A STUDY OF THE SOURCES OF INFECTION IN SURGERY.

J. B. Patterson, M.D., Kunsan, Korea.

It would be impossible to calculate the enormity of study and work already done on this subject since it was first shown that bacteria were the chiefest foes of surgical success. So much has now been accomplished in the warfare against the pus-forming organisms that the careful surgeon uniformly defeats them, yet not enough has been done to determine the best method for general use and the limits of its use. For that reason we report this study, that it may be added to the mass of evidence already gathered on this subject.

By means of the sterilizer, dressings, gloves, instruments, and water may be made absolutely sterile. The sources of danger are the air of the operating room, breath and sweat from surgeons and assistants, besides infection from the surgeons' hands and the parts adjacent to the field of operation of the patient. Because of the lesser importance of the infections from the air, breath, sweat, and field of operation, these will be taken up first.

We here describe our method of procedure.

DESCRIPTION OF TECHNIQUE.

We use acid glucose agar; the reaction being of such an acidity that 1.5 per cent of a normal solution of sodium hydroxide is required to be added to the medium to make it neutral to phenolphthalein (that is fifteen cubic centimeters of normal hydrochloric acid to the litre). This was recommended by the Bacteriological Committee of the American Public Health Association.

This culture media is sterilized in tubes containing about ten cubic centimeters. This is stored until the time for using. The agar is then heated to melting and then cooled to 40 degrees C. After this the agar is poured into Petri dishes of four inches in diameter. For observations
Montreal Medical College (at right).
Out-patient Department of Hospital.

Part of the Operating Room, with amphitheatre for students.
on the bacteria of air, it is simply left exposed on a level surface for the
time desired. We chose thirty minutes. To examine sweat we drop
the sweat from the face into the dish and pour the agar over it, and
spread it around. To examine soap, the same method is employed.
To examine water, we take twenty cubic centimeters of agar and two
cubic centimeters of water.

The examination of the hands and the field of operation is not so
simple. The operator whose hands are to be examined is given a
piece of sterile gauze two and one-half inches square and a sterile tooth­
pick. The test requires that the nails shall each be gone under twice
and that the gauze shall be rubbed twice between each finger and in
each palm. The tooth pick is wiped on the gauze and is in turn
washed off in the melted agar that has been poured into a four inch
Petri dish. The Petri dish is then covered and allowed to cool on a
level surface. We turn the dishes upside down to prevent spreading of
the colonies by the water of condensation. After three or four days
each healthy bacterium will produce a family and they may then be
counted by the aid of a ruled plate.

We have examined the gauze square after it is washed in the agar
and before it is thrown away. In four tests, aggregating 65,049 colonies,
but 3,666 remained in the gauze. Therefore, more than 90% of the
bacteria originally secured from the hands show in the Petri dish count.

This gauze and tooth pick are sterilized in the autoclave with the
Petri dish. Sterile forceps are used in handing them to the surgeon
about to be examined.

This method furnishes a splendid picture of the number and
strength of the organisms and their kind, for, after many colonies
have been studied, we can tell the most common organisms by the
appearance of their colonies, and by the size of the colony we may also
judge somewhat of the hardiness of organisms.

Others have made observations with bouillon in tubes, but the
nonpathogenic bacteria may grow so fast as to obscure the pathogenic.
Slight infection may evade, or accidental infection deceive us. After
many observations were taken on the many sources of infection it was
thought that the Petri dish was the only practical method of a
comparative study of the sources of infection.

AIR.

The following figures will show that the danger from air-borne
bacteria is comparatively not very great. There are almost no floating
organisms in the operating room before operation. During and after
A Study of the Sources of Infection in Surgery.

operations the number is increased. The numbers of bacteria, which fell on a four inch Petri dish before operations, varied from none at all to fifteen, the exposure being thirty minutes. Only a small portion of these were pus-forming bacteria. Small operating rooms were much cleaner than the amphitheatre. Before operations the plates from the small rooms were uniformly sterile, but during and after operation the numbers were increased from six to twenty colonies in thirty minutes. After operation and during operation the number of colonies is between six and seventy-nine in the amphitheatre. In the hospital laboratory, the number of colonies range from none to one hundred and three; one-half to two-thirds of these are staphylococci. In the large female wards the numbers are from thirty to two hundred. The male wards are decidedly cleaner, showing between thirty and sixty-six. Many observers report a great many more colonies developed from the air. We made controls with agar from a well known manufacturer, and this showed almost the same numbers.

FIELD OF OPERATION.

The field of operation is easy or hard to sterilize according to the part of the body to be worked on. We have found that the abdomen may be adequately prepared by shaving and scrubbing, with a weak bichloride pack applied two hours before the operation. The perineum and vagina were not prepared so well, the average number of colonies per Petri dish being fifteen hundred. This source of infection is less dangerous from the fact that the body has a certain immunity for organisms, which have lived on its own lymph. Many times in emergency, preparation is impossible, yet, as a rule, no bad results have followed.

BREATH.

A plate exposed before a surgical patient's face while he engaged in conversation for fifteen minutes resulted in twenty-nine colonies. Subtract a conversative number to allow for the air-borne bacteria and probably twenty-three would be a truer picture.

A pneumonia patient with temperature of 102.4, pulse 128, and respiration 42, breathed on a plate for fifteen minutes at a distance of three and one-half inches; eighteen colonies developed, nearly all of which were pneumococci. A septic child breathed on a plate ten minutes, at a distance of four inches; twelve colonies developed. Another septic case breathed on a plate ten minutes, at a distance of four inches, and sixteen colonies developed. These facts have a bearing on the wearing of masks. It will be seen that when a puff of smoke is blown through a gauze mask that the smoke is scarcely impeded; so
also is the finer spray of saliva. Our observations on this subject are limited, but at least do not show much advantage in the use of the mask of gauze. We have seen masks made of heavier material, not close fitting, and long enough to reach under the neck of the sterile gown. A brief test of this with tobacco smoke will show that the breath is actually deflected from the direction of the wound. Moreover, the drops of perspiration do not drop through, but roll down on the inside.

Observations showing the number of bacteria expelled in the breath.

<table>
<thead>
<tr>
<th>Time</th>
<th>Distance from mouth</th>
<th>Colonies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conversoning ... ... 15 minutes.</td>
<td>6 inches.</td>
<td>29</td>
</tr>
<tr>
<td>2. Quiet septic case ... ... 10</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>3. Quiet septic case ... ... 10</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>4. Reading without mask ... ... 10</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>5. Reading without mask ... ... 10</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6. Reading without mask ... ... 10</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>7. Reading without mask ... ... 10</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>8. Reading with mask ... ... 10</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>9. Reading with mask ... ... 10</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>10. Pneumonia boy ... ... 15</td>
<td>3½</td>
<td>8</td>
</tr>
</tbody>
</table>

Nos. 8 and 9 were taken while reading with a mask. The colonies were counted on the fourth day.

Sweat.

Eleven observations were made upon the character and number of organisms in sweat. One drop was allowed to roll down over the face into the dish of agar. The average number of colonies to develop was one hundred and sixty-nine, and practically all were staphylococci. These tests were made upon basket ball players at the Central Y. M. C. A. Gymnasium, and on the fireman at Mullanphy Hospital.

In two loops of sweat from a fireman's face there were one hundred and fifty staphylococcus albus colonies.

It should be remembered that the bacteria of sweat have not been sickened by antiseptics and are, for that reason, more virulent. Besides, when they change hosts, they will multiply more rapidly. It is, therefore, to be avoided. Yet it is one of the lesser dangers.

Among other things, emergencies often play a large part in infection. Hasty preparation of gloves, instruments, or some parts of dressing or sponges. Dr. Harrington has shown that in some hospitals the autoclave is packed so tightly that the steam does not thoroughly penetrate the center of some dressings. We have noticed that often in emergency a small supply of dressing or sponges is placed in the instrument sterilizer for twenty minutes. This is not enough to kill
all the pyogenic organisms. Preferably that should be boiled rather than steamed for that time. We found that gloves steamed in the instrument sterilizer for ten minutes are not sterile. The colonies showed a slow growth, yet there were very many of them. The ideal preparation for gloves certainly is the autoclave. We cannot say whether this would shorten the life of gloves or not, but with this method the gloves are dry, and those who use them much prefer them to wet ones.

SOAP.

A very common error in technique is the use of infected soap in the preparation of the hands for operation. We made repeated examinations of soap from various hospitals and in no case did we fail to find numbers of staphylococci. One drop of soap used in the preparation for the operating room in several of the St. Louis hospitals averaged over 5,000 organisms, of which 22% were staphylococci.

We became impressed with the fact that bacteria will grow in soap. We found that boiling kills these, but that after a few days the soap again contains the same kind of growths, probably by re-inoculation. In all nineteen observations were recorded on bacteria of soap.

STUDIES ON THE RESULTS OF DIFFERENT METHODS OF HAND STERILIZATION.

The observations made on air, sweat, soap, breath, and field of operation were used as a means of comparing the dangers from the several sources with those coming from the hands of the operator and assistants. About one hundred observations were made when it was evident that the hands were the source of most infection. The following studies have to do with the different methods most used in the St. Louis hospitals.

1. Permanganate of Potash and Oxalic Acid, Bichloride of Mercury 1:1,000.

Permanganate and oxalic acid followed by bichloride of mercury, showing number of colonies developed from cultures taken after the different steps in preparation.

<table>
<thead>
<tr>
<th>After Soap and Water</th>
<th>After Perm, and Oxalic</th>
<th>After Bichloride of Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 colonies.</td>
<td>0 colonies.</td>
<td>0 colonies 2 min.</td>
</tr>
<tr>
<td>5,000 &quot;</td>
<td>0 &quot;</td>
<td>250 &quot;</td>
</tr>
<tr>
<td>2,500 &quot;</td>
<td>100 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>1,000 &quot;</td>
<td>400 &quot;</td>
<td>50 &quot;</td>
</tr>
<tr>
<td></td>
<td>4,000 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>Av. 2,250</td>
<td>Av. 900</td>
<td>60</td>
</tr>
</tbody>
</table>
Permanganate and oxalic acid have an effect. This is made more perfect by the use of bichloride of mercury, but it has no advantage over the simpler method. In all cases the bichloride of mercury is thoroughly washed off before the culture is taken from the hands. This is to prevent the chance of rendering the agar non-nutrient because of the bichloride which might remain. This, however, seems to be unnecessary, for before we thought of this point, some of the students and nurses, who had been dressing pus cases with unprotected hands had thousands of colonies grow without having washed off the bichloride. This observation caused us to note the difference in those having used forceps to do the dressing, and those who used their unprotected hands. We will discuss this more fully below.

2. Alcohol 50%, Bichloride of Mercury 1:1,000.

The alcohol and bichloride were both used five minutes after thorough scrubbing with sterile soap and water.

<table>
<thead>
<tr>
<th>After 50% Alcohol</th>
<th>After Bichloride of Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,500 colonies.</td>
<td>65 colonies.</td>
</tr>
<tr>
<td>22,500</td>
<td>210</td>
</tr>
<tr>
<td>6,000</td>
<td>9</td>
</tr>
<tr>
<td>15,000</td>
<td>3</td>
</tr>
<tr>
<td>6,000</td>
<td>0</td>
</tr>
<tr>
<td>Average 11,100</td>
<td>57</td>
</tr>
</tbody>
</table>

Fifty per cent. alcohol has no effect, and it will be noted that the results are little better than those obtained from soap and water. We know that these results do not agree with many observers. We think that they have not sought to get their cultures by rubbing up the epithelium, but simply from the surface of the finger tips.

3. Alcohol 95%, Bichloride of Mercury, 1:1,000.

<table>
<thead>
<tr>
<th>After Soap and Water</th>
<th>After 95% Alcohol—5 min.</th>
<th>After Bichloride—5 min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,000 colonies.</td>
<td>5,000 colonies.</td>
<td>0 colonies.</td>
</tr>
<tr>
<td>1,000</td>
<td>5,000</td>
<td>0</td>
</tr>
<tr>
<td>5,000</td>
<td>800</td>
<td>0</td>
</tr>
<tr>
<td>4,000</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Average 3,750</td>
<td>2,714</td>
<td>0</td>
</tr>
</tbody>
</table>

Ninety-five per cent alcohol in itself has no effect, but its influence is most shown when followed by bichloride. This may be explained by the fact that alcohol dehydrates the skin and after this the bichloride penetrates the recesses of the skin more easily.
4. Bichloride of Mercury, 1-1,000.

After Soap and Water—5 to 8 min. After Bichloride of Mercury—5 min.

<table>
<thead>
<tr>
<th>Average number of colonies</th>
<th>26,000</th>
<th>1-1,000, 5 min.</th>
<th>160 colonies.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90,000</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>85,000</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19,000</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50,000</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9,000</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13,000</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15,000</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>38,250</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

Bichloride (1-1,000) after washing, if used for five minutes, is amply effective. This method has great advantage in that it is simple and requires few basins and there is no sediment as in the lime and soda method. Alcohol and bichloride are equally applicable at private home, hospital, or office.

5. Lime and Soda, Bichloride of Mercury, 1-1,000.

This method consists of washing thoroughly with soap and water and brush. Then chlorinated lime (bleaching powder) and bicarbonate of soda are mixed together in the hand and rubbed into a smooth paste with water. Nascent chlorine is set free and besides the paste serves as a mechanical cleanser. The first series of observations resulted as follows:

<table>
<thead>
<tr>
<th>Average number of colonies</th>
<th>Average number after lime and soda.</th>
<th>Average number after bich. of merc. 1 to 5 minutes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>40,626</td>
<td>4,208</td>
<td>339</td>
</tr>
</tbody>
</table>

This table includes students, nurses, and surgeons. The surgeons themselves averaged 33 colonies per plate after the bichloride.

Another and later series on the lime and soda method is given below.

<table>
<thead>
<tr>
<th>No. of colonies after lime and soda.</th>
<th>No. of colonies after bichloride 1-1,000, two to four minutes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>187</td>
<td>5</td>
</tr>
<tr>
<td>3,750</td>
<td>1,950</td>
</tr>
<tr>
<td>187</td>
<td>110</td>
</tr>
<tr>
<td>1,800</td>
<td>0</td>
</tr>
<tr>
<td>1,600</td>
<td>900</td>
</tr>
<tr>
<td>6,500</td>
<td>...</td>
</tr>
<tr>
<td>13,000</td>
<td>...</td>
</tr>
<tr>
<td>560</td>
<td>...</td>
</tr>
<tr>
<td>3,200</td>
<td>...</td>
</tr>
<tr>
<td>5,200</td>
<td>...</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>5,604</td>
</tr>
</tbody>
</table>

The lime and soda has an effect, but there are serious objections to it. It requires more vessels and cannot well be used outside of a hospital. It tends to clog the waste pipes and sewers.
6. Harrington’s Solution.

This solution consists of hydrochloric acid, 60 cubic centimeters, bichloride of mercury 8 grammes, alcohol 640 cubic centimeters and water 300 cubic centimeters.

After soap and water the solution was used from one to three minutes, and every one using it for these tests complained that it was irritating.

No. of colonies after soap and water. No. of colonies after Harrington.

| ... | 40 |
| ... | 26 |
| 880 | 600 |
| 50,000 | 450 |
| 30,000 |  |
| Average | 40,000 |

Harrington's solution is effective, but is too much of an irritant for practical use. The average assistant will not persist in its use long enough to adequately prepare the hands.

Inside of Gloves after Operation.

Number of colonies developed from cultures taken inside of gloves after operation.

| 1 | 0 |
| 15 | 70 |
| 21 | 350 |
| 100 | 100 |
| 0 | 85 |
| Average | 82 |

It has often been said that punctured gloves are very dangerous. We have examined the gloves inside and out, as well as the water and perspiration remaining in the gloves after operation, and the gauze from about the wrist.

In one instance we found 225 colonies from outside the gloves after operation while only 110 inside. The maceration then does not produce bacteria from the lower strata of the skin. Punctured gloves are only dangerous when the hands have not been thoroughly cleansed.

Gauze about the Wrist after Operation.

Number of colonies from entire gauze after operation.

| 0 | 0 |
| 10 | 63 |
| 10 |  |
| Average | 15 |
Perspiration from the wrist and forearm do not contain many organisms if hands and arms are cleansed.

**Care of the Hands outside of the Operating Room.**

The figures below are those which have called our attention to the fact that there is a difference between the hands that have been used in pus or about infection, and those that have been protected against any contamination. It will be seen also that those who hurry their preparation are easily picked out from their Petri dish.

| After washing for 5 minutes and Bichloride of Mercury 1 to 1,000, 5 minutes. |
|----------------------------------|-----------------|-----------------|
| Miss — dressing pus cases daily for weeks | ... | ... | 3.750 |
| Miss — one week later after four times using Bichloride and keeping out of pus | ... | ... | ... | ... | ... | ... | 0 |
| Mr. — dressing pus cases with hands unprotected | ... | ... | 2.930 |
| Mr. — one week later, dressing cases with forceps in meantime | ... | ... | ... | ... | ... | ... | 0 |
| Dr. C. — who uses forceps | ... | ... | ... | ... | ... | ... | 5 |
| Dr. — of the City Hospital dressing chronic surgery with unprotected hands—Bichloride oft repeated | ... | ... | ... | ... | 780 |
| Dr. — Chronic surgery at City Hospital—unprotected hands | ... | ... | 700 |
| Dr. — Chronic surgery at City Hospital—unprotected hands | ... | 65 |

It will thus be seen that the kinds of work that a surgeon does with his hands renders it easy or hard for him to cleanse his hands. It seems that the recesses of the skin act as culture pockets and the less they are inoculated, and the oftener they are cleansed, the easier to prepare them for operation.

This brings up the subject of surgical dressings. By using sterile forceps to do this work it is easily possible to dress almost any kind of case without touching either dressing or wound with the hands. It has great advantage because the dressings may be done with absolutely no new infection being added. Secondly it enables the doctor to be his own assistant, and at the same time observe absolutely aseptic technique.

