiological division. Absence of symptoms in incomplete anatomical division of a nerve may be explained on the view that a nerve may contain more fibres than are absolutely necessary to supply the part. Reverting now to the

**Symptoms of Incomplete Division.** We find these to be sensory, motor, electrical, and after results or sequelae.

**Sensory.**—In many light cases there is no loss to slight touch, but the patient is conscious of an area of skin altered in sensibility. Thus he may not be able to detect the difference between satin and velvet. But usually loss to touch of cotton-wool is absolute, and this may be the only sign of injury. In a more severe case there may be also loss of sensation to prick, and the sensory loss resemble that of complete division, though unaccompanied by motor loss. As a rule, however, in a case of such severity this symptom also is present.

**Motor.**—Paralysis of some or all the muscles supplied may result. Thus in a case of incomplete division of the median under my care, the opponens pollicis and flexor brevis were paralysed; all the other motor fibres were intact.

**Electrical.**—Usually reaction to interrupted current is lost, but the muscles respond to the constant current; there is no reversal of excitability.

**After-results of Incomplete Division.**—These may be the first symptoms. (a) Pain, more frequent than after complete division, accompanied by tenderness (hyperalgesia) and sometimes by glossy skin. When severe this condition is called "causalgia." These symptoms are the result of irritation, and occur usually after a latent period of a few days to three weeks. The pain is most pronounced in incomplete division, and especially common after gunshot: it is very severe, burning, and widespread. In these cases the skin is glossy, thin and polished, often appearing as though there were cellulitis beneath. These points are well illustrated in the following case: A Chinaman, aged 34, had the left perineal nerve incompletely divided by a stab in the buttock during a brawl. When seen the wound had been packed by a Chinese practitioner, and cellulitis set in. As a result the nerve injury was overlooked. Three weeks later the patient
complained of severe pains in the dorsum of the foot, radiating up the leg. Changes in the skin so simulated abscess formation that a dispenser applied a fomentation. The pain continuing and becoming more severe necessitated injections of morphia. By this time a correct diagnosis having been arrived at, I cut down on the nerve; the injured portion at the margin of the great sacro-sciatic foramen was found enlarged and embedded in fibrous tissue. The affected part was resected and the nerve sutured. Pain ceases at once. Such severe pain rapidly affects the patient's general condition; he loses self-control and becomes emotional and hysterical. At the same time it must be added that the pain is seldom so severe. The pain may be present without the marked skin changes described above. It is felt over the full area of the nerve. The condition is in fact a kind of neuritis.

TREATMENT.

The principles governing the treatment of any kind of nerve injury are: (a) Maintain nutrition of the parts. (b) Prevent over-stretching of the paralysed muscles, and contraction in opposing muscles, until conduction is restored, either by nature or the surgeon.

The operation is but a step; the successful result depends on the after-treatment, carried on it may be for months or even years. In the present state of hospital practise in China this after-treatment is very difficult.

The paralysed muscles must be kept relaxed on a splint until power is restored. The splint should be removed daily and massage and passive movement carried out. Electrical treatment is not so necessary. The patient should be warned against slight injuries, which in the anaesthetic state of the limb are apt to cause disproportionate damage. As soon as voluntary power begins to return, the splint is removed and active exercise indulged in until recovery is complete.

To restore conduction the ends of the divided nerve must be brought into continuity and maintained in that position until regeneration takes place. This is generally by suture, Primary or Secondary.

Primary suture is union before degeneration commences in the peripheral end of the nerve. As prognosis is then more favourable, it should be made a matter of routine to examine for evidence of nerve injury in all patients with accidentally acquired wounds.

Such evidence having been obtained, the skin should be thoroughly cleansed—asepsis in these cases is most necessary—and the nerve exposed; it is necessary as a rule to make an incision at right angles.
to the wound. If the nerve be incompletely divided a catgut suture will bring the cut fibres into apposition. If the nerve be completely divided, primary suture must be performed. In this operation it is necessary to bring the ends into apposition and to prevent, if possible, the ingrowth of fibrous tissue and adhesions to neighbouring structures. If the ends are lacerated, they should be trimmed transversely with a sharp knife—never with scissors. For the suture catgut, as fine as possible, and a small round needle are best. Never use silk. Pass the suture through the whole thickness of the nerve, at right angles to its axis, and tie with just sufficient force to bring the ends into contact. One suture is usually enough. It is recommended to prevent adhesions by wrapping a piece of chromisised Cargile membrane round the junction. This is slowly absorbed. I have never used it myself. The whole should be done with the utmost gentleness. It is well to put in a drain for 24 hours in an accident wound. Suture the skin wound. Then put up on a splint in such a way as to prevent tension on the junction and relax the paralysed muscles.

Subcutaneous injuries (where there is evidence of damage to a nerve without any lesion of the skin) should be placed on a splint and treated expectantly. If within 14 days the reaction of degeneration appears, operate, remove the damaged section, and suture end to end.

If the nerve becomes secondarily involved in callus or fibrous tissue, expose and free it.

Secondary suture; in contradistinction to primary means suture after degeneration has set in the peripheral end of the nerve. It may be done with good hope of success up to three years from the receipt of the injury. Prognosis depends not only on the time of the operation—the sooner the better—but also on the nature of the original wound. It is less favourable if suppuration have taken place in the original wound. The condition of the muscles and joints must also be taken into account. Should the muscles not react to the constant current, recovery of motor power is probably impossible. But operation is still worth while if trophic changes are present, as ulcers tend to heal after suture.

Operation (in three stages):—

1. An incision is made over the nerve, of good length for ease of manipulation. The nerve is traced from above and below into the seat of injury.

2. A bulbous enlargement is found on the proximal part, and both ends are usually surrounded by fibrous tissue. The nerve is cleared
and stretched, in order to be able later to approximate the cut ends. The proximal bulb is then sliced away with a sharp knife until apparently normal fibres are seen; if the lower end it is necessary only to remove a thin transverse section. Suture is performed in the same manner as in the primary operation, but catgut, hardened to resist absorption in iodine-formol or chromic acid, or else kangaroo tendon should be used. Put up on a splint with joints relaxed until the whole has healed, and then correct gradually.

Treatment of nerve injuries complicating fractures.—If the injury is discovered at the first examination, the nerve should be cut down on and appropriate treatment adopted. Often the damage is not apparent until the splints are removed. In this case, if division is complete, operation should be done. The nerve is exposed and traced from above and below towards the fracture. Sometimes it is found ruptured; then it should be sutured. More often it is embedded in or overgrown with callus. This should be chipped away, and if the nerve is thin and fibrous, the damaged parts are excised, and the ends united. Occasionally it may be enough merely to free the nerve. If division be incomplete, it is better to wait and keep the limb at rest. Then if improvement do not occur, operation becomes necessary.

Of Gun-shot wounds.—Here primary union, owing to the usually infected wound, is inadvisable. The parts should be kept at rest and suture performed after healing has taken place.

Plastic Operations.—In secondary suture it is often impossible to approximate the two ends. Here something must be done to bridge over the gap. Many and ingenious methods have been advocated. If the gap is less than four inches in width, the method of choice is to transplant a piece of human nerve into it, either from an amputated limb, or failing this, from the patient's own radial nerve and suture it at either end to the distal and proximal portions of the nerve whose continuity it is desired to restore. But this may be impossible owing, for instance, to the size of the nerve. Then tubular suture may be tried. The gap is bridged by numerous catgut strands, approximating the ends as nearly as possible, and the junction is surrounded by a tube either of decalcified bone, or one of the patient's own superficial veins; the whole forming a scaffold for the down-growing nerve fibres.

An alternative plan is nerve anastomosis. If there is a large mixed nerve trunk in the neighbourhood, a flap may be raised from it; not
more than \( \frac{2}{3} \) of the nerve being divided and united end to end to the peripheral part of the divided nerve. The aim should be to bring cut ends of axis cylinders into contact; it is no use suturing a cut nerve into the sheath of a sound nerve.

Recovery after suture.—Before conduction can be re-established, regeneration must have taken place. Hence after division followed by suture, an interval must elapse before an improvement can be traced. Immediate restoration never takes place. This interval varies, and recovery progresses by a series of stages.

Sensory recovery.—There are three stages.
1. Restoration of sensation to prick.
2. " " to light touch and slight differences of temperature.
3. " " power of localization.

After Primary suture, sensibility to prick will appear in 6 to 16 weeks. The end of the second stage—sensibility to light touch—will be reached in about two years, but complete sensory recovery will take three years.

Motor recovery.—The further the point of section from the periphery the longer the time necessary for motor return. Thus after the usual division of nerves at the wrist, power will be regained in a year; if at the elbow, the hand will not recover for two years.

Prognosis.—After primary suture complete muscular and sensory recovery may occur. Prognosis depends on the nerve injury, the distance of the injury from the periphery, and the condition of the wound, e.g., the musculo-spiral recovers more quickly and entirely than the ulnar; suppuration may delay or prevent recovery.

After Secondary suture.—Recovery follows same general lines as after primary. Motor recovery follows much the same march. In sensory the first stage is often quicker, but the second is delayed, and complete recovery is unusual. As a rule both take longer, but in a case of secondary suture of the musculo-spiral I found the muscles beginning to act voluntarily at the end of three months.

Prognosis depends on
1. The time after the injury—up to three years is good.
2. On the nerve involved, e.g., recovery may be perfect after suture of the musculo-spiral, but is not likely after suture of the ulnar.
3. On the amount of deformity that has taken place.
4. Perfect sensory recovery is unlikely.
Recovery after incomplete division.—A word or two remains to be said on this point. Speaking briefly, after incomplete division both forms of sensibility, if lost, return at the same time, not in stages, at a date which varies with the distance of the injury from the periphery from about three weeks at the wrist to six months at the plexus. Complete recovery as a rule rapidly follows. Muscular recovery commences at a time which varies in the same way. As a rule motor power and perfect sensibility are regained within a year. It must not be forgotten, however, that occasionally tenderness may develop in the distribution of the affected nerve necessitating a resection of the damaged portion with end to end suture.

In conclusion, I have to add that for most of my facts I am indebted to Sherren's book on Nerve Injuries, which those interested in this topic would do well to consult.

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THE INTERNATIONAL PLAGUE CONFERENCE.

