THE INFLUENCE OF COD-LIVER OIL ON THE CALCIUM AND PHOSPHORUS METABOLISM IN TETANY.*

LIU SHIH-HAO, M.D., Peking.

The close association between rickets and infantile tetany is a clinical observation of long standing. The relationship has been further verified by chemical studies which have indicated a disturbance in the balance between calcium and phosphorus in both conditions. In infantile tetany there is a diminution of the calcium content of the blood, the inorganic phosphorus remaining normal or slightly above normal in the majority of the cases. It has been shown that the calcium content of the blood rises with the disappearance of the symptoms of tetany. In rickets, however, the blood calcium is usually normal or nearly so, while the phosphorus is reduced 40 per cent to 60 per cent or even more. When a cure results from the use of cod liver oil, ultra-violet radiation, exposure to sunlight, or the use of proper dietary regime, the phosphorus of the serum rises to normal limits, and there is a deposition of tricalcium phosphate in the bone. When rickets is complicated by tetany, certain cases may show only a low concentration of calcium, while still others may present a diminution of both calcium and phosphorus.

According to the available evidence, it seems that the defective calcification in rickets may be accounted for by the fact that the bone-forming elements, calcium and phosphorus, are present in the blood in such low concentrations that the precipitation of tricalcium phosphate is impossible. Similarly it is believed that the symptoms of tetany are attributable to the low calcium concentration in the blood and tissues, because numerous researches

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have demonstrated the important relation of calcium salts to irritability of the central nervous system. Their withdrawal, as by applying oxalate to the cortex, leaves the latter in a state of hyperirritability, which can be made to disappear by supplying a solution of calcium salts. Furthermore, the addition of calcium to a solution of sodium salts allays the stimulating effect of the latter on the isolated frog muscle.

It is believed that calcium salts in blood exist in three forms, namely, (a) as highly dissociable compounds with protein; (b) as undissociated crystalloid molecules; and (c) as free ions. Presumably, calcium salts exert their physiological effect only to such extent as physico-chemical conditions permit their presence as calcium ions. Any condition that decreases the dissociation of calcium in the blood would tend to produce symptoms of tetany even though the total calcium in the blood were normal. When the concentration of the ionized calcium is lowered, hyperirritability of the neuro-muscular system results. Rona and Takahashi have shown that increase in the bicarbonate content of the blood diminishes the ionized calcium, whereas increase in the hydrogen ion concentration permits a larger concentration of calcium ions. For this reason symptoms of tetany appear as a result of the administration of alkalies, gastric operations, or hyperpnoea, where a definite increase of bicarbonate or a decrease of hydrogen ion concentration has been demonstrated. Recently Gamble and Ross have found following the administration of calcium chloride, ammonium chloride, and hydrochloric acid, to infants with tetany, that the plasma bicarbonate is decreased, and the hydrogen ion concentration of the plasma is increased, while the tetanoid symptoms disappear. The first two factors increase the ionization of calcium so that enough ions are present to allow normal irritability of the nerves.

In addition to the bicarbonate content and the hydrogen ion concentration, another factor that influences the ionization of calcium is its total concentration in the plasma. Of the total calcium about one-third is bound by protein and may be left out of consideration, because, as shown by Salversen and Linder, the lowered calcium in tetany is not due to a primary decrease in the protein-bound calcium, but is caused by a decrease in the diffusible fraction. This fraction comprises the free calcium ions and the
undissociated crystalloid molecules of calcium salts. Using the formula of Rona and Takahashi the calcium ion concentration is found to be about 3 mg. per 100 c.c. of blood, a value experimentally confirmed by Brinkman and Van Dam.* The remaining third is said to be present as undissociated calcium carbonate in supersaturated solution. These two fractions are present in a constant ratio as expressed in the following equation:

\[
\frac{(\text{Ca}^{++})(\text{CO}_3^-)}{(\text{Ca}_3\text{CO}_3)} = K
\]

In order to maintain this constant, any decrease in the diffusible calcium would involve the undissociated molecules as well. When the calcium ions are sufficiently decreased, tetany occurs. In the majority of cases of tetany, where there is no increase of plasma bicarbonate nor decrease of hydrogen ion concentration, one may conclude that the low total calcium in the blood is responsible for the diffusible calcium concentration, the immediate cause of tetany.