It is much quicker, for it requires less time to boil instruments than to thoroughly wash the hands. And while one patient is being dressed the forceps may be laid down and the hands used to make such changes as emergency demands, which, without the use of forceps, usually means a break in aseptic technique. It has its medico-legal value, in that no patient would have ground to claim infection from the doctor's faulty work.

We have used forceps to pass the catheter and have taught the attendants on the halls to do the same. This is a great advantage, for these men usually work alone and almost never know how to thoroughly prepare their hands, nor have they the time. The chance of starting a cystitis is reduced to the minimum.
The following are instances of people being hurried in preparation:

Mrs. — nurse on general duty, hurried in preparation ... 600
Mrs. — one week later with more careful preparation ... 0
Dr. B. — hurried preparation ... 3,750

This shows that there is danger in hasty preparation. The strength of the solution of course may be increased, but this does not offer time for penetration, and of course is not valuable without that. In case of absolute and imperative need for hasty preparation, we can suggest tincture of iodine. We have only one observation on this method, but the result was a sterile plate.

The most striking fact is that from numbers alone the hands are the most dangerous source of infection yet met with. Nearly all of these bacteria are staphylococcus albus and aureus; streptococci have been found. Muir and Richie say these staphylococci of the skin are probably attenuated forms of the pyogenes. But their being attenuated in the skin does not mean that when they are lodged on tissue of lower resistance in another person that they will not be exceedingly virulent.

The writer has been repeatedly warned of the danger of infection from old leg ulcers. One doctor showed us the scar of a serious infection of the hand, secured by cleansing an old ulcer whose infection seemed not to be active, yet in ten hours' time nothing but free incision would give relief, and weeks were required for the healing.

McFarland states that "experiments have shown that both staphylococcus aureus and albus exists in attenuated and virulent forms, and there is every reason to believe that in the majority of instances they inhabit the surface of the body in a feebly virulent condition." Add to this the well known fact that when bacteria change hosts their virulence is many fold greater, so that infection from the surgeon is more dangerous than from the patient's own body.

This may explain the fact that pathogenic bacteria may inhabit the mouth and pharynx for a long while with no disturbance of health.

CONCLUSIONS.

1. The hands are the chief carriers of infection; they become culture places and transmitters of infection.

2. The hands may be rendered practically sterile, and this is best done with bichloride of mercury in the strength of 1 to 1,000 for five minutes. The only method which gave an absolutely sterile plate every time was 95% alcohol, followed with bichloride 1 to 1,000 for five minutes.
3. Hasty preparation is dangerous, even criminal at times.
4. Soap is a source of infection. Soap should be boiled each day, or after each operation.
5. Forceps should be used in the dressings of all chronic surgery to furnish the most perfect asepsis and to facilitate the surgeon's work.

A CASE OF FEBRILE SPLENOMEGALY WITH SPLENECTOMY.

G. GUSHUE-TAYLOR, M.B., B.S., M.R.C.S., Tainan, Formosa

In reading the literature of comparatively new or little practised surgical procedures, one comes upon the statement, not infrequently, that a surgeon who has performed the operation only once and has been unfortunate enough to have had a fatal result in that case, is not likely to report it. It is sad if such be the case and one does not wish to controvert the statement, still the fact remains that we learn much from our mistakes and failures, and rise on the dead stepping stones of our surgical calamities to higher flights of benefit to future patients. If we can personally learn from our misfortune, I think it well to give our experience for what it is worth, to our brethren.

This preface will suffice to introduce a case of febrile splenomegaly on which I operated recently, the notes of which are recorded below with passing comments.

Though not a discourse on the disease, it may be well to give a short definition which will include the main points of the condition. It is a chronic enlargement of the spleen due to hyperplasia of one or more of its constituent elements, an excessive growth of fibrous tissue, endothelial overgrowth and large blood spaces, associated with anaemia of a secondary type, later enlargement of liver with smooth fibrotic changes going on to ascites. Throughout the course of the disease the patient has irregular attacks of irregular fever, which do not as a rule yield to quinine. In suitable cases splenectomy is attended with very good results.

The case, a woman aged 40, may be considered a borderland one as ascites had already supervened before operation, though not more than two or three pints.

3/3/14. Admitted suffering from anaemia, lack of energy, irregular fever and occasional attacks of abdominal pain. The spleen was much enlarged reaching beyond the umbilicus. Liver enlarged. Patient kept
in hospital under nourishing treatment with a mixture of iron, arsenic, and quinine for two weeks, during which time her general condition improved, and a slight bronchitis which she had disappeared. Her blood picture was that of a secondary anaemia with a red count of 2,900,000.

19/3/14. Spleenectomy. Anaesthetic, chloroform, changed to a mixture of half and half chloroform and ether about half way through the operation. The only point in operation where the anaesthetic gave trouble was when the spleen was being dislocated out of the abdomen; she stopped breathing, but resumed immediately the organ was on the outside of the abdominal wall. Incision, vertical, through middle of left rectus about two inches from middle line, extending up to near costal margin, and down to below level of umbilicus. This incision gave good access to pedicle and there was no need for any transverse incision. Hand passed over spleen and no adhesions of any moment. The south pole of the spleen was pulled out of the abdomen and held by the assistant while a leash of vessels running down were cut between two ligatures of stout thread. Before tying, their peritoneal coat was cleared about one inch in length. After about two inches of the pedicle was so dealt with the whole spleen was tilted out of the abdomen and held steady by the assistant while the remaining vessels of the pedicle were tied. The veins are exceedingly thin and dilated, and tear on the least provocation. In tying the last ligature but one, the tail of the pancreas was accidentally included in the ligature and a small piece cut off. The pedicle was inspected and let fall into the abdomen. During its removal there was not sufficient loss of blood to saturate a small sponge. Abdominal wall sutured with silk worm gut, through and through sutures, and patient put back to bed.

Spleen weighed 5 pounds as removed from body, the length of hilum was 8 inches, a difficult length to include in any ordinary catch forceps. Liver enlarged, firm and smooth surface.

20/3/14. Without any warning, had a sudden attack of acute bronchitis with profuse secretion of mucus. Respiration over 40 a minute. No rise in temperature. Pulse small and weak 95-110. Gave a stimulating expectorant 3-hourly, and during the night gave one dose of pulv. ipecac. grs. 15 with brandy and water à à drchs. 2, this was repeated in 15 mins. and caused vomiting which immediately relieved her respiratory distress. Abdominal distention and distress was relieved by calomel grs. ⅔ hourly and hypo. inj. pituitary ext. 1 cc., repeated in 5 hrs. This with a turpentine enema repeated
A Case of Febrile Splenomegaly with Splenectomy. 253

three times gave good passage of flatus. As she had a thin, weak pulse she was kept on brandy drch. 2, 3-hourly.

21-26/3/14. As will be seen from last note patient gave cause for much anxiety during the first 36 hours after operation, but for the next 6 days she ran an easy course, propped up on a bed rest.

26 onwards. Temperature irregular varying 99-100.5°F. No discomfort and happy and comfortable.

28th. Stitches out, wound healed first intention, no suggestion of what was going to appear on the

31/3/14. On dressing wound found tail of pancreas prolapsed through the upper third of scar, patient in no discomfort. There was no discharge of pus, and only a little pancreatic secretion, just enough to moisten the dressings. There was no sugar in urine, nor was any found on repeated examination.

7/4/14. Put a ligature around the tail of pancreas with the idea of making it slough off.


10/4/14. Temp. still up, pain more severe, a little distention, pulse small, thin, fast; abdomen opened through lower end of wound found ascites recollecting, and pus in the pelvis. No pus was noticed though looked for in region of pancreas. Closer examination may have shown a track down deep in the posterior abdomen, but as no good could come to the patient by prolonging the operation, the abdomen was drained and patient put back to bed. She stood this exploration well.


Notes on Case:

1. In dealing with this case I found the greatest help from an article by Owen Richards, Cairo, "Splenectomy in Egyptian Splenomegaly," especially as regards the surgical procedure followed. It seems to me that "a systematic division of individual vessels between ligatures" without the use of big clamps, is preferable to seizing the whole pedicle in a clamp. The latter method is apt to be more bloody, and is to my mind attended by a grave risk of slipping of ligatures.

2. Regarding involvement of tail of pancreas in ligature Bland-Sutton says: "Occasionally the tail of the pancreas is included in the ligature, but this is of no consequence, except that additional care must be exercised in tightening the ligature." Another surgeon (I regret that I cannot recall the reference), reporting a series of cases including three in which the tail of pancreas was injured, says no ill effect
followed, though in one instance he took the precaution of leaving a
drain down to the cut pancreas for a couple of days, but says such was
not necessary. I must confess having read these papers I was not
uneasy as to the fate of my patient's pancreas, and my surprise was
great on seeing it prolapsed after the wound had healed. Did it digest
a way out through the recent scar? It did not suppurate out. Being
out what was the correct treatment? I presume the ligature cut into
fresh tissue and so allowed the introduction of septic organisms. It
would have been wiser after the event to have adopted the expectant
attitude. If this experience leads others in removing tropical spleens
to respect the tail of the pancreas it will not have been recorded in vain.

3. The effect on the blood is very quickly seen in the rapidity of
recovery. Eight days after the removal the red blood corpuscles had
gone up to 4,200,000, and whites to 25,000. It is fairly common to
get a leucocytosis after splenectomy, this taking place in about 30 per
cent of cases.

4. Marked benefit was gotten from pituitary extract in dealing
with post-operative paralysis with distention of the small gut.

References.

   January.

A SURGICAL PILGRIMAGE.—(Continued.)

CHARLES KIRKLAND ROYS, M.D., Weihsien, Shantung.

One of the strongest reasons which led the writer to return to
America by way of Vienna was the belief that there is a very large
field for Orthopaedic Surgery here in China. I had also a strong
desire to visit the Clinic of Prof. Adolph Lorenz, famous for his
bloodless operations and his wide application of the plaster bandage.

ORTHOPAEDIC NOTES.

While we see cases here almost daily which are suitable for
orthopaedic treatment, yet the difficulty of getting good work done in
steel and leather in China prevents us from using the braces which are
demanded. So we are thrown back of necessity on the plaster bandage:
and it was interesting to me to see the enormous amount of plaster
which is used in Europe and America, even where expert brace-makers
are easy of access. Lorenz uses plaster fixation alone, after his reduc-
tion of congenital dislocation of the hip. He uses it for all cases of
tuberculosis of the hip, fixing the joint in slight flexion and abduction
if it is still movable, and in the pathological position if it is not. He
allows and encourages the patient to walk at once, claiming that the
risk of ankylosis is more than offset by the improved general condition,
due to exercise, sunlight, and fresh air. Where sinuses exist, windows
are cut in the plaster, and the sinuses dressed through the openings
made. When all active inflammation has disappeared from the joint,
then faulty position can be corrected by extra-articular wedge-shaped
cuts of bone.

The same principles he applies to Pott's disease of the spine,
depending on plaster fixation to prevent irritation until ankylosis can
take place. When there is anything more than an incipient process,
ankylosis is the best result that can be hoped for in all joints except the
elbow. Complete return to normal is rarely obtained by any treatment,
and a movable joint is always in danger of relapses. Ely, Albee and
others in America hold this same principle, but try to secure early
ankylosis by arthrectomy, depending on the bony fixation to cause the
disappearance of the tuberculosis.

I saw Royal Whitman in New York using plaster almost as widely
as Lorenz, but he differed from him in this; that he denied the efficiency
of plaster fixation for tubercular lesions high up or low down in the
spinal column. This is for the reason that the spine is, as it were,
broken into two very unequal fragments; and that the plaster jacket
cannot control the shorter of the two, not having sufficient leverage.
This is the view held by most American authorities, who recommend
the Bradford frame, or a similar apparatus for fixation in the recumbent
position, especially for all cases above the mid-dorsal region. I must
say, however, that I saw cases of cervical Pott's immensely relieved by
the Lorenz plaster collar, which is put on with the patient suspended
in a halter, and bridges the gap between the jaw and sternum. When
partly dry it is cut through behind, sprung apart, padded and re-applied,
being held shut by a few turns of roller bandage. By this simple means
the distressing pain and stiff neck of these patients can be much relieved.

Another development in the treatment of bone tuberculosis is the
application of direct sun-rays to the affected part. This helic-therapy
has become very popular in Switzerland, and at many resorts people
with tuberculosis of lungs or bone spend their entire time sunning
themselves in various scanty costumes. We read of children running
about with only "snow-shoes and bathing-trunks" between them and
the sun's rays. This is more than a fad; and beyond doubt the intense
sunshine of North China could produce a considerable effect if systematically applied to tuberculosis lesions.

In the surgical treatment of tuberculosis of the spine the different operations of bone-transplantation have recently caused a great deal of talk. By grafting bone into the spinous processes over the kyphos it is hoped to produce ankylosis, and to form an "internal splint" of bone; theoretically far more efficient in controlling the deformity than any form of apparatus. A section of the fibula has been used to bridge the gap between the spines, but the best results seem to follow the method of Albee, by which a section of the crest of the tibia is removed, and implanted in the split tips of the spines, over-lapping the kyphos, and secured to healthy vertebrae above and below. Albee recommends as a preparatory measure a long recumbency on a reversely-bent Bradford frame, to secure a recession of the deformity; and a similar frame, or spinal brace, to follow the operation. So that the operation does not take the place of treatment by fixation, but is an aid in securing more rapid and complete bony ankylosis of the vertebrae involved. When we think of the prolonged treatment necessary to secure firm ankylosis in the spine, and the reluctance of our Chinese patients to persevere in such treatment, it would seem that an operation which aims to shorten this treatment is worthy of our serious consideration.

TREATMENT OF PULMONARY TUBERCULOSIS.

This is a subject of melancholy and almost tragic interest for us who are working in China. For some years I have found roughly one-third of my cases to be suffering from advancing tuberculosis. A recent statement of the causes of break-downs among missionaries ascribes over 10% of these to pulmonary tuberculosis. One of my chief objects while on furlough was to find out the most significant of recent developments in the treatment of tuberculosis.

It is impossible in a paper like this to go into all the details of the methods referred to, or to mention all methods which are being used in the world-wide campaign against tuberculosis. I have selected a few which seem most applicable to conditions here in China, and are worthy of further study by all of us. While giving full credit to the preventive measures so widely advertised at home, yet it is a cure which we long for, while watching the melancholy procession of emaciated forms which daily pass through our dispensaries—quite beyond the reach of our ordinary methods of treatment.

The curative measures now most used can be divided roughly as follows:—1. Sanatarium methods, requiring control of the patients.
hours a day; 2. Dispensary methods: the patient at home, seen daily or at longer intervals.

Sanatorium methods are of two kinds, which seem mutually contradictory, but in practice are applied to different classes of patients. There is the rest cure, or the Saranac method, more or less familiar to us all; with complete rest, forced feeding, and continuous out-door life. This is especially useful in very early cases, who can afford it. Then there is the work cure, which may be described as a series of graduated exercises which stir up the local lesion, and cause auto-inoculations just sufficient to make the patient generate anti-bodies without extending the lesion. This method is applicable to more advanced cases, of strong physique, and has been used with most success in men of the laboring class. In and around London it has attracted much attention. It is said to be followed by relapse much less often than the rest cure. Both of those may be combined, where possible, with helio-therapy; i.e., direct sunlight on the chest, with a minimum of clothing to obstruct the sun's rays.

The following methods may be and often are used in sanatoria; but they are called dispensary methods because they can be used on patients seen only at intervals. There is the injection of tuberculin in some of its numerous forms. This has been enormously extended in recent years. I saw at Johns Hopkins in a special clinic on tuberculosis, a series of cases of which had been treated by Hamman with tuberculin for varying periods, all of whom showed improvement, though of varying degree. Tuberculin dispensaries are found everywhere. In practice, several things seem evident. First, there is still no agreement among authorities as to the reaction—whether it is to be avoided at all costs or to be disregarded. Among those who advocate the work cure, a reaction seems to have no terrors; but the Saranac school takes infinite pains to avoid it, as was the original method of Koch. Another conclusion seems evident: viz., that similar effects follow the use of all kinds of tuberculin, which differ only in degree of toxicity, or reaction-producing power. The cases chosen for tuberculin therapy should be those moderately advanced, with bacilli in the sputum. The incipient cases may do well, but may do just as well without it. Very acute cases and those with many complications are better off without it.

Artificial pneumothorax has lately come into great prominence in the treatment of pulmonary tuberculosis. It is another measure which may be used in dispensary cases, and it frequently produces most spectacular results. Here is a heroic measure, which undoubtedly offers hope to men otherwise doomed. At the clinic on tuberculosis referred
to above, I saw a series of cases which had been treated by this method; and the reporter of the cases was most enthusiastic over the results obtained. In New York I heard a lecture on this subject by Dr. James A. Miller, with a demonstration of the apparatus. At the meeting of the American Medical Association in Minneapolis, two papers on artificial pneumothorax were read, both of which were very optimistic in tone.

Out of about 1,000 cases treated up to 1913, over 40% had a symptomatic recovery. Of the cases reported by Brauar and Spengler of Hamburg, only 22% showed no improvement. A full description of apparatus and technique cannot be given here. The essential thing is the injection of nitrogen in gradually increasing doses between the layers of the pleura over the diseased lung until it becomes quite collapsed; and lies against the hilus airless and almost bloodless, with its cavities emptied and their sides in contact; an ideal condition for the rapid fibrosis of its tubercular lesions. This picture suggests at once the class of cases to which the method is best fitted: i.e., for advanced unilateral cases without extensive adhesions. One lung must be able to function, but a small focus at the apex of that lung is not a strict contraindication. This is advocated as a routine treatment for hemoptysis, whenever it is possible to tell from which side the blood is coming. For its curative use, the most exact determination of adhesions should be made, preferably by the X-ray plate. Here in China that is not always possible, and it would seem that if the method is to be widely used here, we must rely on a careful physical examination, together with the behaviour of the lung during the first injection. There might be a considerable percentage of failures due to firm adhesions: but by care in the use of the apparatus a trial injection would be no great risk to the patient. The writer while in America invested in one of the Floyd needles so widely used there, and hopes to evolve a practical apparatus for the manufacture and the injection of nitrogen after the model designed by Robinson of Boston, which seems the simplest and easiest to copy.