By courtesy of the North-China Daily News.

(From its own Correspondent.)

MUKDEN, Manchuria, April 7th.

BACTERIOLOGICAL PROBLEMS.

The morning discussion was resumed in the afternoon and a day's hard and solid work got through. At the beginning of the conference a doctor, who had made great strides in obtaining knowledge about the plague and was well up-to-date, remarked that there was not much more to be found out, but to-day's sittings, which were confined entirely to bacteriological problems, showed conclusively, in the words of Sir Matthew Hale, "that much learning shows how little mortals know," the feeling of the conference being that this pneumonic plague has opened up questions which cannot be satisfactorily answered without much more research. The learned scientists say again and again that there are depths beyond their present ken, and evidently the conference is treating its responsibilities most seriously. One feels a great reverence for the respected "father of the conference," Dr. Martini, when with all his undoubted wisdom and experience he owns that there is much yet to be learned.

Dr. Kollecha, the Russian pathological specialist, read a paper on the subject of the mode of infection. He began by saying that the summation of all his work showed him that there were lots of problems unsolved.
He stated that the three chief modes of infection were: (1). Absorption by the tonsils; (2). Spreading down the lymphatic vessels of the respiratory track; and (3). Into the lungs direct. At the conclusion of his able address, during which he raised many other important and interesting points, he showed a number of microscopical specimens of tissues in which the invasion of the plague bacillus could be clearly seen.

Dr. Fujinami said that he had the same experiences as Dr. Kollecha, which convinced him that it was difficult to say which was the real mode of infection. His investigations showed him that always the most bacilli were found in the bronchial glands and a very few in the tonsils, a fact that pointed to primary infection in the lungs themselves.

Prof. Zabolotny, commenting on the previous speakers, said that the statistics were too small for definite conclusions to be founded upon them.

**ANIMAL PLAGUE AND THE EPIDEMIC.**

Dr. C. T. Andrew stated that as the result of his observations on many thousands of rats and rat fleas, he had found plague in only one variety of rat, i.e., Mus. decumanus, or the common brown, sewer rat. This species is extremely susceptible to plague. He also dealt with the "seasonal" prevalence of rat fleas, in which it could be seen that there is a periodic prevalence of this flea, and Dr. Andrew's experiences in Tangshan led him to believe that this coincided with the times of outbreak of bubonic plague. The tables and statistics were very interesting.

Dr. Kitasato confirmed these observations. After further discussion, Dr. Fujinami remarked that at Fushun a donkey had died of disease, which on bacteriological examination proved to be real plague, whilst a dead dog found in an infected household also answered to the same test.

Dr. Hill next read a summary of his investigations on the relation of the epidemic to climatic influences.

It was noticeable that there existed a considerable difference of opinion among the bacteriologists with regard to the toxic power and virulence of what has now come to be called the "Harbin bacillus," the causal agent of this epidemic.

Dr. Christie, during the discussion on the relation of animals to human plague, was able to cite an incident from the report of Dr. Livingstone Learmonth, of Hsimmintu, in which it was stated that.
at a large roadside inn on the Imperial road, near Hsinminfu, a traveller died of plague, and that before his death, it happened, that as it was very cold, a favourite donkey was tethered in the same room near the sick man. Two days later the donkey's nose was seen to be bleeding, and the inn-keeper decided that the donkey had plague and must be killed, whereupon a man from a neighbouring village protested against killing such a nice beast and started to lead it away; his hand getting some blood on it, which he did not wash off. He was not allowed to take the donkey away, but went home, died of plague and infected the village. Later a man killed the donkey, and after two days died of plague and infected his village. It is also stated that certain people who ate the meat died, but it is questioned whether they did not otherwise contract the infection. One thing was vouched for, and that was that neither the man who handled the donkey's bridle or the man who killed the animal were ever near the man who died of plague at the first, but certainly took their contagion from the donkey.

There is some difference of opinion on this point concerning donkeys taking the plague, as some have been treated with the virus hypodermically and have shown no symptoms of plague, but the question will be further threshed out, and it is hoped that Dr. Lewis, of Paotingfu, who arrived this evening, will be able to elucidate this important point. It seems pretty certain that donkeys and other animals can be infected by taking the breath of a human subject who has the plague and vice versa.

April 9th.

RESPONSIBILITY OF THE RAT.

The first week's sessions of the conference have been of exceptional interest, especially as the opinions expressed by those who have made a close study of the recent epidemic are diametrically opposed to popular theories. For instance, Professor Shibayama, Dr. Strong, and Dr. Martini, by laboratory experiments, have clearly demonstrated that the bacilli of pneumonic plague are no more virulent than those of many bubonic strains, and Dr. Strong has furnished convincing proofs in support of his opinion that the decrease of the epidemic cannot in any way be attributed to a loss of general virulence of the organism. It appears to be the opinion of those best qualified to judge that the virulence of pneumonic strains is maintained by direct infection from lung to lung without the intervention of rodents as in bubonic plague, and that in the lungs the bacilli find exceptionally favourable surroundings for growth and development.
The inception of the recent epidemic has been generally attributed to a species of marmot known as the tarabagan, which is trapped in large numbers in Manchuria and Mongolia, but discussions at the conference have elicited the fact that no one has yet seen a tarabagan naturally infected with plague. Until a plague-infected tarabagan has been found, and subjected to proper bacteriological tests, scientists will not regard the responsibility of the tarabagan as proved, however strong the inference may be. It may be mentioned that Japanese bacteriologists have proved the susceptibility of the tarabagan to plague bacilli.

THE METHOD OF INFECTION.

It may be stated without fear of contradiction that there are no two opinions as to the general method of infection. The infectivity of a pneumonic plague patient’s sputum has been clearly proved by careful tests, and the Japanese doctors have succeeded in cultivating plague bacilli on agar plates upon which patients have coughed, even when held at a distance of nearly four feet from the mouth.

There has been considerable discussion upon the susceptibility of animals to this form of plague, and the Japanese had clearly proved three cases of unusual infection, namely, two donkeys and a dog. Upon the seat of primary infection in pneumonic plague there is considerable difference of opinion, and nothing definite can be concluded until the whole question of morbid anatomy has been threshed out.

The identification of the pneumonic strain with the bubonic may be considered proved by the fact that cutaneous and subcutaneous injection of guinea-pigs and other animals with the former, has produced typical buboes and other symptoms, without, as a rule, any symptoms of pneumonic infection. This point is of considerable interest inasmuch as it was generally feared that the pneumonic epidemic would be followed later in the year by bubonic plague. As a precautionary measure between thirty and forty thousand rats have been examined in Manchuria, but up to the present only one was found to be plague infected, and this was in a house where several had occurred from pneumonic plague. As is generally known, bubonic epidemics are invariably preceded by an epidemic among rats, and it is therefore hoped that the absence of rat infection may be taken to mean that there is no immediate danger of the appearance of bubonic plague.

Curiously enough it will be found that expert opinion is almost unanimous upon the point that a bubonic epidemic is much more to
be feared than an outbreak of pneumonic plague. This is explained by the fact that human infection can be easily traced, contacts can be isolated, and other precautions can be taken to control the pneumonic plague, whereas an extensive epidemic among rats is almost impossible to control, and renders the community in which it occurs constantly liable to a fresh outbreak.

At the conclusion of its sessions the conference is expected to embody the result of its investigations in a series of recommendations to the Chinese government, which should constitute a most important advance in methods to be adopted for combating plague in future epidemics.

During the week, at the special invitation of the South Manchuria Railway, a visit was paid to the latter's plague hospital, where an exceedingly interesting collection of plague exhibits was on view, and on another afternoon the old Imperial palace at Mukden, which contains priceless treasures, portraits and records of the Manchu dynasty, was thrown open for the delegates' benefit.

At the sixth session of the conference the papers and discussions were confined to the bacteriological aspects of the subject.

Dr. Broquet (France) read a paper on a special method for the preservation of organs of plague-stricken persons and animals when these could not be bacteriologically examined on the spot. By a preparation of which he gave particulars, these specimens could be sent to a laboratory some good distance away and would arrive there in a condition fit for proper investigation, and the laboratory could then wire back the results, thus enabling local opinion to know definitely as to whether plague had broken out in the place.

Dr. Strong then read the results of a careful series of experiments made at Mukden to determine the infectivity of the breath and the range of it. His results confirmed the necessity for complete sets of clothing and masks being worn by those on plague duty and emphasized the importance of wearing glasses to prevent infection on the conjunctivæ of the eyes.

Dr. Petrie (England) then spoke on the infectivity of fleas as proved by his experience in India, and went on to suggest the use of what appeared to him a more suitable culture medium for exposing near the breath of the patient, by the use of which the plague bacilli were more readily distinguished from other general germs in the air.
Prof. Zabolotny (Russia) next addressed the meeting on the infectivity of corpses. In fifteen bodies examined by Russian doctors, three months after death, in this epidemic, the bacilli were found living in all. These bodies had been buried. A Russian colleague of his had also found living bacilli in a body which had been buried six months, thus proving that the germs can remain alive a long time in the earth, and thus rats, tarabagan and other rodents can become infected by burrowing and eating the flesh, and so giving rise to an epizootic among them. He also emphasized most strongly the necessity for the most careful disposal of plague corpses.

Dr. Wu gave the results of some experiments he had made with agar tubes at Harbin.

Dr. Fujinami (Japan) gave a short account of some experiments at Tairen with Harbin and Mukden cultures, showing that the bacilli can resist heat up to 50° C., and that at greater heat it took a long time to kill them; at 80° C. they are sterile in five minutes. Cloth garments with germs exposed to the sun and air took several days for the bacilli to become sterile.

An interesting discussion followed.

The International Plague Conference.

April 11th.

The work of the conference was again confined to bacteriological issues.

Prof. Shibayama spoke upon the examination of sputum. He stated that when a man is seized with pneumonic plague in the earlier stages of his illness, there is very little sputum, and the bacilli are very difficult to find. In the later stages, when the sputum becomes blood-stained, the bacilli are plentiful and easy to find. In the later stages of the disease involution forms appear. The behaviour of the sputum in pneumonic plague is very like that in croupous pneumonia.