But the question arises: "What causes the low total calcium in the blood of infants with tetany?" In rickets the low phosphorus content of the blood, which mainly accounts for the failure of calcification of the bones, has been shown to be due to defective absorption of this element through the gastrointestinal tract by the metabolism experiments of Schabad and Schloss. Normally, 70 per cent or more of the phosphorus excreted by breast fed infants appears in the urine, and with children on cow's milk about 60 per cent is thus excreted. In rickets the conditions are quite reversed: much the larger part may be eliminated through the bowels. When recovery takes place following the administration of cod liver oil a return to normal occurs; the phosphorus may be quite unchanged in amount but that in the feces is greatly reduced. Retention occurs at the expense of the fecal phosphorus. Recent work by Orr, Holt, Wilkins, and Boone has further shown that ultra-violet radiation, like cod liver oil, causes large amounts of calcium and phosphorus to be retained in the body, and the increased calcium and phosphorus are found in the urine after the radiation, indicating an increased absorption from the intestines. They conclude that the defective absorption from the intestine found in active rickets is the cause of the

*Referred to under Reference 10. Original article is not available.
low concentrations of calcium and phosphorus found in the serum and is the ultimate cause of the defective calcification of the bones of the rachitic infants. The condition of affairs in tetany, however, remains obscure, although this latter disease has been extensively treated with cod liver oil\textsuperscript{13}, and ultra-violet radiation\textsuperscript{14}. It has been the purpose of this study to determine, in the first place, whether or not the low serum calcium in tetany is due to the defective absorption of this substance through the intestine; and in the second place, whether or not the efficacy of cod liver oil in the treatment of tetany lies in its ability to promote the absorption of calcium from the intestinal canal.

\textbf{METHODS OF INVESTIGATION.}

The subjects were two girls, each of whom showed on admission to the hospital marked carpopedal spasm, Chvostek's sign, Trousseau's sign, and the typical electrical reactions characteristic of tetany. They came from an orphanage in Peking containing about fifty girls and seventy boys, varying from 10 to 18 years in age. About ten of the girls complained of stiffness of the fingers during the winter months, and showed on examination varying degrees of the facial phenomenon. In all of the cases this was the first symptom complained of, although several later had difficulty in walking. None of the boys were affected similarly. Investigation into the living conditions showed that the girls stayed indoors practically all the time in the colder months, studying two hours and working on embroidery eight hours daily. The boys were employed in rug weaving, so that their hands were employed approximately to the same extent. They had better facilities for getting out into the open air and running about in the sunlight, which were denied the girls.

The diet in the orphanage is practically constant throughout the year. It consists of the following foodstuffs: for breakfast, millet gruel, corn bread, salted turnip; for lunch, wheat bread, vegetable; for supper, corn bread, vegetable. A portion of meat is served once a month, and the vegetables are varied according to the season. Bean sprouts are obtainable in January and February; onions and bean curd in February and March; spinach in April; egg-plant and gourds, May to July; pearl melons in August and September; and cabbage, October to January. During the period of study the patients were
kept on a uniform diet resembling the orphanage diet as closely as possible, and both the intake and the composition of this diet were accurately known.

The patients remained in the hospital for about ten weeks. The period during which they were studied is divisible into two parts, namely, a control period of five weeks without treatment, and a second period of equal length during which they received cod liver oil, 15 c.c. three times daily. Toward the end of each of these periods four consecutive days were set apart as metabolism periods. During each of these the total 24-hr. urine was collected and the creatinin was determined to insure the obtaining of complete specimens. Stools were collected and marked off to correspond to the 4-day period with charcoal. From the specimens of stool and urine, the output of calcium and phosphorus of each period was determined; and from the amount and composition of the food taken, the intake of calcium and phosphorus was calculated. Values for milk were taken from Babcock while those for other foods were taken from Shermann and Gettler. During the two periods determinations of the calcium and phosphorus of the blood serum and of cerebro-spinal fluid were made. The electrical reactions were also obtained, and in order to determine whether a condition of alkalosis existed, the carbon-dioxide combining power was estimated both before and after treatment. The pH of the gastric contents during the two periods was also determined to see whether a decreased gastric acidity might be present as a factor in the causation of tetany in these cases.