All the methods mentioned above would seem quite practicable here in China; especially if some beneficent organization could establish and equip a series of sanataria, preferably in connection with missionary hospitals, with both in-patient and out-patient departments; with a central agency for the over-sight of the work, for the instruction of those in charge of sanataria, and for the manufacture and distribution of tuberculin. This I believe to be the best way possible under present conditions to deal with the problem of tuberculosis in China, and I have referred to it elsewhere in the columns of this JOURNAL.
BALANTIDIUM COLI.

J. M. Wright, Tak-hing.

Class, Infusoria; Genus, Balantidium; Order, Heterotricha.

This infusoria is of oval form, the anterior extremity narrowed, and the posterior broad and rounded. There are cilia along the left border and on the front part of the right border. The movement is always darting. The cysts are globular or oval. Parasitic in the terminal gut of human beings and pigs, in amphibians and in the body cavity of polychaetic annelida (Braun).

Braun reports sixty-eight cases collected from the following countries: Russia, Scandinavia, Finland, Cochin China, Italy, Germany, United States, and Prussia, thus showing wide distribution. The same author also says that most authors do not regard balantidia as a primary cause of disease, but that they may aggravate existing disease.

It is mentioned as being found in the walls of the intestine, in the lung, in the lymphatics and blood vessels of the intestinal wall, in pus from liver and pulmonary abscess.

Daniels says: "It is probably pathogenic."

Stitt says: "These parasites cause an infection similar to dysentery and may bring about a fatal termination."

Sir Patrick Manson mentions finding a ciliated infusoria resembling balantidium coli in pus from a liver abscess.

Braun says that the pig is considered to be the means of transmitting these parasites to man, and that this takes place in the encysted stage, that the free parasites have small power of resistance, perishing when the feces become cool.

Dr. Andrews of Manila says they have a record of four cases of balantidium infection and all were fatal.

It is likely the infection may be found in different parts of China. Several have mentioned observing this parasite in South China.

We have for the last three years tried to keep a record of the cases coming under our observation, but owing to the difficulty of keeping in touch with patients, after returning home, it has not been as thorough as we would wish. In ordinary smear examination of feces we have overlooked the parasites except when the stools have been watery; but when the material has been strained through a sieve using boiled water, their active movements have been readily observed when present. At first they are very active as seen under the coverglass, but as the material becomes viscid from evaporation the movement becomes slower,
and the process of encysting can be easily observed. They first begin to limit their field of activity and perform circular movements. The pointed extremity describes movements which would remind one of the prehensile upper lip of the tapir. Finally they take on a circular shape and usually spin around for some time and come to the resting stage in which they seem to be globular. A drop of methylene blue solution or of gentian violet to the coverglass preparation will make the flagella visible and sometimes a nucleus and a vacuole.

We have found the infection in apparently healthy individuals, and in no case could we blame the infection for any of the symptoms. All the symptoms in any of the cases could be accounted for by other conditions, and on the relief of such complaints as hookworm, malaria, and ulcer of the stomach, the condition of the patient improved and resulted in a good recovery.

We have kept for observation fecal specimens containing balantidium coli and have found them active and abundant at the end of ten days to ninety-four days, thus showing that for this region they do not die shortly after the voiding of fecal material.

It is said they may be reduced in number in the bowel by a slightly acid enema. We notice under a coverglass that a solution of methylene blue often reduces their motility and apparently hastens encysting, and have given this drug as an experiment in several cases, but so far have not had sufficient opportunity to note results to be of any value in recommending it.

From our observation thus far, we are inclined to think that their presence is not necessarily a disturbing factor. If there exists a disease of the lower bowel, one can easily imagine harm that they might do. We know of two cases in which infection was discovered three and two years ago, respectively, who are to-day in good health. As we have opportunity to observe more cases we may be able to learn more definitely in regard to the results of harboring this parasite.

In this article we have drawn from the following authors: Braun, Stitt, Daniels, and Manson.
MEDICAL EDUCATION UNDER THE MISSIONS. ITS POSSIBILITIES AND LIMITATIONS.

H. V. Wenham, M.B., F. R. C. S.

The object of this article is to try and bring home to readers of the C. M. Journal the fact of the present crisis in their medical education work for China. They are attempting great things, but with many the vision is yet only a narrow one, and others, although they have the vision, are hindered from attaining to it by the existence of conditions which render real advance impossible.

This work has crept upon us by degrees. At first, medical missionaries had no idea of attempting anything like systematic medical education, but events have moved on, and times have changed so rapidly that whereas a few years ago they were content with training a handful of hospital assistants, now they are in a position almost to take the lead in scientific medical education for the whole country.

Such a position carries with it an enormous opportunity and a great responsibility, when we think what it may mean to the future medical profession in China.

But do we realise the serious character of this work or how easily we may lose the opportunity? Surely it is time now that we reconsider our position, and decide how much can be done, and what we should attempt.

In the first place, is the provision of efficient medical education for Chinese students a proper function of the missionary societies? Admittedly it is the most expensive form of education, and to provide it means a large monetary gift to the Chinese. Is it right to use the hardly-spared money of those who give to Missions—often indeed the "widow's mite"—for the object of higher scientific education? Personally, I think not.

If the work is financed by (say) the Chinese Government, or by bodies outside the Missions, that is another matter, for the missionaries set apart for this may still do the work for which they came by the direct influence which they can bring to bear on their students.

As things now stand, how much are the Missions capable of doing?

Under certain conditions they can do the following:

(1) Establish one high-grade School of Medicine either in Peking or Nanking by concentrating at the one place the best of their teachers who are keen on teaching in English.

(2) Establish three lower grade Medical Schools teaching in Chinese, by concentrating all their best Chinese-speaking teachers in these three places.
(3) Establish a strong Translation Department of two foreign doctors, four Chinese assistants, and possibly two government nominees.

This much can be done under certain conditions, but to attempt much more, as we are now doing, without any real co-operation or plan or uniformity, can only result in failure, as far as the attainment of real medical education is concerned.

What then are the required conditions?

1. Each school thus formed must have its own governing body on the spot, free from the control both of missionary societies at home and of mission committees in China, although there is no reason why the missionary societies should not be represented on such governing bodies. This body must control the affairs of the school entirely, acting in all technical matters on the advice of the faculty of the school itself.

2. The teachers appointed to each school must be set free entirely by the societies for this work, and henceforth be responsible only to the governing body of the school, which will direct all their work and movements.

3. Similarly those who undertake translation work must be set free altogether for this by the societies, and do this work only.

4. The schools must be adequately financed from sources other than those of the missionary societies. They cannot be dependent on the societies for running expenses.

If the Missions are willing to accept such conditions—and not otherwise—the above gives, I think, in outline the maximum amount of medical education work that the present staffs of the Missions are capable of dealing with effectively, or that they should attempt.

If they are unwilling, it seems to me that a continuance of present methods cannot result in any real scientific medical education. As it is the majority of our teachers are only half time men or less, very many are not well qualified for teaching, and very many are attempting to teach in Chinese with an inadequate knowledge of the language.

We continue to do poor educational work—we fail to turn out leaders—that work goes to other hands—and all the time we profess to be Christian educationalists with the highest aims and content only with the highest standards. Should we be content to let things drift? Should we not see to it that what we do attempt is done thoroughly whether we teach in English or Chinese. Let the Missions give their men right out and unconditionally and trust them: and let us work hand in hand, and not against one another.
PREVALENCE OF HOOKWORM AT CHANGSHA.

ALFRED C. REED, M.D., Changsha.

It is axiomatic that the first step in a wide campaign for the eradication of hookworm infection is to determine the degree of its incidence and the factors which govern it. The Changsha Yale Hospital is, therefore, taking up studies of incidence and its related factors, in order to secure such data as will make possible and practical wide-spread sanitary measures for the eradication of this disease from the territory tributary to Changsha. The present report will not touch on contributory factors but will present the results of an initial survey of a group of unselected persons with reference to the prevalence of ankylostomiasis.

The significance of hookworm disease in China in economic, social, and physical terms, has yet to be measured. The necessary data for this estimation are not at hand. For this reason, analogies from similarly directed studies in western countries will not hold. Given in any case the presence of Ankylostoma in a certain definite ratio of incidence, it is not possible to say that because in America or elsewhere certain economic, social, or physical conditions ensue as a direct result, similar conditions will be foundsequent in China. Similar results may follow in China but their recognition must depend on new studies; on the methods but not on the results of western countries.

 Particularly is this true in the economic sphere, a subject capable of much amplification. Succinctly stated, there are complicating industrial factors in China which may or may not entirely change the economic significance of a high incidence ratio of ankylostomiasis. Chief among these factors are cheap human labor and the low value of human life. In the industrial market to-day, human life and labor are the cheapest purchasable commodities, from the standpoint of both buyer and seller. Likewise, the supply of both for practical purposes is inexhaustible. How far this state of affairs will persist in the presence of an influx of western men and civilization and their increasing influence, is a question to be answered by the next generation. Opposed as it may be to the ideas of the west and to the opportunity for sanitary progress in China, the fact stands thus at present. The immediate result is to decrease the value of a dollar-and-cents economic argument in favor of hookworm eradication. The efficiency of the worker may be definitely decreased by this disease, but so great is the supply of workers and so cheap is their labor, that the sum total of loss is inconsiderable. The situation here described is not merely theoretical;
it has been met in practical investigations of this problem, and in large industrial enterprises.

Again, in its bearing as a predisposing factor in the development of other diseases, insufficient data are at hand to assign ankylostomiasis a definite etiological relationship. The appalling prevalence of tuberculosis and lues, together with the common mal-nutrition and slender margin of safety from actual starvation, make thorough study essential to determine whether ankylostomiasis is a factor of moment or a mere coincidence. These same considerations are valid in respect of the economic significance of the disease. As the Chinese are essentially an unprogressive race whose _summa bonum_ is to follow in the paths their fathers trod, hookworm disease cannot certainly be adjudged an agent which has inhibited social and mental development. The ideas here sketched may serve to indicate the inherent difficulties in getting a point of departure in instituting a campaign of education in regard to hookworm infestation in this district. It is a work for specialists and, in its planning, the local needs must not obscure the wider relations of China to the world at large, and of a vast endemic area of hookworm infection here to the world's commercial and social life.

Investigations so far made indicate that in central China, at least, considerable weight must be attached to the self-limited character of hookworm infection in the untreated individual. Stiles states that if reinfection can be ruled out, a hookworm patient may retain part of his infection for at least 6 years and 7 months, and probably for from 10 to 12 years. In China almost continuous re-infection is certain, but there is some ground for the supposition that even in the presence of re-infection, the disease tends toward self-limitation. The explanation of a partial true immunity scarcely seems plausible. Investigation of this point is indicated.

The initial survey of _Ankylostoma_ incidence here reported, covered 120 persons, drawn indiscriminately from among servants, students, coolies, and other available persons in normal health, in a city with a population of 300,000, and included all hospital admissions during a limited period. The method of examination was the simple preparation of smears directly from the specimen of feces. In no case was concentration or special methods employed nor was the microscopic search for ova prolonged if they were not found in the first one or two slides. It is important to remember this, together with the varied classes of society from which the subjects were drawn, in view of the statement quoted by Stitt* to the effect that where ordinary

---

* Stitt: Practical Bacteriology and Parasitology, 1913.
Prevalence of Hookworm at Changsha.

Microscopic examination for ova shows 40% infections, and concentration methods show 55%. Cultural methods will show 99% infections.

Of a total of 120 persons examined, 14 or 11.6% were infected with hookworm, 73 or 60.8% with Ascaris lumbricoides, 11 or 9.1% with Trichoschephalus dispar, and one case showed Schistosomum japonicum. In the positive cases, only Ankylostomum duodenale was identified. Of the positive cases, none were under 20 years of age, 12 were between 20 and 40, and 2 were over 40 years of age. Eight of the positive cases were natives of Changsha, the others being scattered widely. Of the males examined, 13 or 15% were infected and of the 34 females, 1 or 3% were infected. This difference in ratio between the sexes is accounted for by the difference in occupational exposure, a difference which is accentuated by the circumstance that the bound foot of the Chinese woman and the fact that she cannot walk bare-footed tend to increase her segregation from places and occupations where hookworm infection is most easily contracted. The fact that foot-binding compels a constant support of the foot by bandages and entirely prevents locomotion if bare-footed, is without question a matter of considerable importance in preventing a wider spread of parasitic affections such as ankylostomiasis, schistosomiasis, and similar diseases where a common mode of infection is through the skin of the feet and legs.

The appended table shows the distribution of the cases examined according to occupation. Even in the small number presented, certain features are significant. The occupations offer extreme variety in their range, and the positive cases are distributed through ten of them, surely indication enough of a wide range of incidence outside of occupational lines. The heaviest rate of incidence would seem to be among the soldiers, farmers, and boatmen. The latter two would be expected to turnish a high rate of infection, but not so the soldiers, as they wear shoes and are better clad than men of other callings.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Hookworm Present</th>
<th>Hookworm absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopmen</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Student</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Mechanical trades</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Housewife</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Servant</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Coolie</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Soldier</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Peddler</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Farmer</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Boatman</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gentry</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Accountant</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Official</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Prostitute</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

14 106
A detailed examination of soldiers for *Ankylostomum* is indicated and should furnish valuable data both on incidence and on the efficiency significance of the disease.

In the 120 cases examined, differential leucocyte counts were made and the microscopic appearance of the red blood cells in stained preparations was noted. Blood smears were stained by Leishman's modification of the Romanowsky stain. In 11 of the 14 positive cases, the appearance of the red blood cells was within normal limits. The remaining 3 showed a secondary anemia as evidenced by pallor, irregular staining, and irregular shapes. No unusual feature was observed in the differential counts of the 106 negative cases. In the 14 positive cases, the average differential count of 200 leucocytes was as follows:—Polymorphonuclear neutrophiles, 57% ; large lymphocytes, 5% ; small lymphocytes, 20% ; mono-nuclear and transitional forms 12% ; eosinophiles, 3% : and basophiles, 0.5%.

CONCLUSIONS.

1. There is a paucity of data from which to estimate the economic, social, and physical significance of hookworm infection in China.

2. An initial study in a campaign against hookworm infection by the Changsha Yale Hospital presents 120 unselected cases examined, with an infection ratio of 11.6% hookworm (which is a minimal figure). 60.8% *Ascaris*, 9.1% *Trichocephalus*, with one case showing *Schistosomum japonicum*.

3. Less occupational exposure, to which foot-binding contributes, determines a rate of incidence of 3% in women as against 15% in men. The positive cases were scattered through many occupations, though farmers and boatmen are especially liable.

4. Special studies are indicated to determine the incidence of *Ankylostomum* among soldiers.
PREVALENCE OF HOOKWORM AT PINGHSIANG COLLIERY.—AN ABSTRACT.*

ALFRED C. KEERD, M.D., CHANGSHA.

It was felt by the staff of the Changsha Yale Hospital that investigation of the prevalence and conditions favoring ankylostomiasis in the deep mines of south-central China would be of value because of the known occurrence of the disease in this section, because of the importance of mines in its propagation and spread, and because future efforts to eradicate so serious a disease must be based on definite knowledge of its incidence and strongholds. For these reasons and with the desire to institute studies well within the affected zone, arrangements were made between the foreign staff of the colliery and the Yale Hospital whereby a member of the hospital staff was detailed in March 1914 for this investigation. The Ping Hsiang Colliery is the largest in China and has very extensive underground workings. It employs about 9,000 men, of whom about 6,000 work underground. The German staff of engineers gave every facility and the most cordial co-operation in the furtherance of this study.

The conclusions reached in the investigation were as follows.

1) The geographical location, geological formations, and meteorological conditions at the Pinghsiang Colliery are decidedly favorable to hookworm infection.

2) The native mines from which the water supply of the colliery is drained are undoubtedly heavily infected and are a potential source of danger to the colliery, and probably an actual danger. Investigation of the conditions affecting hookworm infection in the native mines is urgently necessary.

3) Conditions in the underground works of the colliery are highly favorable to the propagation and dissemination of hookworm infection, in the particulars of excessive moisture, high temperatures, darkness, constant re-infection by promiscuous defecation, the habits and clothing of the coolies, and the lack of special provisions for sanitary control.

4) Examination of 272 persons showed a general incidence of 81.6%. Of the 225 who worked underground, 90.2% were found infected. The ratio of incidence was much less in the above-ground works, and the infection was also found present entirely outside the colliery.

*(Note.—The full report of which the conclusions alone are given here, will appear later in specialized journals, being too long for publication in the C. M. J.)*
(5) Evidence is deduced indicating that the 90.2% infection in the mine is a minimal figure and that the true figure approaches 100%.

(6) The only factors determining the rate of incidence are conditions in the mine itself.

(7) Eradication will be peculiarly difficult and slow but can be accomplished along lines which are definitely presented in the full report.

(8) This study indicates forcibly the need for intensive investigation of hookworm infection in Hunan and Kiangsi provinces, especially in respect of the foreign and native mines, where the disease is apparently a largely unsuspected factor in economic, social, and industrial inefficiency.

EXTRACTS FROM THE REPORT OF THE MOUKDEN MEDICAL COLLEGE FOR 1913.

Dugal Christer.

(This College was opened in March 1912 with 50 students, and has just admitted 40 more. Its teaching staff is seven resident European doctors, one qualified chemist, two visiting lecturers, and Chinese assistants.

SPECIAL FEATURES OF THE MOUKDEN MEDICAL COLLEGE.

This College holds a position somewhat unique in China.

It is representative of a distinct area, viz.: the whole of the three Provinces of Manchuria. So far as we have ascertained, it is the only college which holds its entrance examination in a variety of centres. In January 1912 it was held simultaneously in thirteen places, and in December 1913 in fourteen. The most distant in time is 5 days' journey from Moukden by road, the most distant in space 36 hours' journey by train.