Prof. Zabolotny agreed that it was very difficult to find the bacilli in the earlier stages. One must always employ Gram's method. Often it was not possible to rely solely on microscopic examination of the sputum for diagnosis; other methods must be employed. The professor then went on to speak of the examination of the blood. In septicæmic cases he said that one can usually obtain the bacillus during the period of forty-eight hours before death. At the beginning of the illness the examination of the blood is often negative. He described the cultural methods which he had employed in finding the bacillus. The upshot of his remarks was that blood examination was only
good in cases where it is very difficult to say from the sputum, which should always be examined. If they cannot be found in the sputum they may sometimes be found in the blood, but one must confine one's-self to that.

Dr. Strong then read an important paper on prophylactic inoculation and described the work he had done in vaccination with attenuated living culture of plague bacilli.

Prof. Galcotti said that general immunity was not always sufficient to prevent foci of infection in the alveoli of the lungs. He advocated the use of Lustig's serum and said that the blood of monkeys, so treated, possessed a very high bactericidal power.

Dr. Fang (China) then read a paper giving statistics of inoculation at Fuchiatien with vaccine. There had only been four deaths out of four hundred and thirty-nine persons thus inoculated.

Dr. Martini then related the results of his plague serum investigations; the upshot being that serum therapy, in the recent epidemic, yielded small protecting power and required, for even that, very high doses. As for its saving effect it could only be of use in the earliest stages of the disease. It had no curing value when the illness was fully developed.

Prof. Zabolotny related the work done by Russian doctors on the subject of serum treatment. His conclusions were that it must be applied quickly after exposure to infection and during the incubation of the disease. In any case it can only prolong life in pneumonic plague, and very large doses were required, both subcutaneously and intravenously.

Dr. Paul Haffkine related the results of forty-two cases at Harbin, which were injected with serum; death resulting in all.

An interesting discussion then took place; the session being prolonged up to the lunch hour, and, as there are many very important aspects of this question remaining to be considered, the discussion on the papers read was resumed the next day.

April 12th.

INOCULATIONS DISCUSSED.

Yesterday's discussion on the bacteriological aspects of the plague was resumed to-day and occupied the whole morning; interest being centred on the prophylactic value of inoculations.

Drs. Oyama, Kasai and Worrel recounted their experiences of inoculations with vaccine lymph, and supported their statements by a mass of figures, mainly relating to the reactionary effects following on inoculation.
Prof. Zabolotny gave it as his opinion, (1). That one cannot speak definitely of the preventive value of inoculation against pneumatic plague, as the statistics are insufficient; (2). That, so far, it seemed not to give sufficient protection and (3). That it will probably be necessary to modify, in some way, the existing vaccines.

Dr. Gray pointed out that the subject was most important for the medical men in China, as on them would fall the onus of recommending some system of vaccination in future epidemics. He insisted that the discussion had not led to anything definite, so with the object of crystallizing the views of the conference, he read a statement embodying the work done up to date. It was, however, decided to appoint a committee to consider further and report on this important question.

The latter part of the meeting was occupied mainly by the discussion on therapeutic serums. It was generally conceded that serum is useful only if given early. In pneumatic plague by the time the organisms are demonstrable, it is then too late to give serum. Dr. Martini related a case of pneumatic plague contracted in a laboratory, which had been fully proved, bacteriologically and microscopically, and which by the injection of 450 and 600 c. c. of serum, shortly after exposure, had been cured.

Dr. Kitasato closed the discussion by saying that it should be accepted, as a general rule, that the families of plague patients, that is all the contacts of a case, should be immunized at once by serum injections.

Finally Dr. Strong read a most valuable paper, prepared by Dr. Teague and himself on the results of their postmortem examinations performed on twenty-five bodies in Mukden. He remarked that, so far as the literature of the subject went, only six autopsies had been described, though there had been notes, more or less definite, of other cases. He then gave a complete and detailed résumé of the appearances found in the various organs of his subjects and the proportions in which they were invaded by the plague bacilli. He concluded by giving his reasons for considering lung affection to be primary and not secondary to a general septicæmia. His contribution was a most valuable one to the work of the conference.

In the afternoon there was a special meeting of the doctors and others, who gathered to consider quarantine measures for North China at this present time, but nothing was to be made public until their definite decisions had been arrived at.
THE VALUE OF SERUM.

Professor Galiotti gave some statistics of a serum prepared by Prof. Lustig and himself. The serum was prepared by inoculating horses with plague endotoxin. Out of 610 plague patients 313 were treated with serum, and the percentage of recovery was 39.62, whilst out of 297 not so treated the percentage of recovery was 20.21. Septicæmic plague cases were kept alive for twelve to fifteen days by daily inoculation of 50 to 100 c. c. of serum. His conclusions were as follows:—

1. That serum prepared by this method exerted a distinctly favourable influence on the course of the disease. 2. That the percentage of recoveries in those treated with serum compared with those not treated shows about twenty per cent. in favour of the former. 3. That the use of this serum is far more satisfactory in early cases; for this reason in private practice the rate of recovery was 59.37 per cent. 4. That in septicæmic cases the serum only prolonged life. 5. That the serum had no effect in pneumonic cases.

Surgeon-General Uyama said he had inoculated 1,923 soldiers with vaccine from Prof. Kitasato's laboratory in Tokio. At first one c. c. of vaccine was given and eight days later two c. c. The temperature rose after three to six hours and remained high for about forty-eight hours. Headache, perspiration and swelling of glands were symptoms of the reaction, but in no case dangerous. Dr. Kasai had inoculated 2,852 persons in a similar manner. Eight ultimately developed plague and died at periods varying from two days to one month after inoculation. He stated that in seven of the inoculated cases the disease was prolonged. Dr. Worell stated he had inoculated eighty cases; and none were subsequently infected. His method was to give two c. c. twice at an interval of eight days. Prof. Zabolotny referred to the case of Dr. Marmontoff, who died in Harbin after receiving three injections of one c. c. two c. c., and three c. c. of vaccine respectively. Dr. Begutsky said that in Harbin 8,635 people were vaccinated. Amongst these were 1,600 Chinese, and only seven of them died. Dr. Haffkine stated that 132 persons had been inoculated by him at the Russian Plague Hospital in Harbin. Of these twenty-two contracted plague—thirteen after one injection, eight after two injections, and one after three injections. Ten cases were ultimately proved to be tubercular. He used a combined injection of 1.5 or 2 c. c. of vaccine and 10-20 c. c. of serum. Prof. Shibayama said that in Japan over 100,000 inoculations had been done during the past ten years.
Dr. Strong said that he concurred with Dr. Martini as to the amount of serum necessary to protect rats against plague infection. In many of his experiments he had used so much serum that the rats died from carbolic acid poisoning, from the carbolic acid with which the serum was preserved—5 per cent. If the serum were given at the time of infection, 60 per cent. could be saved. If it was given twenty-four hours afterwards forty per cent. could be saved. If given forty hours afterwards only 33 per cent. were saved. In regard to the treatment of pneumonic plague by serum he believed that at the time the plague organisms were demonstrable in the sputum it was too late to give the serum with much chance of success.

Prof. Shibayama said that during an epidemic in Japan there were eight cases of plague pneumonia. Five were treated with Tokio serum given in very large doses and two, who were treated in the early stages of the disease, were cured. Dr. Martini referred to the attendant of Dr. Sachs, in Berlin, who after the death of the latter was given 45 c. c. of Paris anti-pest serum. Nevertheless he got ill, developed fever and three days later had bloody sputum. He was given further doses of 450 to 600 c. c. and was cured. The diagnosis in this case was confirmed by bacteriological tests and infected guinea-pigs and rats in the usual manner. He also made agglutinative tests, and everything was positive. Prof. Kitasato advised the inoculation of all contacts with prophylactic vaccine.

April 13th.

Bacteriology and Pathology.

Dr. Wang, of the government hospital, Mukden, opened the meeting with an interesting paper relating to plague amongst mules. The organs of these animals had been found in the laboratory investigations showed that the mules died of true plague.

Dr. Fujinami then read a detailed account of twenty-nine necropsies, of which three were performed on animals. As a result of this work he was able to draw important conclusions, principally with reference to the way in which plague bacilli gain an entrance into the living body.

Dr. Martini next detailed his experiments on white rats, which experiments were chiefly concerned with investigating the virulence and toxicity of bubonic and pneumonic strains. The animals were infected through their respiratory tracts. This he did by allowing the animal to inhale from a spray of culture containing plague bacilli. He found that it was possible to obtain a very high degree of virulence and toxicity by the lung passages.
An important discussion followed, after which Dr. Kitasato closed the bacteriological section of the conference and vacated the chair. Dr. Wu, the president, then made a short speech, thanking Dr. Kitasato for so ably filling the post.

**Epidemiological Factors.**

Dr. Christie read an able paper dealing generally with the clinical observations which he had made at Mukden during the recent outbreak.

Dr. Ch’uan next addressed the conference on the difficult subject of the diagnosis of the symptoms. He had experience of a large number of cases at Fuchiatien. His paper, when published, should prove, like Dr. Christie’s, of much practical value to those in countries where this plague may arise, especially to persons dwelling in the interior.

Dr. Hill gave an interesting summary of the replies to the queries which he had sent out to numerous plague districts. He found the mean rate of incubation to be four days; some developing very rapidly within twenty-four hours and others in seven, eight and even twelve days. He also described in detail a case of purely septicæmic plague.

Dr. Chabaneix, who represents the Viceroy of Chihli Province, detailed the results of his observations at Tientsin.

Dr. Kasai concluded the meeting with a long paper, denoting much careful work on his observations in Tairen with regard to the symptoms which the plague patients exhibited, who were under his treatment in Tairen.

One point was emphasized in the discussions that though tuberculosis prevails amongst so many people in China and as a most common disease, yet the plague cases had only a small percentage. The majority of the deaths were among otherwise healthy people.

Dr. Wu urged the conference to try and work out by experiments some definite conclusions about animals taking the plague and conveying it to human beings.

Several very interesting points have been discussed by the International Plague Conference this week. On Monday the subjects for discussion included the two very important topics of the infectivity of the breath and of corpses. Dr. Strong, the senior American delegate, read an exhaustive paper upon the former subject. He and his associate, Dr. Teague, have spent a month in studying plague in
The International Plague Conference.