Definite preparation for the entrance examinations of the Arts and Medical Colleges is given in 13 different Christian High Schools, belonging to all the Protestant Missions working in Manchuria, the Scottish, Irish, and Danish. This ensures a supply of suitable students.

In government schools the announcement of our entrance examination is welcomed, and the students are encouraged to enter the College.

The numbers applying for entrance are large, 143 being examined in January 1912, and 157 in January 1913.

Our relations with Government are intimate and cordial, and the authorities take a lively interest in the College. The Tu-tu, the Civil
Governor, the Commissioner of Education, and others have visited it, the last several times, one of which was during the recent Entrance Examination.

A Representative of Government is appointed to confer with our Senatus and Board of Management regarding College matters.

The Commissioner of Education appoints a man to be present at Entrance Examinations and Professional Examinations.

A government grant is given regularly towards the support of the College.

Government recognition is promised to our graduates, and the government imprimatur on our diplomas.

The College is affiliated with the largest hospital in North China, with 140 beds and 47,000 out-patient visits annually. There are three separate consulting-rooms and a large surgical dressing-room, where students can conveniently learn their practical work, and two modern operating-rooms with special galleries for students.

OUR COLLEGE WORK.

The College is amply justifying the hopes and expectations of its promoters. Our students have now nearly completed their 2nd year, and are developing visibly, and advancing steadily in the quality of their work. During 1913 they have had systematic instruction in Histology, Anatomy, Physiology, Physiological Chemistry, Materia Medica, and Pharmacy, and also in English. . . . . They are now beginning their practical duties, dispensing and surgical dressings, and most of them seem thoroughly to enjoy their new work. In December 1914 they are expected to go up for their second Professional Examination.

OUR NEW STUDENTS.

A second Entrance Examination was held in December 1915. Our standard was higher and our requirements more varied than on the previous occasion, and we charged for registration. The subjects were Chinese Classics and Essay, History, Geography, Arithmetic, Algebra, Geometry, and English. In spite of all this the number of applicants was 157, higher than before, but we could only admit the highest 40. One of our new men is an Arts College graduate who has been teaching for three years since graduation, and two others have been some years in the Arts College. Ten come from government schools, and the rest direct from Christian schools, though not all from Christian homes.
TEACHING ENGLISH.

The medical course presents so many and such difficult subjects of study that it may be asked why we burden our students with a foreign language in addition. There are several reasons.

English is now considered part of the necessary equipment of any young man who is to be regarded as well-educated.

The Government will not recognize a medical course conducted wholly in the Chinese language, the Board of Education having decided that a foreign language is necessary for the teaching of western medical science. Without English, therefore, our graduates can receive no government diploma, nor take their place along with others as fully-qualified medical men.

Our number of medical books in Chinese is very small, and it is impossible for any man who cannot read a foreign language to keep up his professional knowledge.

For these reasons our students all have an hour of English daily. More than a dozen of the best are already able to talk with fair facility and to read simple books with ease. It is encouraging that among these are most of our best students. It is expected that a large number will be able to receive more or less of their clinical and practical instruction in this language.

BUILDINGS AND EQUIPMENT.

The teaching block of the College, erected in 1911, has proved itself thoroughly satisfactory. Its capabilities are now strained to the utmost to house all our students, new and old, and still to leave room for teaching. Plans for the new dormitory block are complete, and building is now beginning. It will be situated about three minutes' walk from the College. . . . There will be accommodation for 120 students and four masters, besides common-room, dining hall, bath-rooms, kitchen, and servants' quarters.

College funds were used during the year to build an addition to the out-patient department of the Hospital, for teaching purposes, as the presence of students renders it absolutely necessary to have more than one good-sized consulting room and a surgical dressing-room.

During 1913 some requirements for teaching Physiology and Pharmacy have been added. A special gift of microscopes has been of so much help to us that we hardly know how we could have done without it.

We are also greatly indebted to the General of the army in Manchuria for a donation of $2,000 for an X-Ray outfit. This is now installed in a special room in the new addition to the dispensary block.
Moukden Hospital in 1913.

During the last two years there have been great developments in the Moukden Medical Mission, for it is impossible to open a college without materially affecting the work of the hospital connected with it. The Medical College and the Hospital are entirely separate financially, but they must of necessity be intimately related.

The out-patient visits during 1913 have been 47,000, and in summer there were often 400 in a forenoon. Three doctors now see patients simultaneously in three rooms, consulting-rooms for medical, surgical, and eye cases respectively, and relays of students attend to the surgical dressings in another large, bright room.

In a large city like Moukden, surrounded by a closely populated plain, the numbers needing medical help must always be great. As the proportion inclined to trust western rather than native methods increases, the pressure on our hospital accommodation becomes ever more difficult to meet; and now, for the greater part of the year, there are always a number of patients waiting for an empty bed. Indeed we could fill our 140 beds twice over. There have been close upon 1,000 in-patients during the year, and 2,380 operations have been performed.

A two-storey block has just been completed on ground at the back of the Hospital given us by Government. Here we have accommodation, in small rooms and a ward, for 30 additional patients.

Another improvement and extension during the year has been in our operating-room. Part of a legacy was still in our hands and with this we enlarged the former operating-room, and produced two bright roomy theatres with students' galleries. They have tiled floors, walls tiled six feet up and glass ceilings, and are admirably suited for their purpose.

---

Research Reports.

W. W. Cadbury.

Knowing of the great prevalence of ankylostomiasis among the Chinese of the province of Kwangtung it occurred to me that it would be of interest to determine what was the relative incidence of this disease among students of the better class. This appealed to me as of especial interest because of the requirement recently enforced, compelling all Chinese emigrating to America for any purpose whatever to have a fecal examination and if ankylostomiasis is present, the
emigrant must delay his departure until the health authorities are satisfied that he is free from this disease. The examining physicians in Hongkong have informed me that the proportion of Chinese applying for a clean bill of health and who give no evidence of ankylostomiasis is comparatively small. The following figures are therefore somewhat surprising.

Altogether seventy-six students were examined. Seventy-five of these were students at the Canton Christian College and one from the Normal School of Canton. It may be noted that the boys as a rule come from the higher classes of Chinese and very few have ever been employed on the farm as laborers. The ages varied from 11 years to 25 years. The examinations were made routinely without reference to any ailment or suspicion of helminthiasis. There were two or three exceptions where ascariasis was suspected.

Method of Examination.—The stool was collected in a small earthenware jar. About ten grams were placed in a corked bottle with about thirty cc. of clean water. The bottle was thoroughly shaken until the solid matter was dissolved. The whole was then filtered through a course wire mesh (window screening). The filtrate was then allowed to stand for fifteen minutes when the supernatent water was poured off leaving only sufficient to fill a centrifuge tube. This was thoroughly shaken and then poured into the centrifuge tube and centrifuged for five or ten minutes. A small portion of the sediment was removed with a pipette and examined microscopically for ova.

Tabulated Results.

| Total number of students examined | 76 |
| Number of students whose feces contained ova of intestinal parasites | 40 |
| Number of students whose feces did not show ova of intestinal parasites | 27 |
| Fecal examinations giving positive findings | 64 |
| Fecal examinations giving negative findings | 36 |

Of the positive cases parasites were found as follows:

- **Ascaris**... 36 cases
- **Tricocephalus dispar**... 18
- **Clonorchis sinensis**... 7
- Both **Ascaris** and **Tricocephalus dispar**... 12
- Both **Clonorchis** and **Tricocephalus**... 1

No case of ankylostomiasis was found among the students, although some who were suspected of being infected were examined more than once.

Two members of the foreign staff were examined in one of whom ascaris ova were demonstrated.
Five hospital native nurses were examined—three boys and two girls. Two were negative. In two *Ascaris* ova were found, in two ova of *Trichocephalus dispar*, while one showed ova of *Clonorchis sinensis*.

In addition to the students a few cases in the Hospital of the University Medical School were also examined for ova, with the following results:

**General Diagnosis.** Ova found in Stools.

- Abrasion of foot: .................. *Ascaris*.
- Eczema: .......................... *Ascaris* and *Trichocephalus dispar*.
- Tuberculosis of hip: .................. *Ascaris*.
- Chronic interstitial nephritis: ........... *Clonorchis sinensis*.
- Chronic rheumatism: .................. *Ascaris*.
- Chronic hepatitis and jaundice: ........... *Ascaris* and *Trichocephalus*.
- Pernicious anemia, amenorrhoea: ........... *Inkylostoma* and *Trichocephalus*.
- Chronic gastro-enteritis: ............ *Clonorchis sinensis* and *Trichocephalus*.
- Hepatic cirrhosis: .................. *Clonorchis sinensis*.

The cases of *Clonorchis* may be considered separately. Altogether there were thirteen cases observed in a total of 98 examinations made, or about 13%. Seven of these were students, one was a nurse and five were hospital patients. Of these thirteen cases, one a student had complained for some time of indigestion and colicky pains. Another case was a man suffering from chronic interstitial nephritis with severe albuminuria, and ascites. One had chronic gastro-enteritis, one cirrhosis of the liver with ascites. A nurse with *Clonorchis* had a mitral lesion of the heart. The other cases showed no other symptoms of disease. Two cases of ankylostomiasis were examined for ova in the stools, because of a marked grade of anemia. One was a girl who had not menstruated for more than a year. After expulsion of the parasites but two months elapsed before there was a return of the normal menstrual flow.

TAK HING, West River, South China.

To the Research Committee of the S. China Branch of C. M. M. A.

Number of specimens of feces since last report ... 233

Ova: *Ascaris lumbricoides* ... ... 165

*Tric. dispar* ... ... 154

*Ankylostom. duod.* ... ... 106

*Clonorch. sinensis* ... ... 2

Seaworm ... ... 1

*Conidium* ... ... 15

Parasites: *Balantidium coli. Gigant.* ... 10

*,* , Minute ... 3

Of the 68 specimens in which no ova of *Ascaris lumb.* were found, 55 were specimens taken after the administration of santonin. The
ages of the 13 patients whose first specimens showed no ova of this parasite ranged from two to sixty-two years.

The youngest patient showing *Ascaris* infection was nine months old.

Specimens of Blood ... ... ... ... ... ... ... ... ... ... 23
Crescent ... ... ... ... ... ... ... ... ... ... ... ... 1
Signet ... ... ... ... ... ... ... ... ... ... ... ... 1
Tertian benign ... ... ... ... ... ... ... ... ... ... 2
,, malignant ... ... ... ... ... ... ... ... ... ... 2
Eosinophelia ... ... ... ... ... ... ... ... ... ... ... 6

Respectfully submitted by

J. M. WRIGHT.
K. W. MCBURNAY.

DISTRIBUTION OF KALA-AZAR IN CHINA AND KOREA. A REPRINT.*

S. COCHRAN, M.D., Hwaiyuan.

Last year I made an attempt to obtain accurate information of the distribution of the disease. A circular-letter was sent to all physicians, whose names could be obtained, practising in China and Korea. The province of Chihli was omitted, as I had information that a similar canvass was already contemplated for that province by a resident there.

Some 70 answers have been received; of these, the following men report having found the parasite:—Hupeh: Aird of Hankow, Fowler of Hsiaokan, and Thomson of Hankow, by spleen puncture; Honan: Leslie of Changte, by spleen and liver punctures; Shantung: Schultz of Tsinan, by smears from excised lymph-nodes, and smears from an excised spleen; and Roys of Weihsien, by spleen puncture and excised lymph-node. I have verbal communications also from Lambert of Kiukiang, Somerville of Wuchang, and Wills of Tsaoshih, Hupeh, telling of finding the parasite in spleen punctures. To these may be added Aspland of Peking (1), and a case in Tientsin, also mentioned by Aspland (2). Material from cases resembling Kala-azar clinically have been examined microscopically with a negative result in the following places:—Ningpo (two cases of spleen puncture and one of liver puncture); Tainan, Formosa ("not a few cases" of splenic and hepatic puncture); Yiyang, Hunan (circulating blood); Changsha (method not stated); Changteh, Hunan (by gland smears); Shanghai (spleen puncture and circulating blood); Yangchow (lymph-nodes); Canton (spleen and circulating blood); Hainan (liver, spleen, and blood); Wuhu, Anhwei (numerous liver and spleen punctures).

Cases resembling Kala-azar are not seen in the following localities:—Anhwei: Luchowfu; Fukien: Kutien, Kienking; Hunan: Hengchow, Shengchow; Kwangtung: Hongkong, Kongmoon; Szechwan: Tungchwanfu, Ch'ungking, Mienschuhsien, Yachow; Manchuria: Chaoyauhsien, Kwangchentze, Liaoyang, Kirin, Tielhliang, Yungling, Antung; Korea: Haiju, Chemulpo, Seoul, Kunsan.
Cases clinically like Kala-azar are seen in moderate numbers in the following places:—Chekiang: Shaowu, Wenchow; Fukien: Fuchow; Hunan: Changteh; Kiangsi: Jaochow, Suchow; Kwangtung: Takging, Yungkong, Dosing; Shensi: Sianfu; Szechwan: Paoning, Tzeliutsing; Shantung: Pangechwang, Pinyin, Lintsingchow.

There have come reports that cases clinically resembling Kala-azar are seen in large numbers in the following places:—Kiangsu: Sutsien, Tsingkiangpu, Hsuchowfu; Shantung: Taian, Tengchow, Laichowfu, Hwanghsien; Formosa: Shoka; Kwangtung: Pakhoi, Swatow.

It will be noticed from the above, by comparing with the map, that all the positive examinations have been reported from north of the Yangtze, with the exception of Wuchang and Kiukiang, which lie on the river. All the negative examinations, on the other hand, lie to the south of the Yangtze, with the exception of Yangchow, only a few miles from the river. Furthermore, cases clinically diagnosed as Kala-azar are seen in large numbers at several points in Kiangsu and Shantung, connecting the points in Anhwei, Shantung, and Chihli, where a positive diagnosis has been made. I have personal knowledge that there are large numbers of cases giving typical Kala-azar symptoms in Nanhsuchow, Ingchowfu, and Taihohsier, in Anhwei. On the other hand, the numerous cases reported from Swatow, Pakhoi, and Shoka (Formosa), if interpreted in the light of the negative examinations reported in similar cases in their neighbourhoods, would seem not to be Kala-azar. In the light, then, of the somewhat meagre information now at hand, the endemic area of Kala-azar in China will be somewhat as indicated by the outline on the map.

Incidence of Kala-azar in Hwaiyuan.

Anyone in charge of a general hospital service in this part of China must be struck at once by the large number of cases with splenomegaly applying for treatment. Of course some of them are undoubtedly due to other causes: the first case, for example, that we took into the hospital ward to examine carefully for possible Leishmania, turned out to be splenomedullary Leukaemia. Making due allowance, however, for such exceptions, the majority of cases of large spleen applying for treatment are with little doubt due to Leishmania. It is, of course, impossible to make any estimate of the number of cases in proportion to the general population. A little idea of it can, however, be obtained from the fact that in two years, from June 1st, 1910, to the corresponding date 1912, out of a total of 8,058 different patients applying for treatment to our out-patient department, 83 are recorded under the diagnosis of "Kala-azar," or "Splenomegaly"—a little over one per cent.
During the past year we have made fecal examinations of all our in-door patients—both surgical and medical—a matter of routine. We found that all our patients had intestinal parasites and that after a course of treatment for the same they improved rapidly. We were often surprised and gratified to find our surgical cases gain rapidly in weight after leaving the hospital. This we accredited greatly to their freedom from parasites.

During the past year 95 of our 101 hospital patients had fecal examinations for eggs of intestinal parasites. In April we began to examine the feces of some of our dispensary cases, taking one or two cases every few days. It was necessary for us to get a specimen from the dispensary cases before their leaving the dispensary as they refuse to bring us specimens for examination afterwards.

During the first part of the year we examined only one or two slides from each case. Later in the year we examined six to ten slides from each case; since the beginning of December in all our cases we make our examinations after sedimenting or centrifuging, with the result that we were able to obtain a higher percentage of "hook worm" infection. In the following table we have included nine cases of the *Paragonimus westermani* or the lung fluke, as we found the ova in the feces when the patient had not given us a history of having a cough and before we had examined the sputum.

<table>
<thead>
<tr>
<th></th>
<th>95 In-patients.</th>
<th>111 Out-patients.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cases. Per cent.</td>
<td>Cases. Per cent.</td>
</tr>
<tr>
<td>Nematoda</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ascaris lumbricoides</em></td>
<td>82</td>
<td>86.1</td>
</tr>
<tr>
<td><em>Trichina spiralis</em></td>
<td>75</td>
<td>79</td>
</tr>
<tr>
<td><em>Ancylostoma duodenale</em></td>
<td>52</td>
<td>54.7</td>
</tr>
<tr>
<td><em>Oxyuris vermicularis</em></td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td><em>Strongyloides intestinalis</em></td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td><em>Ascaris canis</em> (?</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><em>Paragonimus westermani</em></td>
<td>9</td>
<td>9.4</td>
</tr>
<tr>
<td><em>Opisthorchis sinensis</em></td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td><em>Cystostrongylus heterophyes</em> (?</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Cestoda</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Taenia saginata</em></td>
<td>11</td>
<td>11.5</td>
</tr>
<tr>
<td>Two different ova found</td>
<td>31</td>
<td>32.6</td>
</tr>
<tr>
<td>Three</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>Four</td>
<td>11</td>
<td>11.5</td>
</tr>
<tr>
<td>Five</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Japanese</td>
<td>9</td>
<td>9.4</td>
</tr>
<tr>
<td>Chinese</td>
<td>5</td>
<td>5.2</td>
</tr>
<tr>
<td>Koreans</td>
<td>81</td>
<td>85.2</td>
</tr>
<tr>
<td>Surgical</td>
<td>75</td>
<td>79</td>
</tr>
<tr>
<td>Medical</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Miners examined 35. Number infected with &quot;hook worm&quot; 23 or 66%.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital cases examined in December 16. Percentage of &quot;hook worm&quot; inf. 69.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispensary  25. Number infected with &quot;hook worm&quot; 76.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

* Since sending in this report, Dr. Stryker has been killed by a Japanese assassin.
During the year we treated 1,793 cases for round worm and all of the cases not examined gave a history of having passed the worms either by mouth or rectum and of having pain in the abdomen. The only treatment for round worms is santonin and our method of treatment will be described under "hook worm."

*Trichoecephalus trichiuris* or "whip worm." Percentage of infections, 73. The presence of this parasite, which inhabits the lower part of the small intestine and the upper part of the large intestine, gives little trouble to the patient. In a few cases we have been able to get the parasite by giving santonin and beta-naphthol.

*Ankylostoma duodenale* or "hook worm." Percentage of infections, 58. In December after sedimenting and centrifuging all specimens examined we obtained a percentage of infections of 73. We found the hook worm ova in all classes including farmers, miners, coolies, and merchants. In this country we have never seen any patients that gave a history of "ground itch."

Our routine treatment for all our cases is as follows: Patient is put on a liquid diet for one day and on the afternoon of that day he is given a half ounce of castor oil and at 8 p.m. a powder containing two grains each of calomel and santonin mixed with a little sugar of milk. The following morning at 6 a.m. 15 grains of beta-naphthol are given in powder followed by a like dose at 7 a.m., 8 a.m., and 9 a.m. At 11 a.m. one half ounce of Epsom salts is given. At 8 p.m. the same day the patient is given another dose of calomel and santonin as on the previous evening and the next morning at 6 a.m. half an ounce of Epsom salts. Two hours later the patient is put on a soft diet, having been on a liquid diet for the past two days. We have found the above treatment very efficacious in expelling round worm, hook worm, and whip worm and we have not had any bad effects from the above treatment. One of our patients passed 102 hook worms in one evacuation. The above treatment is repeated within ten days if the patient is in the hospital or if they return for treatment.

*Oxyuris vermicularis* or "pin worm." This worm may be common but very few patients come for treatment. We found two cases of this parasite among our surgical patients and one of them passed 132 pin worms in one evacuation.

In two cases we found the larva of the *Strongyloides intestinalis* and in one case we felt sure upon repeated examinations that we found the ova of the *Ascaris canis*, a common parasite in the intestine of the dog and cat but rarely observed in man. In two cases we found the ova of the *Opisthorchis sinensis*, a parasite which inhabits the bile duct.
and gall bladder of domestic dogs and cats as well as of human subjects. Regarding the finding of the ova of the *Cotylogonimus heterophyes* we are very doubtful although we had two cases in which ova resembling the ova of this parasite were found on repeated examinations.

During the year we treated 37 cases of *Taenia saginata* or tape-worm. All the cases that applied for treatment had passed segments of the parasite. One of our surgical cases passed 125 feet of tape-worm, there being three heads, showing that there were three distinct tape-worms.

*Paragonimus westermani* or the lung fluke worm is the cause of a disease known as endemic haemoptysis, a disease which is common in this district. During the year we treated 95 cases and the diagnosis in all the cases was made by finding the ova in the sputum. We find the disease at all ages and it is the cause of a chronic cough with the expectoration of a peculiar rusty brown sputum. We have seen cases without the characteristic sputum at the time they were examined but the clear sputum contained the ova. Occasionally these patients have attacks of haemoptysis or bleeding from the lungs. These patients are not troubled with a cough every day but have attacks of coughing every week or every month and others go for several months without a cough, yet their sputum will always contain ova. Some of our cases have had the disease only a few days and others have had it for over thirty years. In the majority of cases there are no physical signs. In one case the patient had pleurisy with effusion and in the fluid we found the ova of the fluke worm. Nine of our cases who were admitted to the hospital for surgical operations gave no history of a cough, yet their sputum contained ova.

The worm lies in burrows near the surface of the lung and these burrows connect with the bronchial tubes, the ova containing secretion from the parasite excite the cough and expectoration. We have tried many plans of treatment, including the injection of emetine hydrochloride, but without cure.

The only epidemic we had during the year was an epidemic of meat-poisoning during the last of May, when we treated over 90 cases in two days. The poisoning was due to the eating of meat infected with organisms of the *Bacillus paratyphosus* group. None of the patients were seen until thirty-six and forty-eight hours after they had eaten the poisoned meat and one of the fatal cases was not seen until the sixth day. All the cases gave a history of having eaten the infected meat raw or slightly cooked. All the fatal cases had eaten raw, the liver, spleen, or intestine of the infected bull.
Within two to twenty-four hours after eating the infected meat they began to show symptoms of poisoning. All the cases presented a considerable degree of prostration. Of the 90 cases treated there were ten serious ones. Three died in their homes, one of whom died before treatment could be given forty-eight hours after eating the infected meat. The other two cases were moribund when seen on the second and sixth days of the poisoning. The remaining seven serious cases were admitted to the hospital and three of these died.

Vaccine in Hot Weather.

Dr. Stanley, in Annual Report Shanghai Health Department, says:

"Those who have occasion to use smallpox vaccine during the warm weather should remember its great sensitiveness to even a moderately elevated temperature. It may be noted that vaccine at a temperature of 57° C. becomes inert in 5 minutes. Even at 37° C., a temperature often reached in summer in China, vaccine is rendered inert in 24 hours. On the other hand at 5° C. below zero vaccine will remain unaltered for a year. Unless, therefore, there is some special reason, vaccination during the warm weather, say, between May 1 and September 30, is inadvisable in China owing to rapid loss of virulence at the prevailing atmospheric temperature. For this reason smallpox vaccine between these dates can not be guaranteed effective. The best time for vaccination undoubtedly is in the early winter months, that is to say, before smallpox becomes prevalent. The Chinese, following their old custom of inoculation, still hanker after spring vaccination. Plague, typhoid, and other bacterial vaccines have been sent out from the Laboratory. The demand for bacterial vaccines prepared according to the methods of Sir Almroth Wright is increasing.

"Scarlet Fever. The annual admission of foreign cases into the Isolation Hospital since 1902 has been 34, 7, 11, 11, 20, 70, 25, 9, 32, 22, 64 and 56. Of these 361 cases, 65 proved fatal, a case fatality of 18.2% as compared with a case fatality in England of under 5. The case fatality has not markedly changed since the introduction of scarlet fever into Shanghai. Although scarlet fever has hitherto failed to establish itself firmly in any part of Asia, excepting Asia Minor, and is practically unknown in the tropics, it appears to have come to Shanghai to stay. Scarlet fever was practically unknown in Shanghai prior to 1900, when it was probably introduced by foreign immigrants. As would be expected with a recently-introduced disease, against which evolution has afforded no natural immunity, scarlet fever has been of a virulent type among the Chinese. It is probable that the passage of the disease through the susceptible Chinese has led to an intensification of the virus, so that it is more fatal to foreigners also."
The China Medical Journal.

VOL. XXVIII. JULY, 1914. No. 4.

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.

Editorial.

THE THEORY OF INFECTION—ANAPHYLAXIS.

Not for many years has so fascinating a subject engaged our attention as the theories which revolve around the protein molecule, anaphylaxis, sensitization and other kindred ideas. That the symptoms of many disease conditions are due to protein poisoning or the "parenteral" digestion of protein is now held by many observers and scientific men. Hay fever, for instance, is held to be the sensitization of the individual to the protein molecule of the pollen of certain plants. Victor C. Vaughan has carried this theory further than perhaps any other man, and his theory carried out to the minutest details is most fascinating and almost convincing. His writings on these hypotheses culminate in a book of over four hundred pages written during the past year. He says:

"When proteins are taken into the alimentary canal and are acted on by the digestive juices the product becomes poisonous at about the peptone stage, and if the peptone formed in alimentary digestion should be absorbed into the circulation it would be highly injurious; but the digestive process proceeds and the peptone is broken up into harmless amino-acids, which are absorbed and synthesized into the proteins of our bodies.

When proteins find their way into the blood without being brought under the action of the digestive juices of the alimentary canal they must be digested in the blood and tissues, and in this process the protein poison is set free and, since general distribution cannot be hindered, it exerts its deleterious effects on the body. This is called parenteral digestion."

He holds that all living things, of which the cell is the unit, feed through the activity of their ferments, of which there are two
kinds, analytic and synthetic. The former splits up the food which the latter assimilates and builds upon. The first are diffusible in the medium in which the cell lives, while the latter remain in the cell. These ferments are therefore styled extracellular and intracellular. Ferments furthermore are specific in two senses. First, each kind of cell elaborates its own kind of ferment and secondly this ferment is able to split up only certain proteins.

His theory of how bacteria cause disease is this. He says every living cell, and a bacterium is such a living cell, must form ferments which are able to split up food for this cell; therefore, in order for a certain bacterium to be pathogenic to a certain animal body, it is necessary first that this bacterium be able to split up and feed on the protein of that animal body; secondly, the ferments of the animal body must not be immediately, at least, destructive to the invading bacterium.

The body cells, especially the blood cells, also elaborate ferments which digest foreign protein. This fact is most easily demonstrated in the action of the extracellular ferment of the leucocyte, which is germicidal because it digests bacterial protein. That every living cell, like every bacterial cell, elaborates its specific ferment has, moreover, been demonstrated by Abderhalden and his colleagues in their wonderful work on the specific ferments.

Professor Vaughan now claims that the complex protein molecule of which the infective bacteria such as the typhoid, colon, and pneumococcus are types, and which are protein molecules, contain an intracellular poison. This poison must not be confused with a toxin which is different. The toxin, for instance, can be destroyed by heat, while this intracellular poison can not be so destroyed.

This poison unit is the primary group and is the same for all protein molecules. It is harmless so long as it is in combination with other groups, but there are other secondary and tertiary groups in the protein molecule of the bacterium which cause the elaboration of certain specific ferments in the animal body which are specific for that particular bacterial protein. These now attack the bacterium and by their destruction and parenteral digestion cause the liberation of the primary or poisonous group, and this poisonous group is harmful because of its combination with secondary groups.
in the cells of the animal body. Morbid processes of the infectious diseases according to Vaughan represent efforts on the part of the animal body to elaborate ferments and to establish new combinations, through the activity of which the poisonous action of the noxious protein may be allayed or averted. In order to illustrate his theory he gives the following picture of typhoid invasion.

"In the light of what has been learned from studies of the protein poison and protein sensitization let us see how the typhoid bacillus acts in inducing the disease. The bacillus, finding its way into the body, grows and multiplies. Its extracellular ferment acts on the proteins of man's body and prepares the food which is built into typhoid tissue by the intracellular ferments. The ferments of the body-cells are not capable of destroying the invading organism and during the period of incubation it multiplies greatly. During this time the man is not ill. It is not, therefore, the growth and multiplication of the bacillus in the man's body that directly causes the symptoms of typhoid fever, because at the time of its most active growth there is no fever or other symptom. During the period of incubation the bacillus furnishes the ferment, and the proteins of the man's body constitute the substrate. These proteins without much change are taken into the bacterial cells and built into typhoid bacterial tissue. The process is largely one of assimilation and construction, and no poison is liberated; consequently there is no fever or other symptom. After about ten days the period of incubation ceases and the disease is ushered in. The body-cells, under the influence of the foreign protein and for the purpose of its destruction, begin to pour out a new specific ferment. During the disease the body-cells furnish the ferment, and bacterial cells constitute the substrate, the process is destructive, the protein poison is liberated, and fever with its concomitants results. The person may die as a result of the too rapid liberation of the poison, from a lesion due to the effects of the parenteral digestion or from chronic poisoning."

Vaughan does not claim to know what this common protein poison is chemically, but he says it is certainly not an amino-acid, although it may be closely related to one of these. He says the absorption of undigested or partially digested protein from the alimentary canal may be quite as harmful as inoculation with a living virus. His view of sensitization is tersely stated by one writer thus:

"Professor Vaughan's view is that sensitization is the production of a specific proteolytic ferment which acts upon the protein that brings it into existence and upon no other, and that when the protein is again injected the ferment liberates the toxic molecule to which the symptoms are due."
We can not quote all the interesting facts and observations which Professor Vaughan brings to his aid in the establishment of his theory but we recommend that every medical man read at least two of his articles which appeared in two issues of the *Journal of the Am. Med. Ass.*, November 15th, 1913, and February 21st, 1914, respectively.

THE CONFERENCE OF 1915.

Prospects for the C. M. M. A. Conference of 1915 are booming. Though there are already prospects of some good papers the committee are anxious for many more. The exhibits are to be an especial feature of the Conference and our Shanghai medical confrères are on the programme for some interesting and valuable practical demonstrations.

The exhibit which will represent Preventive Medicine, suggestions for which will be found on another page of this number, will be most stimulating to all of us. Certainly no one will dispute the wonderful opportunity in China for the exercise of any and all phases of preventive medicine.

We again call attention to the plan of the committee to have as far as possible all papers in print and at the disposal of the members attending the Conference. This will provide more time for discussion and will also ensure that all papers will be presented to the Conference.

Will firms please note that all business arrangements, including applications for space for exhibits should be made with Dr. John Snell, Soochow?

Dr. Cole, chairman of the Committee on Programme, says:

"Some of us would like to hear a good discussion on the all important question (note the exact words please) *The Choice of an Anaesthetic for the Chinese*. Dr. James L. Maxwell (supported by others) will meet all comers on behalf of chloroform, and if there are any who feel strongly on the subject, we shall be delighted to observe the sparks; in this connection will any who have had deaths under an anaesthetic kindly make careful notes on the subject that we may get some actual facts on a matter of so much difference of opinion? If there are any members who would like
to take part in this discussion on either side will they please first notify the Programme Committee?

Suggestions as to suitable subjects for Conference papers and the names of suitable men and women to prepare such might be made by some who have 'never written a paper in their lives' but who wish to help in this simple way!"

---

PITUITARY EXTRACT IN OBSTETRICS.

Since the first use of pituitary extract in obstetrics by Blair Bell in 1909 the obstetrical world has had much opportunity to watch the value of it, and a perusal of the many reports that have been issued on its use reveals very interesting facts and conclusions. Like any new drug for which a great deal is claimed and much is expected, the first enthusiastic welcome is soon followed by a reaction against it, often as unfair as were the first expectations unwarranted. This reaction is further accentuated by the results of the indiscriminate use by early enthusiasts.

We are in a position now, however, to examine the claims of pituitary extract more calmly and are more nearly able to place this powerful drug in its proper place as an aid in the practice of obstetrics.

Experimentally, it has been demonstrated that pituitrin has only very slight effect on the non-pregnant uterus and that it has very little more in the contractions of the uterus in early pregnancy. The effect increases with the term of pregnancy, however, and the maximum susceptibility to its stimulating action is seen during labor at full term, the effect increasing up to the end of the second stage. During lactation the effect is still marked but decreases gradually as lactation continues.

In labor, it is claimed by many men who have used it extensively that it reduces the necessity for forceps delivery about one half, and some claim that they have seen no harm from its use in any case.

The majority of men, however, state that it should be used with caution and it can be easily understood that a drug which can cause such powerful contractions of the uterine muscles is not without its dangers.
It is well established that it is absolutely contraindicated in the presence of any contraction or deformity of the pelvis causing obstruction to delivery, and the following facts seem pretty well agreed upon by obstetricians.

It has no place in normal labor, and its use should be confined to cases of uterine inertia, postpartum hemorrhage, and Caesarean Section—in this last as a substitute for ergot.

It should be used with caution before the cervix is fairly well dilated, the nearer approach to full dilatation the safer its use.

It is most efficient in the second stage.

It is of some value during third stage but less reliable than in second stage.

In postpartum hemorrhage it is useful but probably not more valuable than ergot.

Its great and undisputed value lies, then, in uterine inertia in the second stage with fully dilated cervix and no pelvic contraction. Even here Edgar, while acknowledging its great value, says one should be ready for immediate operative delivery in order to forestall uterine rupture.

The conclusions to be drawn are that pituitary extract is really a valuable addition to our obstetric resources, but it must be used with caution and with discrimination and intelligence. Further, that although a narrow field for the safe use of pituitrin is left, yet if it can continue to justify its place in this small field it will justify its discovery and use.

HOOKWORM ERADICATION.

The presence of hookworm infection in mining districts, even of temperate zones, has long been noted and guarded against. Its significance in China can hardly be estimated. As pointed out by Dr. Reed in his summary as to the incidence of hookworm at Pinghsiang, we can only note the facts and plan for prevention. To say that the mere elimination of *Ankylostomum* from the mines would produce the same ratio of invigorated human beings as has resulted from its elimination in the Southern American states would be utterly unwarrantable. Too many other conditions exist whose influence cannot be measured. But we have evidence of a
serious amount of infection and an outline of procedure which should bring results. The mine authorities have the opportunity of giving a splendid demonstration of the co-operation between engineers and sanitarians.

A comparison between the figures for hookworm infection in unselected cases in Changsha and similar groups elsewhere in China need not be given here in detail. But it is to be noted that an incidence of 14 per cent. was found in Chengtu in 1913, in unselected groups of cases; while in Formosa, in a male hospital, as many as 44 per cent. of patients were found infected.

Careful studies will probably reveal a much higher percentage of infection than we yet realize.

Edward H. Hume.

THE INDISCRIMINATE SELLING OF DRUGS IN CHINA.

It is unfortunate enough that the Chinese shops are being flooded with foreign patent and proprietary medicines of all sorts and descriptions, and as long as there is no educated public opinion to appeal to and few to educate and create such a public opinion, we must perforce content ourselves with exerting as much influence as possible against the indiscriminate use of these drugs among these with whom we do come in contact. When, however, the firms which are flooding these Chinese markets with their drugs, to be sold as indiscriminately as Chinese children buy foreign toys, have the temerity to address letters to the medical mission body asking their approval and encouragement of this indiscriminate trade, it is, to say the least, "going a little too far." It is in fact almost adding insult to injury, since they insult our intelligence in expecting us to approve of such foisting on the market of their endless preparations for the endless ills of China.

There is no justification of these foreign drug houses, except perhaps the desire to make money, for selling to the ignorant masses of Chinese to swallow for their various aches and pains, such drugs as phenacetin, aspirin, guiacol, not to speak of the countless other drugs the formulae of which are known only to the chemists of the firms.
The China Medical Journal.