Mukden, and during that period they have made numerous experiments in regard to the means by which pneumonic plague infection is spread. They came to the following conclusions: (1). During normal and dyspnoeic respiration of primary pneumonic plague cases, plague bacilli are not usually expelled by means of expired air. (2). During coughing of such cases, even when sputum visible to the naked eye is not expelled, plague bacilli in large numbers may become widely disseminated into the air surrounding the patient. Dr. Strong said that the range of infectivity from the cough of an infected patient was probably several yards. Agar plates exposed close to the mouth of patients who did not cough had not developed any plague organisms. In reply to Dr. Stanley, he stated that it was quite possible that forcible talking might carry infection, but he had made no tests upon this point.

Professor Zabolotny contributed some very interesting information upon the subject of the infectivity of corpses. In bodies exhumed three months after death in Manchuria, living plague bacilli had been found, and this is a point of great importance in view of the possibility of North China becoming reinfected through the medium of tarabagans and other rodents. These corpses, it might be mentioned, were frozen by the cold of the northern winter, and no-one was able to enlighten the conference upon the subject of the duration of plague infection in bodies not preserved from decomposition by freezing.

The discussion of prophylactic inoculations resulted in no definite conclusions being arrived at, but it is hoped that a sub-committee formed for the purpose will be able to sift the conflicting theories and lay definite recommendations before the conference. So far as experience in the recent epidemic went the use of prophylactic inoculation after infection only prolonged the course of the disease without effecting a cure. Statistics would seem to show that persons inoculated before contact enjoyed a certain degree of immunity, though cases were mentioned in which patients contracted and succumbed from pneumonic plague after several inoculations. Dr. Strong advocated the adoption of vaccination with properly attenuated cultures, but recognizing the danger of indiscriminate use of such treatment, suggested that the culture should be recognized internationally and placed with some well-known bacteriological institute, whence all supplies should be obtained. Dr. Galiotti advocated the use of the serum prepared by himself and Professor Lustig as being safer than the use of living cultures and as having been proved efficacious in bubonic epidemics.
Serum therapy, a kindred subject, also evoked considerable dis­
cussion. Dr. Martini stated that as the result of experiments with
animals ten years ago, he had demonstrated that human beings would
require doses of at least 1,000 c. c. of plague serum. This was
practically impossible. Moreover, in human beings and animals plague
serum had given practically no curative effect, but had merely pro-
longed life for a few days. This was because the serum was chiefly
effective as a bactericide, and the more bacteria of the bigger lung
areas it destroyed, the more poison from their destroyed bodies entered
the system. Dr. Kasai gave an account of five cases of pneumonic
plague at Tairen, which were cured by the use of serum. It must,
however, be confessed that the method by which these cases were
diagnosed as plague was not regarded by all the delegates as entirely
convincing.

Pathological anatomy, the next subject discussed, attracted un-
usual interest, not only because of the indefinite knowledge, up to the
present, of the exact method of infection in plague pneumonia, but
also because it was known that Dr. Strong and Dr. Teague, of the
American delegation, had made no fewer than twenty-five autopsies
during the recent epidemic. The following are their conclusions:

Epidemic plague pneumonia results from inhalation; the primary
point of infection being the bronchi. Through the bronchi the plague
bacilli reach the lung tissue and rapidly multiplying there, produce
at first pneumonic changes of the lobular type and shortly afterwards
more general lobar involvement of the lung tissue. The blood becomes
quickly infected and a true bacteriæmia results in every case. Second-
ary pathological changes occur particularly in the spleen, bronchial
glands, heart, blood-vessels, kidneys, and liver. That the bronchial
glands at the bifurcation of the trachea are always much more severely
affected than any of the other lymphatics, argues against the theory
that epidemic plague is primarily a septicæmic disease, and that the
lungs are affected secondarily from the blood. Moreover, in the earliest
stage of the disease the blood may be free from plague bacilli. The
condition observed in the trachea, and bronchi in epidemic pneumonic
plague, is pathognomic of this condition alone. From the appearance
of the mucous membranes of the throat and larynx a diagnosis of
pneumonic plague may sometimes be made. The tonsils may become
secondarily infected in pneumonic plague just as other lymph glands,
for example the bronchial ones, become so infected. However, in
pneumonic plague death occurs before any very marked microscopic
changes occur in the tonsils. There is no doubt also that the tonsils
may become primarily infected in epidemics of pneumonic plague just as has occurred in sporadic cases during epidemics of bubonic plague. This, however, is not the common mode of primary infection, and in such cases involvement of the lymphatic glands of the neck occurs early in the course of the disease. The fact that the oesophagus was found to be normal in every case examined, constitutes another argument against the idea of primary intestinal plague infection since in many of these pneumonic cases, plague bacilli must have been repeatedly swallowed in the bronchial secretions and saliva.

**THE CONFERENCE PET.**

I think I have mentioned before that only one tarabagan has so far graced the conference with its presence. Four were sent down from the north just before the opening day, but three died en route, and the fourth has since become so tame that it may be regarded as the conference pet. On the opening day a telegraphic message was dispatched to Harbin requesting that six live tarabagans should be forwarded at once. This afternoon twelve of these animals were brought down safely by a Customs employée.

The tarabagan is a species of marmot. It is about the size of a cat, has long fur shading off from dark brown on the back to a light brown on the underside of the body, and is armed with sharp claws and exceedingly long teeth. The arrival of this consignment caused quite a flutter of excitement in the laboratories. Dr. Petrie, one of the British delegates who was on the Indian Plague Commission, and Dr. Andrew, of Chinwantao, at once set to work to hunt for fleas upon these animals. They were choloformed in turn, and an average of four fleas, of what is believed to be an entirely new species, was discovered upon each of them. This is regarded as an extremely important result, as it may lead to the discovery of definite proofs regarding the manner in which tarabagans transmit plague to men. The role of the rat-flea in spreading plague among rats, is well known, but so far as can be ascertained no one has hitherto suggested that fleas might be found which spread plague in the same manner among marmots, possibly from them to human beings.

**THE LIGHTER SIDE.**

While much hard work is put in at the morning sessions, and in the afternoons in laboratory and reasearch work, the delegates have been provided with plenty of amusement. The indefatigable Dr. Farrar, of the British Delegation, organized an extremely successful
concert last night, and to-morrow a large party leaves for Tairen by special train to spend the week-end sightseeing there and at Port Arthur. The South Manchuria Railway Co. are acting as hosts, and the opportunity of seeing Port Arthur will be welcomed by all who can get away.

WORK AND PLAY.

The conference has now reached the stage of discussing practical measures to stamp out an epidemic of plague, and may be expected to get to the stage of framing recommendations to the Chinese government at the end of this week.

All the delegates who spent the week-end at Tairen and Port Arthur speak most enthusiastically of their magnificent reception there. The luncheon given by the commandant of Port Arthur, Count Oshima, was a great success, and there was an affecting scene between the Russian and Japanese delegates at its conclusion.

TARABAGANS AND PLAGUE.

Two experiments which may have far-reaching results have been performed during the week-end. In the first place the live flea procured from one of the twelve tarabagans has bitten a man, thus showing that infection may possibly be transmitted in this manner.

But even more important is an experiment made by Dr. Strong. He inoculated six of the twelve tarabagans which were brought down last week with plague, and at the same time inoculated a guinea-pig, which is regarded as one of the most susceptible of animals. In less than three days three of the tarabagans had died of plague, while the guinea pig still lives, thus showing that the tarabagan is distinctly susceptible, the exact reverse of what the Japanese stated to be the case. I will let you know the conclusion of the experiment as soon as the data are available.

April 22nd.

The International Plague Conference is expected to finish its labours by April 28, and on the following day the delegates will leave Mukden by special train for Peking, where they will be the guests of the Chinese government during their stay.

The work of the past week has dealt chiefly with the practical side of combating an epidemic of pneumonic plague, and considerable evidence has been given by the doctors engaged in anti-plague work in Manchuria during the past winter as to the methods they found most effective. Chinese, Russian, and Japanese doctors all recounted their
experiences. Most of the anti-plague work has already been fully de-
scribed, and it would be tedious to recall it in detail.

The question whether there had been a spontaneous decline in the
epidemic, apart from the measures taken, was vigorously discussed.
Evidence points to the conclusion that although plague died out about
the same time in cities where up-to-date sanitary measures were
adopted, as well as in those where no sanitary precautions were en-
forced, the decline cannot altogether be regarded as spontaneous, in-
asmuch as the inhabitants of the most out-of-the way villages had
become thoroughly alarmed, and on their own initiative adopted crude
but efficacious measures to keep plague beyond their borders. In
many a Manchurian hamlet the head-men positively forbade egress or
ingress while plague was raging, and only permitted one or two men
to visit the neighbouring cities to obtain supplies. In Shantung the
peasants of the leased German territory voluntarily established posts
along the frontier river and undertook to pay a heavy fine if anyone
escaped their cordon. The principal experts, including Dr. Martini,
Professor Kitasato, Professor Zabolotny, Dr. Broquet and others con-
curred in the view that whether or not climatic and other influences
had contributed to the decline, the main factor had been the prompt
and effective measures to combat the epidemic, which were enforced
as soon as the gravity of the situation was realised.

The question of the infectivity of houses was discussed at con-
siderable length, and the general conclusion appeared to be that apart
from infected sputum, which became harmless as soon as it dried,
houses were not infective after the occurrence of plague cases in them.
This is a point of considerable importance in view of the large sums
expended by the Chinese and Russian authorities in disinfecting and
even burning down houses in which plague had been found.

Reference was made last week to Dr. Petrie's discovery of fleas
on the tarabagan. The sole flea that survived capture, after being
starved for two days, was placed upon a human arm, off which it
made a substantial meal, so that the possibility of transmission of in-
fec tion to man by means of tarabagan fleas may now be considered as
proved. It should be mentioned, however, that Russian doctors have
found human bones in tarabagan holes, and that this suggests the
possibility of the animals becoming infected by eating plague corpses.

Dr. Strong and Dr. Teague, the American delegates, have made a
series of interesting experiments with tarabagans, experimentally
inoculated with the plague organism. The Japanese had stated early
in the conference that tarabagans were not highly susceptible, but the
experiments referred to proved that these animals, which have generally been regarded as the source of the recent epidemic, are highly susceptible. Five out of six died before a guinea-pig that had been inoculated with the same quantity of plague cultures, and as is generally known, the guinea-pig is exceedingly susceptible to plague.