The following quotation from a letter sent to the medical mission body this year by one of these foreign firms is most naive in its expression of its philanthropic purpose and we would like to hope that they were at least sincere in their intentions, but to expect the endorsement of conscientious medical men would be ludicrous if it were not so serious.

"In a country like China, where medical assistance in most cases is not easy to be obtained and where the mission doctor or even the missionary himself who as a rule is called to give first medical aid can in most cases only be reached after a long journey and where the medical and pharmaceutical knowledge is still so far behind, general and popular remedies made up only on the basis of scientific principles and experiences for certain diseases are of some necessity and they may even turn out as a blessing. They must have attached directions in due and exact form and customary language, about their use, application, dosage and formula and should never be injurious but useful and harmless. We are convinced that after an appropriate examination without prejudice you will come to the conclusion that our specialities prepared and put up in such careful manner and popular form intelligible for one and all can only assist and further you in your general and philanthropic work and that their propagation is advantageous for the population under the aforementioned circumstances. We therefore beg to ask you to kindly assist us in our endeavours. Further samples, price lists, and literature which in time will also be translated in common-sense Chinese are willingly at your disposal."

The gentlemen quoted above seem to think the distinction between patent and proprietary medicines "prepared on the best scientific principles" is all important and the fact of the general and indiscriminate selling in China of any powerful drug a matter of no importance.

Let us, at least, as medical men and as missionaries, set the seal of disapproval to this wholesale exploitation of the suffering masses of China for the benefit of the pockets of the drug houses of any country however reliable these firms may be in all other respects. We can not approve of these methods of foisting their drugs on the general public of China. The Chinese are bravely shaking off opium. Let us pray that they will not fall victims to the drugs of all the other countries.
Preventive Medicine Educational Exhibit, C. M. M. A. Conference.

The Program Committee for the coming Shanghai Conference has decided on a Preventive Medicine Educational Exhibit. It has appointed a committee, and a careful reading of the following notice is urged:

"This proposed exhibit has a definite purpose to fulfil, namely, to show just what has been done in China along preventive lines up to the present time. The committee does not know what has been done in your city. If the exhibit is to amount to anything therefore, you must co-operate with us. We shall be glad to receive:—

(1) Samples of all tracts, posters, charts, handwritten notices, pictures, paintings by Chinese artists, models, mounted specimens, etc. which you have used or which have been used in your district. These should be accompanied by a statement as to their value in arousing interest and arresting attention. The committee would like to know what has been helpful, and also what has not been. State the extent to which what you send was used.

(2) Reports covering
   a. Preventable diseases in your district in their order of prevalence.
   b. Diseases you have taken up (if not fully covered in 1.).
   c. Problems of sanitation and hygiene which you have discussed with men in your district.
   d. Methods you have followed in fighting diseases or getting in touch with the people to discuss problems of health in your district.
   c. Results so far as they have come to your attention.

(3) Pictures of conditions in your city relating to epidemics, sanitation. Scenes in your hospital or city during epidemics. Patients with preventable diseases. Pictures of your isolation building if you have one.

(4) Suggestions to the committee as to how this proposed exhibit can be made of greatest help to us all. Since this is the first time such an exhibit has been undertaken, the committee is very much open to suggestions.

The committee wants to know what you did and how. Please do not be so modest as to say, "The little I have done cannot possibly be of interest to the other members." If your work for prevention is as yet no more than the exhortation, "Don't spit on the floor. Use this,"
we want to know that fact. And please do not say, "I'm too busy." If everybody says that, the exhibit will be a dead one surely.

And the committee would graciously ask that you do it now. If pictures are sent in this summer, as many as can be will be made into lantern slides. A large wall map of China will be prepared showing the location of your hospital. All information sent in will be charted on this map by colored buttons so far as possible. Display racks and tables will have to be made. The exhibit will take on the nature of a survey if every member responds to this appeal. The committee is quite willing to work if you give us the work to do. But we have nothing up our sleeve, and have been appointed to act merely as a clearing house for ideas and material.

Please write your name and address on whatever you send. All material sent in will gladly be returned if you so desire.

This matter is of sufficient importance to merit a personal appeal to each member of the Association. But the writing of so many letters is not feasible. This is a personal appeal. The exhibit will be successful only as there is co-operation. Even though you may be prevented from attending the Conference in person, you can still be present in a helpful way by acting on this request.

Please address all letters and packages to

W. W. Peter,
3 Quinsan Gardens, Shanghai.

ITEMS OF INTEREST.

The Union Medical College of Seoul, Korea, graduated fifteen men in March of this year. Six of these remain with the college and hospital to serve as hospital interns and assistants in the dispensary, and some of them are assisting in the teaching. Of the remainder, six expect to act as assistants in other mission hospitals in Korea. All of the graduates and in fact all of the students in the college are Christians.

The present college year began April 6th, with fifty-six men in the regular classes and twenty-one in the preparatory class.


Dr. Dugald Christie, C. M. G., of Manchuria, has brought out a book entitled "Thirty Years in Mukden, 1885-1913" of which Messrs. Constable and Co. of London are the publishers.
At the first commencement day of the North China Union Medical College for Women, which was held this year, there were at least 1,000 persons present, mostly women, to witness the first two graduates of the institution receive their diplomas.

The government and gentry have granted nearly 10,000 acres of land thirty miles north of Nanking to the Colonization Association for the colonizing work under Mr. Bailie, who has been set aside by the University of Nanking for this special work.

Coordination and standardization of all the educational work of the missions of the four provinces of East Central China is being effected, and a system of education is being developed that it is hoped will assist and stimulate the government system.

Dr. Judson and other members of the China Commission of the Rockefeller Foundation reached China in April. The Commission has come for the purpose of investigating existing conditions of sanitation and hygiene in China with the agencies at present engaged in medical and sanitary work throughout the country.

THE FALLING BIRTH-RATE IN SCOTLAND.

Scotland exhibits the same phenomenon of a falling birth-rate as has been reported from time to time for England. The rate for 1913 was 25.5 per thousand, the lowest yet recorded, being 28 per cent. less than the rate for 1876.

INAUGURATION OF AN AMBULANCE SYSTEM IN LONDON.

Strange as it may appear, London has been without any centralized ambulance system up to the present. In cases of accident the police remove injured persons to the hospital by means of hand ambulances. The council has now decided on an ambulance system sufficient to provide for 27,770 cases of accidents and illness a year. The scheme will be under the control of the fire department, subject to the advice on medical questions of the health officer.—J. A. M. A.

On June 15th the International Opium Conference was held at the Hague.

The corner stone of the new Calcutta School of Tropical Medicine was laid on February 24. The location of this new School of Tropical Medicine has been aptly chosen, as over a third of the deaths in Calcutta are from tropical diseases. The plans provide for a large and
fully equipped building to accommodate several full-time research workers, besides the regular teaching staff. The government has provided $195,000 for the site and laboratories and will contribute to its support. The school, which is expected to be finished within a year, will be open to students from all parts of the world.—(Am. J. T. Med.)

The Loudon School of Tropical Medicine has decided to give two courses a year in tropical sanitation and hygiene. The courses will begin on the first of May and the first of October and will last six weeks. The work, which is expected to be as practical as possible, will include hygiene and sanitation in the tropics, care of sick on board ship in the tropics, port hygiene, sanitary engineering and surveying, helminthology, protozoology, bacteriology, and medical entomology. (id.)

Mr. Wickliffe Rose, director of the commission appointed to institute a campaign against ankylostomiasis and other tropical diseases, and Dr. Sandwith, of the London School of Tropical Medicine, have gone to Egypt, Ceylon, the Federated Malay States, and the Philippine Islands, to carry out work similar to that being done by the American commission. (id.)

The American Posture League was incorporated in Albany, N. Y., April 2. The aim of the organization is the improvement of health and efficiency by teaching the public correct sitting and standing positions. It also hopes to improve the seating accommodations of schools, public audience rooms, factories, shops, etc. (id.)

A committee was recently appointed in France by the Chamber of Deputies to investigate the sanitary conditions in the army. They report that next to Great Britain the French soldiers are the best furnished in Europe. Insufficient clothing, especially shoes, has been one cause of disease, as has also lack of care on the part of superior officers in looking after the health of their men. Another cause of the high morbidity and mortality is the crowding of the barracks, many of which should be put in a more sanitary condition. (id.)

Over 13,000,000 pounds of food were condemned and destroyed in New York City by the Department of Health during 1913. Two thousand seven hundred establishments where food is prepared were kept under supervision, and 3,200 arrests were made for violation of the pure food laws. (id.)
The National Association for the Study and Prevention of Tuberculosis has recently issued a circular setting forth some of the things accomplished by the association, and some of the things yet to be done. Eight hundred state and local anti-tuberculosis societies have been formed in almost every state in the Union. Five hundred hospitals and sanatoria with over 30,000 beds; 400 dispensaries with more than 1,000 physicians, and 150 open-air schools for consumptive and anemic children have been established. Active campaigns have been carried on by the association in forty States and Territories, and 100,000,000 pamphlets on tuberculosis have been distributed. (id.)

On Monday, March 23rd, 1914, there assembled at the Savoy Hotel in London a representative collection of many of the most distinguished personages in the Church, in the Law, in Medicine, and in Science, to do honor to Surgeon-General W. C. Gorgas, M.B., Surgeon General, Medical Department, United States, who was responsible for the wonderful result in the control of sanitation in the construction of the Panama Canal.

BOYS AS SANITARY INSPECTORS.

Using boys to keep the streets clean was the happy inspiration of Policeman Miller of New York City. He organized some street urchins into a sanitary squad of inspectors who reported to him any instances where peddlers or housewives threw rubbish into the streets. A few prosecutions convinced the culprits that health laws are serious matters, not fads of the finical. East Broadway, which is said to have been the dirtiest street in the world, is now the cleanest. (Am Med.)
Book Reviews.


This is a handy little manual, based on William's Manual of Bacteriology, as a substitute for the revision of the same.

It is divided into 3 parts,—Part 1. Bacteriological Technic, including the various methods, preparation of media, collection of material, cultivation of micro-organisms, etc. Part 2 deals with the general biology of micro-organisms, taking up their morphology, classification and physiology, together with brief discussions of parasitism, reaction of host, immunity, etc. Part 3 takes up the specific micro-organisms in detail,—molds, yeasts, cocci, bacteria, spirochetes and protozoa, being concerned especially with the pathogenic organisms.

The work is gotten out in very handy form, clear type, fine illustrations and very useful ones, and will be of great value to anyone wishing to do special work with micro-organisms. One very good feature about the book is the numerous references given to other works and literature, for the benefit of those who wish to go into certain lines more in detail.

H. H. M.


This little book is one of the Blakiston Co's. series of Quiz-compends which are well known to almost everyone who has been a medical student. Their advantage lies in their condensed form and the ease with which they can be kept up to date. The latter point is shown in this book by the inclusion of such recent work as the cultivation of the Plasmodii Falciparum and Vivax, by Bass, and of Treponema Pallidum, by Noguchi.

The usual scheme of a general discussion of Bacteria, Infection, Immunity, etc., followed by detailed descriptions of the various bacteria, is followed out. Animal parasites are also included in the book, making it a very handy little volume.

H. H. M.

**Medical and Surgical Reports of the Episcopal Hospital, Philadelphia. Vol. I. 1913.**

This valuable volume is a report on the work done at the Episcopal Hospital during the year 1912, together with papers written by members of the staff, and read on various occasions throughout the year. The idea is an excellent one in making a collection of contributions to
Book Reviews.

medical literature, which are thus preserved and rendered obtainable, when otherwise they might (many of them) never see the light of day and thus be lost to the profession. They represent the work of men who have the advantage of a large clinical experience with an opportunity for careful observation of cases.

The range of subjects discussed is of course a wide one, including medical, surgical, and obstetrical conditions, together with certain of the specialties. The work is produced in attractive form,—clear type and excellent illustrations.

H. H. M.

BOOK NOTICES.


P. Blakiston’s Son & Co., announce the following recently published books:—


OPHTHALMIC SURGERY. By Charles H. Beard, M. D. Second Revised and Enlarged Edition. With 9 Plates and 374 other illustrations. Octavo XI+745 pages. Cloth $5.00. This edition has been enlarged by 71 pages and contains 79 more illustrations than the first.

BIOCHEMICAL DRUG ASSAY METHODS. With Special Reference to Pharmacodynamic Standardization of Drugs. By Paul S. Pittenger, Ph. G., Ph. C., Phar, D. Edited by F. E. Stewart, M.D., Ph.G. With 88 illustrations. 12mo. Cloth, $1.50.

THE DIAGNOSIS AND TREATMENT OF DIGESTIVE DISEASES. By George M. Niles, M.D. With a colored plate and 86 text illustrations. Octavo. XII+597 pages. Cloth. $5.00.


We acknowledge, with thanks, the receipt of the following book for review:—


We acknowledge with thanks the receipt of a copy of "Lectures on Osteology" by Dr. Thos. Cochrane and Dr. E. T. Hsieh of the Union Medical College, Peking. This new addition to the armamentarium of those who teach in Chinese will be welcomed by the Association. It is arranged to be used along with the Publishing Committee’s Atlas of Anatomy. Price is $1.00 per copy or $1.10 postpaid. Can be had from secretary of U. M. C., Peking.

A. C. H.
REPORT FOR 1913 OF THE CENTRAL CHINA BRANCH OF THE C.M.M.A.

1913 was a good average year for the C. C. M. M. A.; the programme has been carried through without a hitch, except that the Wuchang meeting was held at Wu Shen Miao on the north side of the river. After this meeting, held on June 11th, the nurses' certificates (13) and the Hodge Memorial medals, for the best nurse of the year, for the past four years, were presented to the successful candidates.

The attendance averaged 6.2, at the nine meetings which were held; at five of them twenty cases or specimens were exhibited. Amongst these were:

A thoracic aneurism, in a foreigner, which had caused death by slow starvation; an aneurism of the ankle, probably traumatic, which had caused almost complete absorption of the astragalus and entailed amputation of the foot; a case of pseudo-hypertrophic-musculo-paralysis; a younger brother, also shown, had infantile paralysis; a case of ascites which simulated ovarian cyst and in which the parietal peritoneum was thickened ¼ inch or so and of gristly consistence, the spleen also was enlarged and white but whether that was peritoneal or not was unknown.

The Branch was unfortunate in losing the services of its secretary, Dr. Crawford, owing to her going home on sick leave early in the year; while later on Dr. Merrins left for furlough; but in May we had the pleasure of welcoming Dr. Hilda Byles on her return from furlough, and Dr. Heyward on his coming to Hankow to take up work in the Union Medical College.

At the first meeting when the matter of following up those who have been patients in our hospitals was discussed, it was decided that as it was a matter that required the co-operation of the clerical and the medical missionaries of all missions working in the district, the matter should be taken up by the Provincial Council.

After the President's address on September 17th, the opinion was expressed and warmly supported that at least one paper every year should consider the evangelistic aspects of our work.

As the Branch was without information as to the working of the Nurses' Association Examinations the Nursing Committee was continued for 1914.

Subject to the approval of the Publications Committee of the C. M. M. A. Dr. Massey was asked to act as general editor of a revised edition of the Nursing Book, which was to be in Mandarin. This appointment was endorsed by the Publication Committee in January 1914.

The office bearers for 1914 are:

President ... Dr. Heyward.
Vice-president, Dr. Masscy.
Secretary ... Dr. Wilkinson, W.M.S., Hankow.
Treasurer ... Dr. MacWille, A.C.M., Wuchang.

Nursing Committee:

Dr. Tatchell, Hankow.
Dr. Wilkinson, "
Miss Bell, "

Charles W. Somerville,
Hon. Sec. for 1913.
Nurses' Association.

We hope in the next issue to publish a report of the N. A. C. Conference, which will be held while this number is in the printers' hands.

We are pleased to have this interesting account from our Southern branch, and congratulate our friends on their success. Many of us who are still struggling to give our nurses training of a similar "thorough equipment" will take courage and go on with renewed hope, knowing success awaits perseverance.

A. Clark, Gen. Sec. N. A. C.

Futsing Nurses' Training School.

Miss A. L. Leybourn.

Futsing is a hsien city about thirty miles south of Foochow; the Women's Hospital was opened in 1901, and that year the in-patients numbered 162. In 1913 we had 1,170 under treatment (including the fifty-three in the wards on January 1st); of these, 244 were maternity cases. We have one hundred and thirty beds; thirty-five of these are in the maternity block, which is quite separate from the general hospital.

The history of our efforts to secure and train nurses is interesting and amusing, and for the first nine years we did not succeed very well. It was difficult to obtain the right type of woman and, if obtained, she objected to the "nursing" part of the work. But in January 1910 we organized our first "class;" the probationers signed a three years' agreement, promising to nurse according to western ideals, and we undertook to train them in the proper methods and give them certificates if the necessary examinations were successfully passed.

Last year our C. M. S. Conference acknowledged our hospital as a training school. We have now twenty nurses and probationers; the two seniors have their certificates and are preparing to take the higher grade examination at the end of this year; four are in their third year, eight in their second, and six have not yet "signed on," as they have not completed their three months' probation. We are gradually raising the standard, and our new probationers have had a better education than the seniors. We require that all would-be probationers shall be baptized Christians of fair education; thoroughly familiar with Romanized reading and writing (Foochow dialect). We prefer married women, but admit unmarried ones of twenty-five years and upwards, on the same terms as the others, but younger ones only on special
agreement, omitting midwifery from the course. The nurses and probationers change duty every three months; they take turns in wards and dispensary; they begin to learn monthly nursing towards the end of the first year and midwifery in the second year.

We give regular lectures in all the usual subjects, following the N. A. C. syllabus, the doctor teaching physiology, materia medica, therapeutics, and midwifery. We have excellent models and plenty of clinical material. The nursing lectures extend over the three years; in the first they have "Principles and Practice of Nursing," in the second "Surgical Nursing" with preparation of appliances, care of instruments, etc., and in the third year "Special Medical Diseases" with nursing and treatment. All the teaching is in the vernacular, but terms and nomenclature in English, and materia medica in Latin according to the B. P.; the lectures have all to be written out by the nurses, and theory and practice are taught together. Examinations are held every six months, written and oral, and certificates can be obtained after three years' training, with midwifery included, up to the C. M. B. standard.

The higher grade certificate can be obtained, after four years' training, by those nurses we consider suitable. It includes teeth extraction, minor surgery (abscesses, etc.), vaccination, first aid, and operative midwifery. Our object is to send out well-trained women to work as district nurses in their own homes, to prevent the terrible infantile and maternal mortality due to ignorance and dirt, and, since most of our nurses will be several days' journey away from hospital or doctor, to have them thoroughly equipped for emergencies.

The hospital motto is "Preaching and Healing." Every nurse is responsible for teaching the patients under her care, and every afternoon from 2-3:30 is employed in this work. There are three graded Bible Readings; and we hope that wherever our nurses go they will never forget their double commission "to preach the Gospel and heal the sick," and thus hasten the coming of Christ's Kingdom among their own people.

Our foreign staff consists of one doctor and two nurses, viz., Mabel C. Poulter, M.B., Ch.B., Miss B. A. M. Thomas, and A. L. Leybourn.

The probationers receive 50 cts. a month and food

,, second year's nurses $1.00 ,, ,, ,,  
,, third ,, ,, $1.50 ,, ,, ,,  

and we provide the uniform.
ANTIMONY IN THERAPEUTICS.

Kolle, Hartoch, Rothermundt, and Schürman (Deutsch. Med. Woch. 1913, xxxix, 825) have made an important contribution as to the therapeutic uses of antimony. Their experiments were confined to the treatment of trypanosomiasis but will doubtless be extended to include other parasitic infections. The pentavalent compounds of antimony were found weak pharmacologically and of no great value in dealing with trypanosomiasis; but of the trivalent salts, trioxide of antimony in particular has proved of real use. Administered intramuscularly in a 30 per cent. oil emulsion, the authors were able, with a single injection, to cure experimental trypanosome infections in mice, 1/60 of the fatal dose being amply sufficient for the purpose. In 100 per cent. of cases the mice were sterilized after one or two doses.

THE ENERGY INDEX.

"The best means which we have at present for determining the expended energy of the circulatory system is the use of the mercury manometer. With this instrument, by the auscultatory method, we can accurately measure the arterial pressure at the time of systole and at the time of diastole of the heart. The systole gives us the energy factor in the work of the heart. The diastole gives us the energy factor in the peripheral resistance. From the pulse-rate we know how many systoles and how many diastoles to each minute there are in the arterial tree.

For example, if the maximum pressure is 120 mm. Hg, the minimum pressure 70 mm. Hg and the pulse-rate 72 per minute, the exertion in one minute would be:

In systole: \(120 \times 72 = 8,640\) mm. Hg.
In diastole: \(70 \times 72 = 5,040\) mm. Hg.
In both: \(190 \times 72 = 13,680\) mm. Hg.

This, according to the most practical means we have, represents the total effort exerted per minute by the cardiovascular system. We may call it the energy index or S. D. R. Index.

The advantages of this method of indicating the expended energy of the cardiovascular system are that we are not deceived by the high maximum pressure when it is combined with a relatively low minimum pressure, or vice versa. It is a well-established clinical fact that the two pressures do not always tend in the same direction, and that one or the other may rise or fall.

While the number of pulse-beats per minute is not the greatest factor in producing high blood pressure, nevertheless a greater number of systoles represents a greater total energy expenditure and a greater wear and tear.

The writer gives an instructive series of 289 cases where young men between the ages of 15 and 30 years had their blood pressure recorded and energy index determined. In 41 cases the total energy index varied between 12,024 and 24,552. In 76 cases, with a somewhat higher blood pressure, the index ranged between 14,592 and 33,000. These figures suffice to show the great limits between which the total energy index may vary under given conditions of blood pressure and pulse rate. Judging from the various observations and in the light of what is
known to be the normal maximum, the normal minimum pressure and the pulse rate, it appears that the highest energy index in the normal person is close to 20,000 mm. of mercury per minute.''

(J. H. Barack, in the *Journal of the American Medical Association*, 1914, lxii, 525).

**Department of Surgery.**

**NEOSALVARSAN AND SALVARSAN COMPARED.**

Nelson and Haines in an article under the title "Observations of the Results of Nine Months' Experience with Neosalvarsan at the United States Military Prison, Fort Leavenworth, Kansas," discuss and analyze the treatment of one hundred and eight cases of syphilis with three hundred and forty intravenous injections of neosalvarsan. They draw the following conclusions as to the relative value of neosalvarsan.

"After a careful analysis of the data which have been given in this paper, we believe that the following conclusions are warranted:

1. Five injections of neosalvarsan, combined with intensive mercurial treatment, have failed to show as good curative results, as shown by the serum reactions, as did one dose of salvarsan.

2. In order to "cure" 70 or 80 per cent. of our cases it will be necessary to use four or five times as much neosalvarsan as salvarsan.

3. In view of the increased number of injections of neosalvarsan to bring about "cures" as stated in Conclusion 2, it becomes a far more expensive drug to use.

4. The drug should be used which will bring about the best results in the shortest possible time."

**ABORTIVE TREATMENT OF SYphilis.**

Henry J. Nichols in an article "Syphilis as a Public Health Question" in *Journal of the American Medical Association*, May 16, 1914, says: "It would seem that hospitals are not doing their full duty to their clientele unless they make provision for treating the early stages of syphilis.

"Scientifically, the most hopeful outcome of all the recent work in syphilis is the possibility of diagnosing the disease in the primary stage and of making an immediate and radical cure by the combination of salvarsan and mercury. Abortive treatment of the disease in the primary stage has been the dream of syphilologists for many years, but nearly all attempts have failed, or, in case of the few so-called successful instances, the diagnosis has been questioned. But with our present sure method of diagnosis by finding *Spirochaeta pallida* and using salvarsan, which is a more specific remedy than we have hitherto possessed, the dream has at last come true and this method of handling syphilis rests on a firm basis. It is something new and revolutionary. The best series of cases I have seen to illustrate this point has been recently reported by Boas from Copenhagen and is summarized in Table 1. The treatment in all cases was practically the same, that is, two intravenous injections of salvarsan and fifty inunctions of 3 gm. of mercury.

**Table 1.—Results from Treatment with Salvarsan and Mercury.**

<table>
<thead>
<tr>
<th>Lesions</th>
<th>Cases.</th>
<th>Months Observed</th>
<th>No. Relapses</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chancre (Sp. + W. R. —)</td>
<td>30</td>
<td>2 to 75</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Chancre (W. R. —)</td>
<td>30</td>
<td>2 to 75</td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td>Fresh Secondaries</td>
<td>62</td>
<td>2 to 19</td>
<td>48</td>
<td>14</td>
</tr>
</tbody>
</table>
It will be seen that the percentage of relapse rises steadily as the disease goes on. As a control, a number of cases were treated with the same amount of mercury alone, as appears in Table 2.

**Table 2.—Cases Treated with Mercury Alone.**

<table>
<thead>
<tr>
<th>Lesions</th>
<th>Cases</th>
<th>Months Observed</th>
<th>No Relapse</th>
<th>Relapse</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chancre (Sp. &amp; W. R. —)</td>
<td>8</td>
<td>2 to 5</td>
<td>0</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Chancre (W. R. —)</td>
<td>13</td>
<td>1 to 5</td>
<td>0</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>Fresh secondaries</td>
<td>72</td>
<td>1 to 51</td>
<td>4</td>
<td>68</td>
<td>94</td>
</tr>
</tbody>
</table>

These cases illustrate the usual failure of mercury to abort the disease, and the four cases out of ninety-three which did not relapse probably passed into the so-called latent stage.

In the Army we have records of similar results.

**GASTROINTESTINAL STASIS.**

H. F. Graham in N. Y. Med. Jour. gives the following interesting chart with comments.

Hardly any issue of a medical journal can be taken up of late without finding in it some reference to gastrointestinal stasis. The references which occur in these articles will be more easily understood by a little study of the accompanying diagram which shows many of the factors in the causation of this disease. In addition to those causes of stasis which are capable of being shown in a diagram, may be mentioned, gastric atony, gastric dilatation, cancer or ulcer of the stomach or intestines, stricture of the intestines, spastic or chronic constipation, constipation due to other diseases such as tabes dorsalis, chronic peritonitis, and pressure from without.

---

**Fig.—Diagram, showing causes of gastrointestinal stasis (Graham).**

- 1. Prolapsed stomach.
- 3. Pyloric obstruction.
- 4. Adhesions at the duodenum.
- 5. Mesenteric ileus.
- 6. Adhesions at duodenjejunal angle.
- 7. Lapie’s kink.
- 8. Incompetent ileocecal valve.
- 10. Mobile and dilated cecum.
- 12. Adhesions at the hepatic flexure of the colon.
- 14. Adhesions at the splenic flexure of the colon.
- 15. Adhesions at the sigmoid.
- 16. Angulation at the rectosigmoid junction.
The condemnation of relying upon hypodermic injections of quinine in the treatment of malaria has been from time to time insisted upon in the pages of this journal; the surgical disadvantages were frequently brought prominently forward, and the therapeutic value was decried. Time was, and that but a few years ago, when a practitioner of medicine who refused to give hypodermics of quinine in severe malaria was looked upon as old-fashioned and not in harmony with the scientific advances of the day. After a lack of wisdom in these matters there is nowadays a general outcry against quinine being so given. Captain MacGilchrist, I. M. S., in an article published in the Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India, as long ago as 1911 (No. 41 Memoir) stated "that quinine and its salts are fundamentally unsuited for hypodermic use." In No. 43 of the same Memoirs, 1911, Colonel Sir David Semple, R. A. M. C., brought home to us the danger of tetanus occurring from these injections; and now Sir Ronald Ross, K. C. B, F. R. S., states that "I really do not know why this form of medication is continued in malaria." He further states (Medical Times, March 7, 1914): "It appears to me that the only cases in which intramuscular injection is called for are those in which intestinal absorption may be checked by very marked intestinal affections, or where patients are not to be persuaded to take the drug by the mouth at all. For severe cases, to judge by the experimental evidence, the subcutaneous injections are much worse than useless, because the patient may really not be absorbing any of the drug just at the critical moment when it is necessary that he should absorb a large quantity; and I fancy that a considerable number of the fatal cases are due to this. Where the drug cannot be given by the mouth in very severe cases, the intravenous injection in extreme dilution seems to be much preferable to the intramuscular one. I am aware that opposite opinions have been cited, but do not think that their weight is sufficient to convince us."

Surely, therefore, we shall hear no more of quinine being given hypodermically by British practitioners. Hypodermic medication for many complaints has come to us from France, and we cannot hope to find that the French practitioner will recede from his position, but let us hope that experience will teach us to give up a method of administering quinine which never had anything to recommend it.—Journal of Tropical Medicine, March 16th, 1914.

Some of the strongest language we have read in the pages of a scientific journal are here quoted on the very important subject of the intramuscular injection of quinine salts in malaria. Amongst other remarks we are told that there "is a general outcry" against quinine being so given.

Passing over the fact that this cry has not made itself very much heard in China yet, since it may have been because of our deafness, this leading article has been reprinted in its entirety; we trust that any of us who still find this
method to have a distinct therapeutic value will not be alarmed by the array of names of Indian authorities against the practice.

One of the most weighty reasons given is the fear of the onset of tetanus after such injections; have any of us in any part of China ever seen such a terrible sequel in spite of the tens of thousands of occasions when we have used them? We are told that "in severe cases subcutaneous injections are much worse than useless for reasons of non-absorption" and yet how many of us have been able to save the lives of even comatose sufferers from malaria by means of this worse than useless method.

Finally, is it in good taste to sneer at the country of the immortal Pasteur by suggesting that "we cannot hope to find that the French practitioner will recede from his position," the suggestion amounting to a deliberate charge that certain men prefer error to the truth. Surely i! would be more charitable to suppose that "experience will teach not only us"—referring to the very elect—but also our Gallic friends in such sad need of instruction. Is it just possible that experience may have already taught us that this method of administration has a great deal to recommend it?

A. F. C.

TREATMENT OF CHRONIC ULCERS OF THE LEG WITH FROG FLESH POULTICE.

Note by Lim Boon Keng, M.B., Edin.

In a tropical practice, especially in connection with mining or planting operations, the rapid treatment of ulcers of the legs assumes an economic importance not to be neglected. For many reasons neither the coolies nor the employers of labour like the rest in bed which is so conducive to rapid recovery. Experience teaches that as soon as pain has subsided most coolies prefer to return to work, with the result that simple ulcers become chronic and callous and take months to heal.

The present writer has treated quite a number of chronic ulcers with a cold poultice made from the flesh of freshly killed frogs. Pain and irritation subside in a couple of days, and new skin and healthy granulations grow rapidly. Even the chronic ulcers of tubercular leprosy yield to this simple treatment: in one case reported by me fifteen years ago to the local branch of the British Medical Association, the leprous sores on the malleoli of both legs healed up completely in three or four months after having resisted antiseptic and other treatment for years at the hands of the élite of the local profession. Rest was not insisted on in any of my cases.

The Procedure. — Thoroughly cleanse the ulcer with sterilized water so as to exclude the possibility of a claim that antiseptics used may have an effect on the future cure. Kill two or three large frogs (Rana esculenta), remove the skin, having previously washed the animals in sterilized water. Remove the head with the mouth, pharynx and intestinal organs with stout scissors and remove the flesh from the femora and back. Pound the flesh in a clean mortar and spread on muslin and apply to the sore. Sometimes I have used the bones too.

The Rationale. — The explanation of the clinical fact has not been worked out in detail. What part the frog serum or the white cells of the frog blood play in the healing process I have not had time to investigate; but the successes indicate that the application stops bacterial activity and enables the reparative
process to proceed without hindrance.—Journal of Tropical Medicine, February 2nd, 1914.

—

AN UNUSUAL CASE OF ANKYLOSTOMA INFECTION.

The patient, a middle-aged Englishwoman, was first seen on October 17th, 1913, when she complained of intense itching in various parts of her body; it was most intolerable when on the hands and feet. This itching, which spared no part of the body, was always intense in the afternoon, lasting a few hours, then passing off. She looked white and ill, and had a furred tongue, but no rise of temperature. She complained, not only of want of appetite, but of severe pains in the epigastric region. Her history was that she had been some years in Cairo and had come back from England with her husband, who had leave, arriving on June 11th. On August 29th she felt very ill, having attacks of stomach pain, sickness, and diarrhoea of an intermittent kind. She could not eat and lost several stones in weight. Shortly afterwards, the itching came on daily in bouts which compelled her to scratch and rub the places till, as she said, " she got something out," when the itching stopped. I gave alkalis, bromides, and salicylates without benefit. One day, a week later, she brought a grown-up daughter with her, who described how she had seen on her mother's finger-tips a sharp needle-like object push its way through the skin at the point of itching. I asked them to bring me some if they could. A day later I got three small thread-like objects in spirit much macerated, and under the microscope showing a structure of some sort not recognizable by me. Next day they brought some more of these in a small box. One had been taken from the edge of the upper lip, and under the microscope proved to be a perfect specimen of an embryo of Ankylostoma duodenale. Subsequently these appeared in enormous numbers in the mouth, throat, cheek, windpipe, where they caused much cough and retching. They also pushed their way out of the tongue. The treatment was by thymol, followed by the administration of sulphur tabloids for days. All the drug was thoroughly absorbed. The cure was rapid, and I heard nothing more of my patient subsequently when the itching had stopped, which seemed to indicate that this huge migration of embryos to the periphery had stopped.

As far as I am aware this case is unique. Looss has proved that these embryos will penetrate the skin and find their way to the duodenum. I can find no cases recorded of the converse, and I could not elicit from my patient any determining factors which would have impelled the embryo worms to leave the duodenum and push their way from the arterioles right through the various surfaces of the body. Nor can I advance any theory for my own satisfaction. She was anaemic, with a large increase of white blood corpuscles.


SEGREGATION OF KALA-AZAR.

J. Dodds Price and Leonard Rogers report their experiences of this fatal and persistent disease in India. They have found that everything requisite to stamp out an epidemic is to segregate all new laborers in new quarters, placed not less than 300 yards distant from infected lines. It is possible to move into these new quarters all families from infected lines. The
infected lines are allowed to remain, and it is found that ultimately every previously uninfected person will develop the disease. Further studies of epidemiology tell strongly against the transmission of kala-azar by means of flying insects, and investigations point strongly to the bedbug as the intermediate host. It is possible to infect a certain very small proportion of bedbugs with the parasite, and, while the proportion is small, it is to be remembered that the spread of the disease is relatively slow, coinciding exactly with the relative infrequency of insect infection. Destruction of bugs in the infected hut has been tried, but to be sufficiently thorough it must include destruction of everything in the huts save the walls themselves, and it is probable that even these cannot be heated deeply enough to kill all the contained bugs.—British Medical Journal, February 7th, 1914.

**Diseases of the Eye.**

Under the charge of Dr. J. B. Neal.

**TINCTURE OF IODINE IN OPHTHALMIC PRACTICE.**

JACQUEAU.—In spite of the irritation which might be supposed to follow the use of iodine in affections of the eye, recent observations by the writer show that with proper precautions it is of great value in corneal affections and in connection with operations. After numerous trials he was convinced that attempts to combine iodine with an anaesthetic substance were unsuccessful, and that aqueous solutions present no advantage over alcoholic ones as regards tolerance while they are less penetrating and less active. He recommends the tincture of iodine of the Codex with the addition of 0.75 gm. iodide of potassium to 20 gm. of the tincture, which improves its keeping properties and renders it more easy to dilute it with water when required.