Many difficult questions have been discussed without any definite pronouncement being made in regard to them, such as the disinfection of rickshas, carriages, tramcars, and other vehicles, the stoppage of traffic in infected cities, the disinfection of goods, the closing of churches, theatres, pawnshops, etc. In regard to the closing of churches a terrible story was told by Dr. Wu, who worked in Harbin. There was a Roman Catholic Church there and a community of about 300 Catholics. When the epidemic broke out the Roman Catholic priest was informed that his converts would have to be removed to the ordinary plague hospital if they contracted plague. To this he objected, saying that the services of a foreign doctor were at their disposal, and subsequently he removed all the converts to a separate compound. Services were held daily in the church. In a little over a month 243 out of about 300 converts had succumbed to plague, as well as the priest and his assistant pastors. Coffins were piled up in the compound, and it was only when the priest and his assistants were all dead, and no one could raise a protest, that it was possible to remove the bodies and cremate them.

It is hardly a matter for surprise that the hastily erected plague hospitals to which patients were removed during the recent epidemic left much to be desired, and several delegates expressed the opinion that plague patients should no longer be regarded as objects of fear, but of pity, and that they should be nursed as attentively as patients suffering from any other disease. There is little doubt that the crowding together of patients in large wards, where they were exposed daily to reinfection, militated against any fair trial of sero-therapeutic treatment. The view is generally held that in the event of a further epidemic of pneumonic plague, patients and contacts should be isolated in hospitals constructed upon the box system, so as to give them every chance of recovery. At the same time the almost insuperable difficulties of erecting satisfactory hospital accommodation at short notice in the Manchurian winter were fully recognized.

Few people can have any idea of the elaborate precautions necessary on the part of the medical staff to avoid risk of infection in the performance of their duties. A mask across the nose and mouth to protect the respiratory tract was generally regarded as indispensable,
as well as overalls, gloves and goggles when in actual contact with plague patients. The doctors used an entirely different set of clothing while engaged in plague work. On their return to headquarters their overalls, shoes and goloshes were sprayed with carbolic acid, and were then removed and soaked in sublimate lotion. After gargling, the doctor entered a second room, where he removed the rest of his clothes and took a hot bath containing sublimate lotion. Boots and goloshes, besides being sprayed were rubbed against a mat soaked in carabolic, or in a tray containing powdered lime. At night all the doctor's clothing was sterilized with formalin vapour and dried by hot air.

Dr. Aspland, who did such good work in the Chinese quarter of Harbin, laid great stress upon the value of railway wagons in emergencies as units of quarantine and segregation camps.

Quarantine on sea, river and railway were discussed at considerable length, and revealed many curious discrepancies during the recent epidemic, as, for instance, when fruit imported from South China, where there was no plague, was refused transit by the North China railways. A special committee has been formed to go into the whole question of quarantine, and doubtless will make recommendations which will afford sufficient protection without imposing irksome and unnecessary restrictions upon passengers and trade. The Japanese, throughout the epidemic, placed no restrictions upon the export of wheat, flour and beans, and so far as can be ascertained, no cases of infection from these products have occurred.

The programme before the conference being concluded, all that now remains is to frame the recommendations asked for by the Chinese government. Sub-Committees have been appointed to draw up resolutions for submission to the full conference, and from now onward the deliberations of the conference will be held in camera. In addition to these recommendations the Editorial Committee will draw up a brief statement of conclusions upon the evidence that has been laid before the conference.

The delegates are spending the week end at Harbin as the guests of the Russian government.

A BANQUET.

H. E. Alfred Sze, the Imperial Commissioner representing the Chinese government at the conference, gave a banquet to the delegates last Tuesday, followed by a concert and reception, to which the Viceroy, the Consuls and many other guests were invited. The banquet was served in the conference dining hall. Professor Kitasato
sat on H. E. Sze's right and Dr. Strong on his left. Each guest was presented with a pretty souvenir of the occasion in the shape of a silver card, or cigarette case, or some other memento of Chinese workmanship.

The Viceroy's band played during dinner. At the conclusion of the meal, H. E. Sze rose and announced that he had been instructed by the Imperial government to invite all the delegates to Peking as its guests at the conclusion of the conference. This announcement was greeted with acclamation.

Dr. Martini, the German delegate, who has placed all who attended the conference under a deep obligation by his untiring efforts to minimise the language difficulty, then rose and addressed H. E. Sze as follows:

Excellencies, Ladies and Gentlemen: The very agreeable duty that I have to perform this evening, comforts me for the fact that I must speak once more, notwithstanding the fact that I have spoken nearly every day during the whole conference. My words apply to His Excellency Mr. Sze, our very amiable host. He has given us in a perfect manner, every facility we could desire, for completing our noble work in the service of humanity of devising measures to be taken for combating and preventing plague pneumonia, and can say to-day that our work will be a success. Therefore I request you to drink to the health of H. E. Sze.

The toast was enthusiastically drunk with musical honours.

After dinner an excellent concert was given, at which H. E. Viceroy Hsi Liaung was present. At the conclusion of the programme, which was all too short, all present adjourned to the supper room, where the health of the Viceroy was proposed by Dr. Gray, of H. B. M.'s Legation. The Viceroy looked somewhat puzzled when all present joined in singing "For He's a jolly good fellow," but he must have been still more nonplussed later in the evening when he was persuaded to join hands in an enthusiastic circle of delegates and guests, who sang "Auld Lang Syne." However H. E. thoroughly entered into the spirit of the evening, and before departing for his palace watched an informal dance which took place in the reception room.

The Viceroy has evinced a keen interest in everything appertaining to the conference. He paid a visit to the buildings last Sunday to inspect the laboratories. But the brunt of the work of entertaining the delegates has fallen upon the shoulders of H. E. Alfred Sze, who has won all hearts by his tact, consideration, and bonhomie. He has been untiring in his efforts to make everyone happy and comfortable, he has lost no opportunity of assisting the conference in every way, and every one of the delegates regards him as a personal friend. Not the least pleasant memory of the conference will be the unflagging zeal with which he has carried out his responsibilities as Imperial Commissioner.
The closing ceremony of the International Plague Conference took place this afternoon in the presence of the delegates, the local Consuls, and Chinese officials of Mukden. The interim report of the conference, consisting of conclusions from the evidence by the Editorial Committee, and about 45 resolutions, is not to be published until it appears with the entire official report.

The ceremony took place at 4 p.m. H. E. Viceroy Hsi Liang, who made the first speech, addressed the delegates as follows:

Honourable Delegates, Indies and Gentlemen: We have met to-day on a very auspicious occasion. It is the last day of the four weeks of sessions of the International Plague Conference, and I cannot adequately thank you for the extreme care you have taken in your deliberations, and the dignity you have conferred upon the conference by your daily attendance. The world, and certainly this Empire will, I doubt not, benefit largely as the result of your invaluable services.

One of our great poets describes the memory of good deeds as not only engraved in the heart, never to be forgotten, but also as causing the people to sing with health and happiness (ming kou k'an lo, ying shi shu-hsuan), and the knowledge of this, I can assure you, will not be the least of your rewards. You have shown in your endeavour to preserve the life and health of the people what mankind has been slow to learn, namely, that necessity makes brothers of us all.

I heartily wish you every success in the further elucidation of some of the more obscure problems of the past epidemic which you have in hand, and trust that ere long these will contribute still more to the health and happiness of mankind. Finally may I wish you a safe and pleasant voyage home to the several countries which have sent you on this noble mission?

Dr. Hehewerth, the Dutch Delegate, then presented the interim report of the conference to the Imperial Commissioner, H. E. Alfred Sze, together with an address, to which H. E. Alfred Sze made an appropriate reply.

DR. WU'S ADDRESS.

Dr. Wu Lien-teh then addressed the gathering. He said:

Your Excellencies, Delegates, Ladies and Gentlemen; Before the proceedings of this Conference are closed, may I be permitted as chairman to say a few words. All through the sessions, the discussions have been very complete, and sometimes diversity of opinion has been expressed on subjects of scientific interest, but so far as I can remember—and I have been present at all the meetings—there has always existed the best of relations amongst the distinguished delegates who took part in the sessions. This can only be accounted for by the desire of every one to make the conference a great success, and I cannot thank you enough for the attention you have paid to all the deliberations. That many interesting observations and important data have been gathered, admits, I think, of little doubt, and it is my earnest hope that future researches which will be carried out by you, will clear up certain points which at present may seem obscure. Finally, will you allow me to take this opportunity of thanking you for your unfailing courtesy and also for your kindness to me in my capacity as president?
The teachers of anatomy in the medical schools of China have no easy task. If students in England and America find this subject one of the most difficult of their studies, although lightened considerably and made more attractive by the dissection of human bodies, the student in China, where the customs of the country forbid this kind of dissection, is in a far worse plight. As an aid to teaching and study, resort is had to various substitutes for human dissection, but all are more or less unsatisfactory. The dissection of cats and other animals, necessary for the purposes of comparative anatomy, of course conveys no accurate knowledge of the human body. Charts and flat paper manikins, even on a large scale, are too elementary, and are useful only for outlines. The French and Japanese solid papier maché models, life-size or smaller, are very serviceable indeed, but do not give fine details. The Edinburgh Stereoscopic Atlas of Anatomy is a delight to those who have dissected, as they can bring previously acquired knowledge to the interpretation of the photographs. Chinese students have not this knowledge, and few of them have the sense of proportion and perspective developed sufficiently to enable them to appreciate the pictures, as is evident by the want of perspective in the artistic creations of their countrymen.

Papier maché casts, moulded on actual dissections and afterwards colored by hand, appear to be a new venture. At first sight they were somewhat disappointing. After the highly colored manikins, the coloring seems very sombre, as it is like that of "fresh" subjects in a rather advanced stage, which have lost their freshness to a considerable extent; little has been done to differentiate sharply the muscles from each other; the casts do not fit accurately the one into the other, and so take a great deal of space; the casts of the skin are not of much use, except perhaps for surface markings, and in an emergency, for surgical splints. But continued use reveals the value of the casts of the deeper parts, and as they reproduce the actual form, size, and general appearance of the dissected parts, are not breakable, and are easily handled, teachers of anatomy will find them very useful for class purposes. Of ten Chinese students, five preferred the casts, three preferred the manikin, and two, in whom the artistic sense is more highly developed than in their fellows, preferred the stereoscopic atlas. Surgeons whose anatomical knowledge acquired during student days is not quite as vivid as it might be, may also be glad to possess the casts. The price of single ones ranges from three to six shillings. Altogether there are seventy-three, and the price for the whole lot is about £15.8.6. A reduction of 15% or 20% is made to missionaries. If the twenty-two casts of the skin are not bought, and they are really hardly necessary, the price can be still further greatly reduced, as these casts cost just as much as the rest.

E. M. M.
The yearly subscription to the China Medical Missionary Association is $4 Mex., payable in January of each year. This includes the Journal and postage on the same, whether local or foreign.

All changes of address, departures on and arrivals from furlough should be notified to the Secretary and to the Presbyterian Press. Members are requested to invite new comers to join the Association.

The Editors will be obliged if all those who are building hospitals will send copy of plans and detailed description (in duplicate if possible). These will be loaned, on application, to members who are proposing to build.

Editorials.

It is with particular regret that we announce the resignation of Dr. Jefferys as editor of the China Medical Journal. From 1903 to 1910 he has edited the Journal, either alone or with a co-editor, except when absent on furlough, and those who have watched its development and improvement know in what a large measure it was due to his energy and enthusiasm.

At the triennial meeting of the Medical Association at Hankow, in February, 1910, he was re-elected editor for another term, and Dr. Davenport elected associate editor.

Greatly to the regret of his colleagues and friends he was shortly after invalided home, and though he has practically recovered he writes that he does not feel able to take up the work again on his return to China in the fall.

The present acting editor took up the work of the Journal at the time Dr. Jefferys left for home, and at his request.

Dr. Davenport, by reason of his arduous duties at the Shan-tung Road Hospital and his extra duties as secretary and treasurer of the Association since the last general meeting, has not been able to do much. Thanks to the loyalty of individual members of the association the Journal has not fared so badly as he feared, and the editor takes no credit to himself for having such a creditable paper in the last sixteen months. Whatever deficiencies may have been noticed are entirely due to the locum tenens, who earnestly hopes that the Executive Committee will soon elect some one to fill out Dr. Jefferys' unexpired term.
THE INTERNATIONAL PLAGUE CONFERENCE.

The meeting of the International Plague Conference which has just closed at Moukden, where it has been the guest of the Chinese government, marks, we trust, the beginning of a new era in the attitude of both the government and people of China toward modern or Western medicine and hygiene as distinguished from their own.

Although the superiority of the former has been demonstrated in the hospitals and clinics in China from the days of Dr. Peter Parker to the present, probably no such striking exhibition of its efficiency has ever been presented to the mind of the thinking native as in the handling of the recent epidemic of plague by the foreign and native foreign-trained physicians.

The object lesson of the doctors of Russia, Japan and the Western nations coming to the aid of the stricken region and working so well against such fearful odds should not be lost on either the rulers or people.

In the absence of any definite news from any of the secretaries who have probably been too busy to think about the Journal, we have been able, through the courtesy of the North-China Daily News, to make use of the letters from their regular and special correspondents, which we do most gladly, knowing that many of our readers never have the opportunity of seeing that estimable paper and so would have no chance, except through us, of knowing what was done there until the official report is published or some of the North-China physicians who were present have time to write it up for the Journal.

Those who have followed the reports of the present famine in northern Kiangsu and Anhwei have noticed what an active part in the organization of relief measures has been taken by the missionary physicians in their respective sections, and that doubtless in addition to their regular work which would naturally be greatly increased in such times of distress.

It was with deepest regret that we learned of the very serious illness from famine fever of Dr. Samuel Cochran, of the Hope Hospital, Hwaiyuan. His medical colleagues and friends will
rejoice to learn that he is now convalescing, and wish him renewed health and strength and a safe return to the work in which he has endeared himself to all to whom he has ministered.

The secretary of the Far Eastern Association of Tropical Medicine, Dr. Francis Clark, D.P.H., of Hongkong, asks the Journal to remind the members of the China Medical Missionary Association of the Second Biennial Congress to be held in Hongkong, January 20th to 27th, 1912.

All medical men practicing in the Far East in good standing are cordially invited to attend and take part in the work of the congress. The subscription in 10/6 or $6 Hongkong currency, payable before the opening of the congress.

The papers will be classified in the following groups:

Protozoology, Helminthology.
Cholera, Plague-Leprosy, Tuberculosis.
Tropical Fevers, including Malaria, Beri Beri.
Surgery, Obstetrics, Infantile Diseases, Dysentery.
Climate, Hygiene, Sanitation.

Book Review.

TECHNICAL TERMS, English and Chinese, prepared by the committee of the Educational Association of China and revised by George A. Stuart, A.M., M.D.

This is a book of 352 pages, got up as a companion volume to our medical Lexicon. To those familiar with the former edition it will be obvious that Dr. Stuart has gone over it very carefully and effected a great improvement. Purely medical terms have, for the most part, been excluded, and this has made it possible to add a large number of other terms without materially increasing the size of the book. A List of Special Characters, with origin, sound and meaning and a List of Inorganic Chemical Substances have been appended, a very convenient arrangement. This is a book that none of us can afford to be without.
LALCACA MEMORIAL HOSPITAL.

On February 16th, as an annex to the Shantung Road Hospital for Chinese, Shanghai, the British Consul-General, E. D. H. Fraser, Esq, C.MG., opened a suite of private wards which have been set apart as a memorial to the late Dr. Cawas Lalaca, who was an honorary member of this association.

As will be remembered Dr. Lalaca lost his life in London whilst attempting to save the life of Sir Curzon Wylie from the murderous attack of an Indian fanatic.

Dr. Lalaca's friends in Shanghai, Chinese and foreign, contributed Tael 5,900 to establish some memorial which would ever keep his memory green. As he himself was much interested in this hospital, it was most fitting that the fund should supply some needed addition in connection with its benevolent work.

The accompanying photograph will show the building set apart, bearing his name, which to futurity will testify that "He being dead yet speaketh." We also will hope that the patients who from time to time will benefit by the treatment received therein, will doubtless feel that "his works do follow him."

The wards are well-furnished, well-lighted and in every sense give the feeling of comfort and cleanliness. They will accommodate 15 patients; the charges being from one to five dollars a day. By this means the distinct need for hospital accommodation for better-class patients is met, and it is hoped a source of income will be provided whereby the well-to-do may benefit the poor in the free wards.

In the entrance hall a large photograph of Dr. Lalaca is hung, and underneath it a brass tablet bears the following inscription: "These wards are dedicated to the memory of Dr. Cawas Lalaca, who by his self-sacrificing life enriched Shanghai, and who by his heroic death won the admiration of all men."

A Chinese gentleman speaking at the opening ceremony stated that for twenty years Dr. Lalaca had been his family physician, and also the family physician of many other Chinese families, and his unfailing kindness and courtesy towards all with whom he came in contact, made his relations with them rather of a personal friend than of merely a professional man.

We trust these memorial wards may perpetuate his kindness and courtesy and go one further by pointing many to Him who is the way, the truth and the life.

Cecil J. Davenport.

REPORT OF THE PEKING HOSPITAL, OCTOBER, 1910.

In some respects this year has been an extraordinary year for the hospital, while in other respects it has been very ordinary. It has been extraordinary, in that this is the first year in the history of the hospital, I believe, that it has not called for an appropriation from the Missionary Society. Of course the society does pay the salaries of the foreign physicians. The hospital has been thus able to stand on its own feet because we have thought, and still think, that somewhat after forty years of work by our Society in and around Peking that the time was fully ripe when the Chinese, and especially the Chinese Christians, should support, or, at least, pay for the current
expenses of this phase of the Christian ministry, which is perhaps of more real practical help to them than any other form of the activities of the Missionary Society. It was with this in mind that at last Chinese New Year we put up a notice in the hospital to the effect that while we did not wish to turn anybody away who were in need of medical treatment, even if they had no money, yet on the other hand we felt very strongly that nearly everybody could pay a little, at least, towards all medicine received. We are glad to report that most of our patrons acted on our suggestions willingly, but there were those Christians of whom we expected cooperation, who did not help us very pleasantly. However we expected that we would find this type of Christian, for there always have been those who followed the church not for Christ's sake but only for "the loaves and fishes." But we firmly believe that our course has been, and will be, beneficial both to the hospital and to the church, beneficial to the hospital in that it will enable it to stand alone and allow the money that has been going to its support to go towards the evangelistic work, for which we are all primarily here, and beneficial to the church in that it will help to develop a healthy, manly, independent spirit among the Chinese Christians, a spirit that will not cringe for "ten per cent. off" just because they are Christians, but will make them unwilling to accept anything unless they have paid a reasonable price for it.

The second factor that has enabled us to avoid calling for an appropriation from the Mission is the fact that, as last year, the optical department of the hospital, which I need not mention to this audience, owes its existence to the energy, the skill, and the tact of one of the best opticians that North China or any other country has ever had, a man who has never been abroad to work, a man who has given of his versatile mind to the building up not only of our hospital and medical educational work, but also to the building up of the evangelistic work as well. It is with sincere and grateful hearts that we thank our heavenly Father that we are to have Dr. Hopkins' sympathetic and helpful presence with us next year. Without the financial assistance which the hospital derived from the optical department it could not have paid the salaries of the three assistants, the corps of orderlies and other servants; in a word, the hospital could not have made its expenses from the mere pittances that were charged for the drugs and the few outcalls that were made.

In the regular routine work the hospital has been running an ordinary course with, its usual run of old chronic and emergency cases, among which have been some unusually interesting cases. We have only time to mention one or two typical cases, such as a case of necrosis of the lower jaw, which had resulted from an ulcerated tooth; the patient had procrastinated coming to the hospital, till one half of one side of the lower jaw was one mass of putrefaction and there were two sinuses opening both into the mouth and externally on the cheek. We were able to open up the sinuses, extract the sequestrum and allow the poor chap who, by the way, was a poor fellow with no money to pay for the operation or keeping to go home to his farm, able to use his other jaw to chew his food, while when he came to us he could only take liquid food and was constantly in great pain. He was admonished that should he or any of his neighbors ever have anything
like this again, not to wait so long before coming to the hospital. But such advice seems to slip through the brains of the average Chinaman as easily as water rolls off a duck's back to be left by the wayside.