As a lotion for the eye a solution of iodine is not to be recommended. Even in dilutions below 1 in 50 it causes irritation and the benefit is less than from other substances in common use. These observations apply solely to ordinary conjunctivitis as it has not been used in purulent ophthalmia. It is best applied directly to the lesion after anaesthesia with cocaine. In affections of the lids, iodine has long been used though not to the extent it deserves. In old marginal blepharitis with crusts and ulcers a few applications of iodine along the roots of the eye-lashes give results superior even to those of yellow oxide of mercury.

In traumatic ulcers of the cornea, especially those that from the beginning present the slightly yellowish colour, which is often the prelude to severe infection, the early application of the tincture may save the eye. This method of treatment is of special importance for general practitioners through whose hands many of these cases pass in their earlier stages, when prevention of infection is possible. The technique is simple. The eye is first rendered anaesthetic by instillation of 1 or 2 drops of a 1 to 20 or 1 to 30 solution of cocaine. Then with a few fibres of cotton wool wound round the sharpened extremity of a wooden match the tincture of iodine is applied once or several times to the lesion according to the degree of infection present. No speculum or other
instrument is required; the patient is directed to look in a suitable direction to fix the eye in a convenient position and the lids are gently separated with the fingers of the left hand. If the cocaine has been properly applied and the separation of the lids is maintained for a few seconds to allow the iodine to dry without mixture with the tears there is no pain and the action is confined to the part affected without diffusion over the healthy tissues. The match and cotton wool are preferable to a glass rod as the solution is more accurately applied at the proper spot and in the quantity desired. The application may be repeated daily or even twice daily if necessary. In comparing this method with others such as the application of the cautery the writer states that while some corneal infections are so severe that nothing arrests them, the use of iodine will in some cases arrest and in others hinder the rapid progress of an infected corneal ulcer, so that it has the effect of saving the eye from complete destruction.

Tincture of iodine is useful in operations on the eye. While some operations, such as iridectomy with proper antiseptic precautions, may be regarded as free from the risks of infective complications, inflammatory changes of varying severity are not infrequent after operations for cataract. These the writer believes may be almost entirely avoided by the use of iodine applied as follows before and after the operation. In addition to the usual antiseptic precautions, the ciliary margins of both lids are carefully painted with tincture of iodine the evening before operation or, should the circumstance require it, for several days before. This application is repeated immediately before operation, and after the corneal flap is replaced a little of the solution is applied to the line of incision by means of a match before the dressing is adjusted. This has been tested by the writer in 37 cases of cataract, in none of which has the slightest inflammatory change been observed. The wounds seemed to cicatrize more quickly and painlessly than usual. While further experience is necessary to finally determine its position, the writer regards tincture of iodine thus used as entitled to a place in ophthalmology as high as in general surgery.—*The Medical Review* (quoted in *The Antiseptic*).

MYOPIA PREVENTION BY TEACHERS.

W. H. Bates states that "myopia with elongation of the eyeball is incurable. It is usually acquired during school life. Acute myopia, spasm of the accommodation, or functional myopia is an early stage of incurable myopia. The cause of myopia is an effort to see distant objects." In corroboration of these statements he says: "1. Myopic refraction has always been produced in man and the lower animals when regarding unfamilar distant objects which require an effort. 2. Myopia was prevented in the public schools of Grand Forks, N. D., for eight years by methods which prevented an effort to see distant objects. 3. Myopia was always benefited by treatment suggested by the cause. 4. The cause suggested a method for the experimental production of myopia in dogs, rabbits, and cats. 5. Physicians, teachers, and others interested have investigated and confirmed these facts. 6. It should be emphasized that there is but one cause of myopia—an effort to see distant objects. There is no other."

Bates believes the cure for functional myopia, and therefore the prevention of axial myopia, is to have the children look at familiar
Preventive Medicine.

307

distant objects. He finds the Snellen test card excellent for this purpose. The letters should be memorized and looked at each day for a short time. The results of the use of this method in a number of the public schools of New York City are given and the author thinks they are most encouraging, over 1,000 pupils with defective sight obtaining normal vision in both eyes.—The American Journal of Ophthalmology (quoted in The Antiseptic).

CONCERNING THE USE OF TUBERCULIN IN OPHTHALMOLOGY.

W. B. Weidler, from his observations with the use of tuberculin, offers the following conclusions:

1. The Von Pirquet cutaneous reaction is quite certain in the young and fairly so in the adult, or those over seventeen years of age.

2. In the treatment of keratitis or affections of the cornea, with the Von Pirquet positive, the injections of tuberculin never failed to cure the condition.

3. In the case of tubercle of the choroid where the reaction was positive, injections of tuberculin were of undoubted value, as it restored the vision from 5/200 to 20/20, and in the case of uveitis it brought the vision from 20/70 to 20/30. In both of these cases no other general medication was allowed, nor was it permitted in any of our cases reported in the paper.

4. The evidence collected from his brief study has been such as to make us believe that tuberculin therapy should always be used where there is the slightest suspicion of tubercular manifestation, old or recent. We would also urge the more general use of tuberculin in the ophthalmic practice of medicine.—The American Journal of Ophthalmology (quoted in The Antiseptic).

Preventive Medicine.

Under the charge of Dr. W. W. Peters.

OUTLINES FOR LECTURES ON SANITATION AND HYGIENE.

E. I. Osgood, M.D., Chungow.

During the winter of 1912-13, we prepared, by request of the Nanking Medical Schools, a series of lectures on Sanitation and Hygiene. These we not only gave before the students in that school but also before schools and audiences composed of the general public at several other places.

In order that they might the better be understood by the general public we prepared them in the shape of posters which were written in large characters on sheets of paper and hung conspicuously in the lecture room. Thus the audience was the better able to follow these lectures the subjects of which the Chinese have had previously little knowledge.

With these we also prepared rude drawings to illustrate the various lectures. The shapes of the disease-producing germs, a sketch of the body with the alimentary canal showing, charts showing the comparative values of foods, and sketches of the mosquito and fly with their stages of growth, were thus produced. These can be easily drawn from textbooks on these subjects. Colored chalks add much to the attractiveness of the drawings.

Thinking that the outlines used might be of suggestive value to others who are seeking to instruct
The China Medical Journal.

the Chinese people along these lines, we have revised them and prepared them in both English and Chinese for the China Medical Journal. They are far from perfect and leave much for the speaker to supply. In many cases we have found them valuable as posters to post at our hospital door.

The textbooks which proved of the greatest value to us in preparing these lectures are a series by John Woodside Ritchie on Sanitation, Hygiene, and Physiology which have been especially published for schools in the Philippines. These have now been translated into Chinese and published in Mandarin by the Christian Literature Society.

The posters published in Shanghai by the Board of Health there and also special lectures given by Dr. Arthur Stanley and others were drawn on for some of the material we have used. We trust that these outlines will likewise be utilized. Revision and adaptation to local needs will only add to their value and correct errors which likely have slipped in.

PUBLIC SANITATION.

Public rights must take precedence of private rights.

A Board of Health is necessary for the prevention of the spread of diseases in a city.

The duties of a Board of Health comprise:

1. The studying of the causes of diseases.
2. The educating of the public in regard to laws of health.
3. The collecting of vital statistics, viz.: births, diseases, and deaths.
4. The quarantining of all contagious diseases.
5. The making of vaccination as universal as possible.
6. The cleaning of streets and inspecting of homes. One dirty yard will undo all their other work.
7. The banishing of mosquitoes, flies, rats, etc.
8. The compelling of shopkeepers to keep their food supplies in sanitary condition.
9. The erecting of lavatories and stopping of nuisances.
10. The seeking of a pure water supply for the city.
11. The providing of parks and playgrounds.

SCHOOL SANITATION.

1. School buildings should be placed on high land.
2. They should be so built that the walls and floors are always dry.
3. The buildings should have a maximum of light and air.
4. The playgrounds should be large and open.
5. Outbuildings should have hard floors easily cleaned.
6. The school should provide its own heating of water for drinking.
7. Desks and seats should be fitted to size of pupils.
8. Light should fall on desks from left side.
9. The harder studies should be taken in the morning, the easier in the afternoon.
10. There should be frequent rest periods for exercise.
11. The teachers should guard against contagious diseases among the children.

THE MOSQUITO.

1. Mosquitoes transmit malaria and yellow fever.
2. A distinct variety, the anopheles, transmits malaria.
3. It is distinguished by spots on wings, slanting position when standing and its long legs.
4. It breeds in any collection of still water.
5. A mosquito may lay 300 eggs and produce young in 10 to 20 days.
6. They must bite a malarial person before they can transmit malaria to other people.
7. The malaria germ performs one cycle in the mosquito and one in the human body.
8. The poison is conveyed in the saliva of the mosquito.
9. Incubation period of the germ is less than a week.
10. Mosquitoes rarely leave their breeding places more than 100 feet.
11. Destroy their breeding places by cleaning up all standing water after rains.
12. On ponds use 1 ounce of kerosene to 15 square feet of surface.
13. Screen sleeping quarters.
14. Use quinine when bitten by mosquitoes.
Correspondence.

DONG-KAU, via Foochow.

To the Editor of

"THE CHINA MEDICAL JOURNAL."

DEAR SIR: I do not know whether notice of the following case will be of interest to your readers. It is the first of the kind I have met with, but, since finding it, I see that Sir Patrick Manson in his last edition of "Tropical Diseases" mentions the fact that three or four varieties of Tinea may attack the axilla and cause boil or abscess. The case is as follows.

An old woman came for treatment for two ringworm areas on her arms several months ago. She did not persevere with the treatment till all the disease was gone. On October 26th she came in with three curious swellings close together and the size of a hazel nut in her axilla. These I treated with glycerine, belladonna, and hot fomentations. There was history of itching followed immediately by these swellings. They suppurated and broke down one at a time, exuding a dirty reddish pus, while tracks of inflamed lymphatics spread to the breast, the chest, and down the side. Further down the axilla a typical ordinary carbuncle developed and discharged from many openings. I examined pus from the three initial swellings and found it full of a fungus, white matted mycelium, red round club-like beads. The boils healed in a few days, the carbuncle more slowly. The patient, however, later developed a typical attack of malaria with rigors and sweating and had as a sequel an attack of broncho-pneumonia. The abundant sputum of the first three days of illness was orange colored, and contained the yellow powdery beads of a spreading fungus, the same as those found before, in the axillary abscess. After the third day as the pneumonia patches developed nearer the base of the lung, the sputum became normal. I imagine that the fauces and upper air passages were infected by the fungus but not the lower passages.

I see that Manson says Dhobie's Itch attacks the axilla and often intense irritation may result. There was no knowledge of ringworm, or other lesion, in the case till close on the opening of the boils, nor any trace of eruption or rings about the boils.

I am, yours truly,

MABEL PANTIN.

WEIHSIEN, Shantung, (May 14th, 1914)

AN OPEN LETTER TO THE CHINA MEDICAL COMMISSION OF THE ROCKEFELLER FOUNDATION.

SIRS: I cannot conceive of any aid which your honorable commission can offer, more effective, or more acceptable both to the Medical profession in China and to the Chinese people, than the establishment of numerous small model sanatoria for the treatment of tuberculosis, preferably in close connection with existing Western hospitals, where effective methods for the treatment of tuberculosis can be constantly exhibited. Over most of North China, the dry air and intense sunlight provide excellent conditions for treating tuberculosis. Special locations in high altitudes are advantageous, but not essential; on the contrary, the essentials are to furnish an object-lesson to the great masses of the people, and to secure skilled supervision. It seems to the writer that both these can
best be secured by attaching such sanatoria to existing hospitals.

By standardizing plans and equipment for such institutions, an extensive effect could be produced at a comparatively small expense. When once established and their usefulness proved, their support could be easily secured, chiefly from Chinese sources.

Of course, the problem of tuberculosis should be approached from the side of prevention; but where so large a proportion of the population is actually succumbing to the scourge as here in China, it is idle to discuss prevention if curative measures are to be ignored; and the surest means of securing the respect of the Chinese for the preventive measures we advocate, is to show them that our curative measures are effective in at least some of the cases.

If you are interested in this plan, and desire any information about it, I will be happy to answer any questions in my power.

Very respectfully yours,

CHARLES K. ROYS.

CANTON, China, May 30th, 1914.

To the Editor of "The China Medical Journal."

DEAR Sir:—The second volume of the China Medical Journal published in Chinese is now complete with the appearance of the twelfth number. A review of the index for the year will indicate that the paper has maintained its purpose of adhering to scientific matter exclusively. A number of articles descriptive of the courses, etc., of the various medical schools throughout China have been received and published. These we are sure will prove of great value to medical educators in different parts of China. May we ask the different medical schools to send us further reports showing the progress of their medical educational work. Hospital reports would also be of very great value if physicians working in different parts of the Republic would send us these written in good Wendi.

There were altogether fifty-six articles contributed to the Journal during the last year. Thirty-four of these were written or translated by medical men in the immediate vicinity of Canton. Twenty-two came from sources outside of Canton.

Taking the authors we note that thirty-one different doctors contributed to our columns. Nineteen of these were men or women living in or near to Canton, while twelve were sent by physicians living at a distance. For ourselves we especially appreciate articles contributed by doctors in other parts of China, their suggestions and experience proving of the greatest value to the teachers in Canton. We would especially ask for articles dealing with educational problems since these are of pressing interest to every physician throughout China.

I remain very truly yours,

WM. W. CADBURY,
Editor-in-chief "China Medical Journal.

PHILADELPHIA, September 30th, 1913.

Dr. D. Duncan Main,

President China Medical Missionary Association.

DEAR DR. MAIN: Almost six months ago, while still under medical treatment, I received your very gracious letter, written under "orders"
Correspondence.

from the recent Convention of the Medical Missionary Association at Peking, and expressing its generous and kindly appreciation of my work while in China. It was for more than a year quite impossible for me to attend to even my most important matters of business, and many letters from many dear and valued friends have remained unanswered to this day. Your own official letter and these others have all contributed to the measure of patience with which I have been able to play the game of life, and I thank you, one and all, for the loving hands reached out so far in remembrance.

It would be trite to say that "my Journal comes regularly and I follow with deep interest, etc., etc." Goodness gracious ! ! ! Did I ever bring my heart back here with me? No! Does it not still hover and fuss around St. Luke's and the Mission Press and palpitate up and down the Ma-loo? It surely does so palpitate. But I need the above-mentioned cardiac organ. How can I do any thing over here without it? If you can catch it, please send it back, or I may have to come out and get it.

Please express my sincere gratitude to the Association, and my love to this that and those other members individually. You know which I mean, the ones I really care for. There are only about six hundred of them in this class.

Fraternally yours,

WM. H. JEFFERYS.

[The above interesting letter was only recently discovered by Dr. Main among his papers; but it is better late than never.—Ed.]

To the Editor of "THE CHINA MEDICAL JOURNAL."

Dear Sir: May I request the members of the C. M. M. A., if they would kindly forward to me copies of any tracts or pamphlets, whether in Chinese or other language, on hygiene, medicine and kindred subjects, that are now in use in hospitals, or are distributed to patients?

I am,

Faithfully yours,

W. ARTHUR TATCHELL.
PERSONAL RECORD.

BIRTHS.

At Taiyuenfu, Shansi, May 7th, to Dr. and Mrs. B. C. Broomhall, B. M., a daughter (Katherine Janet).

At Kuling, June 7th, to Dr. and Mrs. W. F. Adams, K. C. in U. S., a son (John William).

MARRIAGES.

At Yunnanfu, March 9th, Dr. E. S. Fish to Miss L. Y. Shepherd (both C. I. M.).

At Newry, Ireland, June 10th, Charles Deane Little to Caroline Joan Cranford, M. B., Ch. B., (both of W. M. S.).

DEPARTURES.

March 16th, Dr. and Mrs. H. G. Thompson and child, C. M. S., for England.

March 25th, Dr. J. M. Foster, American Baptist Foreign Miss. Soc. for U. S. A.

May 29th, Miss Alice E. Trant, nurse, for U. S.

NOTICES.

UNION MEDICAL COLLEGE, PEKING.

The annual entrance examination of students wishing to enter this college will be held on Tuesday, 1st September, 1914. Intending candidates are requested to report themselves at the college not later than Saturday, 29th August.

TRAINED NURSE.

Wanted.—A trained nurse for a small women's hospital in Tung Chwan, Sze., for one year beginning about 1st January, 1915, as locum during furlough of present worker. Further particulars from Dr. Lucy E. Harris, Friends Mission, Tung Chwan, Sze.

BLOOD FILMS WANTED.

Wanted.—Blood films (unfixed) of typhus fever. Dr. W. E. Haigh of the Hodge Memorial Hospital, Hankow, says:—

I have just been examining some blood films taken from epidemic cases of typhus during the Balkan Wars and there is sufficient of interest to follow up the work. I should be glad if any doctors who, seeing cases of authentic typhus, would bear me in mind and send on to me here blood smears (unfixed).

REPTILES, ETC.

Dr. Stanley, Curator of Shanghai Museum, will be greatly obliged to anyone who will kindly send him specimens of Reptiles (snakes, lizards, and tortoises), addressed c/o Municipal Laboratory, Shanghai. The animals are best sent in 75 per cent. alcohol or strong samshu, or if they have remained one month in the preservative fluid they may be sent by post, just wrapped in a cloth moistened with alcohol and placed in a tin box.

WANTED

CHINA MEDICAL JOURNALS

For the following months

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Year</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1887</td>
<td>March</td>
<td>1888</td>
<td>March</td>
</tr>
<tr>
<td>1889</td>
<td>March</td>
<td>1890</td>
<td>March</td>
</tr>
<tr>
<td>1894</td>
<td>September</td>
<td>1899</td>
<td>October</td>
</tr>
<tr>
<td>1901</td>
<td>January</td>
<td>1902</td>
<td>January</td>
</tr>
<tr>
<td>1903</td>
<td>January</td>
<td>1904</td>
<td>January</td>
</tr>
<tr>
<td>1906</td>
<td>May</td>
<td>1908</td>
<td>July</td>
</tr>
<tr>
<td>1909</td>
<td>September</td>
<td>1913</td>
<td>January</td>
</tr>
</tbody>
</table>

Any offer for the above to be sent to the Mission Press,

18 Peking Road, Shanghai.