Another interesting case is that of an old man, a well-to-do merchant of sixty-five years, who came to the hospital led by his young son. After the usual tests we found that the old gentleman could practically see nothing except that he could distinguish between light and darkness; he had been in this condition for eight years. We made a diagnosis of double cataract and operated on him. He went away in the course of five weeks, after having been fitted with the proper spectacles, not only able to see his own way, but also able to read, a thing that he had been unable to do for over ten years. He seemed especially interested in a copy of the Gospel of John, which he took home with him.

We have tried to keep the optical department up to the standard that Dr. Hopkins has set for it, but, of course, with our limited experience we could not in certain phases of the work. However our patronage has kept well up, and we tested for and fitted patients with glasses, including the Prince Regent's brother, and from him down through all the grades of the social order to the coolie who gets his living by the sweat of his brow.

We have treated a few more than the usual number of students and teachers from the Peking University, having diseases ranging from acute mania to simple tonsillitis and still others who wanted a physician's signature to enable them to escape the tortures of the recitation room.

In all the work of the hospital we have been greatly assisted by our assistants Messrs. Poa, Hsu, and Eu, also by Mr. Kao, who has been very helpful since he has been put in his place of work.

Dr. George Lowry turned over the keys and the work of the hospital at Chinese New Year, as he was soon to leave on his well-earned furlough, and, of course, his branch of the work—the surgical—has suffered. But these breaks in the work will inevitably occur till the Society can see its way clear to have men on the field in time to allow the younger men to acquire the language before the other men go home on furlough.

It has been our earnest desire to make the hospital a place where the men who come may not only receive clean, modern, rational, medical treatment, but also a place where every man who comes shall have an opportunity to hear the simple undogmatic story of Jesus Christ. We have not always found our Chinese, employed in the hospital, ready to give those who come to the hospital an opportunity of hearing about Jesus, and we have had to dismiss some of our employees for that reason, because we believe that if we cannot have a Christian hospital we had better not have any, and it is impossible to have a Christian hospital if those who profess to be Christian are Christians only in name.

One side of the spiritual life of the hospital which we have tried to develop this year and with varying success is the daily prayers, at which we have been taking turns, and have been using the S. S. leaflet. We found that scarcely any of the hospital patients came to the daily prayers, while they were held in the rather dilapidated room that is used for their dining room, so we had a well-lighted, clean, warm room fixed up in the main building, and since then we have have had the attendance of varying numbers of the first and second class patients.
as well as other patients and the employees of the hospital.

Another improvement in the hospital equipment this year is the installation of a very good X-ray machine, which was put in before Dr. Lowry went away, and which is of especial value in the branch of work in which he was so interested. The hospital has also received a fresh coat of paint, and looks the better for it.

The hospital has received two special gifts during the year from its friends in the home land, for which it is grateful and wishes to acknowledge the same here: One of fifty dollars (Gold) from the First M. E. Church of Easton Pennsylvania, and one of fifteen dollars (Gold) from the Epworth League, Surprise, Nebraska.

I cannot close this report without saying a few words about one of the most important phases of our medical missionary work, most important because the most lasting part of our work, I believe. I refer to the educational work, not only at the Union Medical College, but also at the hospital. By it we are trying to lift the moral and sanitary ideals of a nation to a higher and cleaner level. As illustrative of such work at the hospital we had a little pamphlet printed on "The Care of the Eyes," in which we try to warn young men of the danger of immoral living and the seriousness of the contagious diseases that are contracted by such living. Each patient who comes to the hospital is given one of the pamphlets and one of the religious tracts.

The opportunities for medical educational work at the Union Medical College are only limited by the amount of strength and energy that our physical bodies will give forth. Our Mission has not been doing its full quota of work there during the greater part of the year, for Dr. Lowry stopped teaching before last Chinese New Year. Dr. Hopkins has not yet returned from his furlough, and I, because I did not have the language, have been unable to teach any medical subjects till this September, when I began to teach mental and nervous diseases and pharmacy. By this work at the Medical College we are not only educating representatives of this people, but we are multiplying ourselves, and we are raising up a set of young men who will, we trust, become Christian physicians, and who in turn will build and manage Christian hospitals for their own needy fellow-citizens. I am sorry to say that this Mission has not got a man pledged to its work from the class that graduates this Chinese New Year, nor even in the class below; this only goes to emphasize the fact again that there is just as great a need, if not a greater need, in this Mission for real Christian physicians as there is for real Christian Chinese theological graduates. The laymen of America are not going to supply the men nor the money indefinitely for this work. We ought not to expect them to do so. We must raise up well-trained Christian Chinese physicians, who will manage hospitals for their own people. The need of China is leadership from its own sons, not of spasmodic, impulsive enthusiasm, not narrowing prejudice, but of matured judgment and conscientious conviction. Part, and I believe, at this date, the far greater part of the work of the medical missionaries is to mould this leadership, and it is to accomplish this that the Union Medical College was established, and, I believe, we can spend our few talents in no better way, nor to greater advantage than in lending our hearty cooperation to this work.

J. J. MULLOWNEY.
To the Editor of

"The China Medical Journal."

Dear Sir: To the physician working in China one of the greatest disadvantages is his distance from centres of medical learning and the meagre opportunity for post-graduate study. It was with this thought in mind that Dr. J. C. McCracken, president of our school, invited Dr. H. S. Houghton, of Wuhu, to give a post-graduate course in parasitology under the auspices of the University Medical School in Canton. Dr. Houghton very generously gave his time entirely free, so that there was no charge for the members of the class except the travelling expenses of Dr. Houghton between Wuhu and Canton. The class was considered such a great success by all that we venture to suggest that similar courses might be given with great profit in other large centres such as Peking, Hankow, Shanghai, etc. The class was held daily from February 14th to 25th inclusive, with two sessions a day—from 9.30 to 12.30 a.m. and from 2 to 4 p.m., except Saturdays, when there was only a morning session.

A lecture was given morning and afternoon, followed by examinations of prepared specimens or fresh ones, where these were procurable. I append herewith a general outline of the course, which was furnished me by Dr. Houghton. As our hospital is not yet completed we were very glad to avail ourselves of the kind offer of the Kung I Medical College in Canton, to use their laboratory. Thirteen doctors—missionaries in the provinces of Kwongtung and Kwongsai—attended the class some coming from a distance of three hundred miles. The following missions were represented: American Baptist Missionary Union, American Presbyterian, American Reformed Presbyterian, American Southern Baptist, Canadian Presbyterian, New Zealand Presbyterian, United Brethren, University Medical School, and two independent missionaries.

In addition to the interest in the actual work we all greatly enjoyed the opportunity of fellowship with the workers from the different missions, thus tightening the bonds of union between us. Those who have met Dr. Houghton and have read his articles on Helminths need not be told that the leader of the course was thoroughly qualified for the task.

Next year, during the New Year holidays, the University Medical School expects to give another post-graduate course, which will include a course in Ophthalmology. It may be of interest to you to know that the medical class which was started by the University Medical School one year ago now numbers five. Instruction is given altogether in English, and the course will be five years in length. It is expected that a new class will be admitted in 1912.

The first section of a permanent hospital (estimated to cost $100,000 U. S. currency when completed) is under construction, and the contract calls for the erection of this first section before September first. A large number of the physicians in the vicinity of
Canton are also earnestly engaged in making plans for a Union Medical School to be taught in Chinese, and it is hoped that this school may be opened in a year or two.

Very truly yours,

Wm. W. Cadbury.

General outline of course given by Dr. H. S. Houghton, under the auspices of the University Medical School in Canton, February 14-25, 1911.

I. (a) Blood. Obtaining blood, examination of fresh blood, counting, stains, specific gravity, coagulation, red cells, hemoglobin, leucocytes.

(b) Leucocytes continued, platelets, blood reaction, anemia, the blood in special conditions.

II. (a) General considerations and laboratory work in the tropics. Arrangement and routine of a laboratory.

(b) General preparations technique. Obtaining material. Preserving specimens whole, museum specimens, field collections, preparation of ovæ, etc.

The rearing of helminths, feeding experiments, etc.

III. (a) Protozoa, taxonomy and life histories.

(b) Protozoan blood parasites.

IV. (a) Feces. Normal.

Pathological, macroscopic.

(b) Microscopic.

Protozoan intestinal parasites.

(b) Helminths, general taxonomy and bio-nomics.

V. (a) Nematodes, general characters.


(b) Detailed consideration of Angiostoma and angiostomiasis. Ascaris and ascariasis. Strongyloides. Oxyuris.

VI. (a) Trematodes.—Definition, anatomy, development. Trematode parasites of man.

(b) Schistosomum hematobium. Schistosomum japonicum.


(b) Cestodes: Definition and class characters, history, anatomy, development, etc.

VIII. (a) Tania: Taenia echinococcus. Dibothriocephalus. 

(b) Resume—Prophylaxis—Miscellaneous: special laboratory methods for various conditions.

LONDON, W., Nov. 22nd, 1910.

Dear Sir: I am sending you a pamphlet containing some papers on asthma which I think will give you the information you seek, but it is not easy to describe in words what itself is a most simple operation. The whole success depends upon the lightness of touch.

A paper that I read at the annual meeting of the B. M. A. in July will, I think, appear next week in the B. M. J. That refers to the most interesting part about this nasal cauterization, viz., that you can raise or lower a patient’s blood pressure by touching different spots. I don’t think necessarily of the nasal mucous membrane only. I believe the anal mucous membrane will act as well if you could see the right place to touch.

That is the point which I have been trying to make men understand for years; in treating the nose for asthma one is not merely trying to remove the irritation which is producing the asthma by reflex-action; it is a much deeper effect, and I am persuaded now that it acts through the vaso motor system. This is borne out by the fact that the more normal the nasal mucous membrane is, the better is the result in asthma. It has now come to this that in any case of asthma of whatever severity or duration if the nose is fairly free of any disease and the blood pressure is high, relief is practically a certainty. The thermo cautery would be far too severe and extensive. You really want to produce a line in the septal mucous membrane slightly above and in front of the middle turbinate about the dimension of this—certainly not bigger than this.

I have an amusing letter from a doctor in S. A. He got my book, and has sent me most glowing accounts of his extraordinary success. He said his modus operandi and equipment would cause me no small astonishment. The equipment consisted of a nasal speculum, a frontal mirror and a wire crochet needle. The patients were taken to his back yard and seated in the
sun beside the kitchen door. When red hot the needle was plucked from the kitchen fire and handed to him as a cautery. He says, in spite of this primitive method, the results are extraordinary and show what could be done with a proper cautery. He got one; but I told him he would not get such good results with it because he could not burn lightly enough. The needle would get half cold in passing from the kitchen fire, and so it has turned out. You cannot touch too lightly. . . . If after one touch you get no improvement the probability is you did it too hard, however lightly you think you did. . . . I am seeing asthmatics in a continuous stream from 10 to 5 every day, and as the great majority get well it looks as if the work will go on increasing . . . . I advise you to use a mounted needle (the eye end) which you might heat in a spirit lamp.

Yours sincerely,

(Signed) ALEXANDER FRANCIS.

PEKING, December 29th, 1910.

DEAR SIR: Three or four years ago I wrote to the JOURNAL giving an account of a form of disease not uncommon in Peking and asked for a diagnosis, and I am sorry to say that none has been given through the medium of the JOURNAL. I pursued my investigations year after year (for the cases are mostly seen in the autumn months), and at Peitaiho and Hankow Conferences spoke of the disease and widely circulated its clinical details. I am now able to state without doubt that the disease is Kala Azar Infantum. I have before me, whilst writing, some beautiful specimens of the Leishman-Donovan Bodies (obtained by spleen puncture) which have been confirmed by Dr. Gibb, our bacteriologist. I am not aware that this disease has been reported before in China, though my ignorance does not preclude the possibility. I hope to write more fully later, but for the present I simply state that the disease is not known in Peking in the adult form; large spleens being almost as rare as comets. I saw a slide at the Hankow Conference belonging to Dr. Somerville, showing the Leishman Bodies from the adult Kala Azar and the bodies in the infantile form are so far exactly similar. Splenomegaly, profound anaemia, irregular and intermittent fever, alternating diarrhoea with necrosis of upper or lower jaw with secondary infection of mouth and cheeks (erroneously I think called Cancrum oris), and inevitable death of the patient, are the items of the clinical picture from statements made in reply by doctors at the above mentioned conferences; the disease which was generally attributed to malaria, is known in all the northern provinces. Personally I lay great importance on the facial necrosis, commencing in the majority of cases in the alveolar process of the upper central incisors and spreading until the upper jaw on one or both sides is necrosed and sloughed away; the cheek becoming infected by contact. The frequency of this onset of necrosis led me last year to suggest, in an article to the British Medical Journal, the possibility of congenital specific origin, but the history of infection in parents is very unreliable. Last week I saw one of my worst cases—a child eleven months old, with the whole of the right upper jaw and cheek black with necrosis and a spleen below the umbilicus, after an illness of five months. I have never seen a case over 10 years of age; the majority are from four
to six. In India both the adult and infantile forms I believe can be seen side by side, but here in my clinical I have only seen two marked by large spleens in adults in five years, so that I feel somewhat justified in saying we have not the adult form in Peking. The local distribution of this disease is being worked at, and we hope to get some interesting details later.

Yours sincerely,

W. H. Graham Aspland.

UNION MEDICAL COLLEGE, PEKING.

DEAR SIR: I had recently to distinguish certain bacilli from the bacillus pestis, and in the course of the work I put through several of the sugars: (1) a culture of the bacillus from a case in the recent Harbin epidemic and (2) a culture I had two years ago from Dr. Stanley, of Shanghai that I have kept active by occasional passage through mice.

The results agree with those given in the Indian Plague Commission reports; this fact you may possibly consider worth recording.

Glucose. Acid formation in less than 24 hours.
Maltose
Levulose
Dextrose in 24 hours.
Mannite
Galactose after 24 hours.
Dextrin
Salicin

With saccharose, lactose and inulin there was no acid formation. In no case was there gas production.

No change of colour took place in neutral red broth.

I am, Sir, yours faithfully.

J. G. Gibb.

CANTON, December 16th, 1910.

DEAR DOCTOR: I have read with interest Dr. James L. Maxwell's "Plea for Lateral Perineal Operation for Vesical Calculus," as published in The China Medical Journal, November, and I can heartily endorse what he says.

After a faithful trial of the suprapubic and other operations for vesical calculus, I invariably choose the lateral perineal as the safest,
The easiest, and quickest method, unless dealing with a stone over two and a half ounces in weight. A review of the long list of cases of vesical calculus which have been operated on in this hospital, shows that the lateral perineal operation has a lower mortality rate and fewer complications than any other form of operation for stone. In a single year I have done sixty-five lateral perineal operations for stone without a death.

I have only had about eighteen hundred cases of stone to operate on, but I take pleasure in adding my testimony to that of Dr. Maxwell’s on behalf of an operation that has too often been discarded for what some surgeons consider more modern methods.

I can imagine some of my co-labourers saying “another moss-back heard from,” but Dr. Maxwell and I will jog along doing these two or three-minute operations and sending our patients off happy while others continue their search and experiments for more modern, possibly “quicker” methods, too often at the expense of the patient’s welfare and happiness.

Fraternally yours,

John M. Swan,
Medical Superintendent, Canton Hospital.

Kiukiang, March 27th, 1911.

Dear Sir: I was much interested in the list of helminths which infect animals in China as given in Jefferys’ and Maxwell’s very thorough work, “Diseases of China.” Perhaps the authors would permit me to point out through the medium of your columns that they have not mentioned one helminth which infects dogs;* at all events in the region of the Yangtzse. I refer to Schistosomum japonicum. The dogs which I have found infected with this helminth have been invariably “sporting” dogs, such as pointers, setters, retrievers, etc.; house dogs, except those with a fondness for swimming, do not seem to become infected, even when living with infected sporting dogs. There are a number of sporting dogs in Kiukiang, and they are all, without exception infected more or less severely. It is not a rapidly fatal disease with them, existing for several years with periods of improvement during the close seasons. I have made two post-mortems on pointers; the last in conjunction with Dr. H. S. Houghton, of Wuhu. Specimens from both cases were sent to Dr. Leiper, of the London School of Tropical Medicine, who pronounced them as being in each instance typical Schistosomum japonicum. The post-mortem appearances as seen in the dog are similar to those observed in human autopsies in the same diseases, i.e., chronic peritonitis, enormous thickening of the coats of the large bowel, and enlargement of the mesenteric glands.

The worms are found only in the portal and mesenteric veins, not in the arteries, and in no other veins have they so far been discovered by us. The eggs are found in large numbers in the submucosa of the large intestine and in the mesenteric glands.

Our proceeding with the second dog was to kill it with chloroform and open it immediately it was dead, transferring the worms from the veins of the mesentery to normal saline before the blood had a chance to coagulate. By this means we were able to obtain nearly 100 perfect specimens in all stages of growth. Dr. Houghton very kindly came up from Wuhu to conduct the in-

* Cats are mentioned.
Correspondence.

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vestigations which were most in­
teresting.

The symptoms shown by the
dogs are those of dysentery. The
stools are passed with straining
and contain more or less blood and
mucus; often this is only a trace
on the top of the stool. The so­
called “dysentery” of dogs as seen
in the Yangtsze districts is invari­
ably Schistosomum japonicum.

As post-mortems on dogs are far
easier to obtain than on human
beings in China, it would seem
that we have abundant material in
these animals for the carrying out
of investigations into the cause,
treatment, and if possible, the pre­
vention of this most serious disease.
No doubt the native dog is also in­
fected, but I have had no opportu­
nity as yet for discovering whether
he is or not. Hoping that readers
of the JOURNAL may find these
rough notes a little useful in their
work amongst the helminths,

I am, Dear Sir,

Yours faithfully,

ALEXANDER C. LAMBERT,

Local Secretary for Central China Society of
Tropical Medicine and Hygiene.

TSAO-SHIH, March 10th, 1911.

DEAR MR. EDITOR: Some time ago
Dr. Plummer asked advice about
Necrosis of Femur.

Dear Mr. Editor: May I ask
through you if any British medical
missionary has received the wrong
volume of Sir William Whitla’s
Practice of Medicine, for I have re­
ceived 2 volumes, both being Vol.
1., and should be very glad to effect
an early exchange.

Yours truly,

E. F. WILLS.
Personal Record.

BIRTHS.
At Wuhu, February 1st, to Dr. and Mrs. H. S. Houghton, M. E. M., twin daughters.
At Peking, March 3rd, to Dr. and Mrs. E. R. Wheeler, of the Union Medical College, a daughter.
On April 14th, at the London Mission, Peking, the wife of Dr. E. J. Stuckey, of a son (James Maitland).
At Siaochang, Chihli, May 1st, to Dr. and Mrs. Bragg, L. M. S., a daughter (Grace Elizabeth).

ARRIVALS.
At Shanghai, February 18th, Dr. and Mrs. J. Stöquist and two children, Swedish American Mission, for Siangyang, Hupeh.

DEPARTURES.
March 17th, Dr. E. D. Vanderburg and family, A. P. M., Hunan, for U. S. A.
April 10th, Dr. G. Whitfield and Mrs. Guinness, C. I. M., Kaifeng, Honan, for England.
May 2nd, Dr. R. W. Dunlap, A. P. M., Tengchowfu, for U. S. A.

X-RAY FOR SALE.
A good bargain in a static machine. 12 discs of 32 inch diameter. Van Houten & Tenbroeck's best static machine. Hard wood, glass cabinet, 2 ft. 6 in. wide, 5 ft. 2 in. long, and 5 ft. 9 in. high. It is just as good as new and in perfect order. A very light runner. It cost over $350.00 gold and freight and duty of over $100.00 Mex. We want to sell this machine only because we now have a street current and want to put a coil in because of the greater convenience. We are willing to sell at considerable sacrifice. Make us an offer.

Address:—John A. S nell,
Soochow Hospital, Soochow.