* The methods employed in this study were the following: calcium in urine was determined by McCrudden's gravimetric method with brom-cresol purple as the indicator. For the determination of phosphorus in urine, the Briggs' modification of Bell and Doisy's method was used.

The total stools of each period were put together, thoroughly mixed and evaporated to dryness on a steam bath. Alcohol (95 per cent) was added and the mixture evaporated to dryness again. The process was repeated once more, making two additions of alcohol in all. The residue was ground up, put in a dessicator overnight, and weighed. Exactly 2 gm. of the air-dried stool were ashed by Stolte's method. Calcium was determined by McCrudden's procedure and phosphorus by the molybdic acid method.

For blood serum and cerebro-spinal fluid, the method of estimation employed for calcium was that of Kramer and Tisdall; for phosphorus, that of Briggs; and for carbon-dioxide combining power, that of Van Slyke and Cullen.

The pH of gastric contents was estimated by the method of Shohl and King.
The China Medical Journal.

REPORT OF CASES

Case 1. Hospital No. 4319.

Li Fu-chien, aged 16, was admitted to the Peking Union Medical College Hospital on January 18, 1924, complaining of rigidity of hands for two months. Discharged well on April 3, 1924. A year ago (February 20, 1923), patient had an attack of tetany, promptly relieved by calcium therapy. Two months before admission she began to have spastic attacks in both hands. These gradually increased in severity and frequency. A week prior to admission both of her feet became involved, and she became practically incapacitated. Menstruation commenced in November, 1923.

On admission, patient was fairly well developed and nourished. Height 142.5 cm. Weight 37.3 kg. Her hands and feet intermittently assumed the typical positions of carpopedal spasm. Chvostek's and Trousseau's signs were present. X-ray of the long bones showed no evidence of rickets. During the first period, when no medication was given, her symptoms persisted without any marked change. With the commencement of cod liver oil therapy, however, her symptoms began to clear up, until about ten days after the treatment was commenced no clinical signs of tetany could be detected. The electrical reactions typical of tetany, before treatment, returned to normal after treatment. Chemical examination of the blood and cerebro-spinal fluid both before and during treatment gave the results shown in Table 1. Table 3 shows the calcium and phosphorus excretion in stool and urine during the 4-day periods before and after medication.

Case 2. Hospital No. 655.

Pai Jui-fang, aged 15, admitted to the Peking Union Medical College Hospital on January 9, 1924 with the complaint of spasms in both hands and feet for 16 days prior to admission. Discharged well on April 3, 1924. The patient had had chronic tuberculous lymphadenitis of the neck operated on here two years ago, and had phlyctenular ophthalmia a year ago.

TABLE I.—CALCIUM, PHOSPHORUS, AND CARBON-DIOXIDE COMBINING POWER OF BLOOD SERUM AND CEREBRO-SPINAL FLUID BEFORE AND AFTER TREATMENT. (CASE 1.)

<table>
<thead>
<tr>
<th></th>
<th>Before Treatment</th>
<th></th>
<th>After Treatment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mg. per 100 c.c.</td>
<td>Mg. per 100 c.c.</td>
<td>Vol. % CO₂</td>
<td>Mg. per 100 c.c.</td>
</tr>
<tr>
<td>Calcium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
<td>5.8</td>
<td>2.38</td>
<td>53%</td>
<td>10.5</td>
</tr>
<tr>
<td>Blood serum...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebro-spinal fluid</td>
<td>3.3</td>
<td>1.41</td>
<td>55%</td>
<td>5.9</td>
</tr>
</tbody>
</table>
Influence of Cod-liver Oil on Metabolism in Tetany. 799

TABLE 3.—THE CALCIUM AND PHOSPHORUS INTAKE AND OUTPUT BEFORE AND AFTER COD LIVER OIL TREATMENT. (CASE I).

<table>
<thead>
<tr>
<th></th>
<th>Intake</th>
<th>Excretion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urine</td>
<td>Stool</td>
</tr>
<tr>
<td>Before Treatment</td>
<td>0.458</td>
<td>0.033</td>
</tr>
<tr>
<td>After Treatment</td>
<td>0.687</td>
<td>0.130</td>
</tr>
</tbody>
</table>

**PHOSPHORUS.**

<table>
<thead>
<tr>
<th></th>
<th>Before Treatment</th>
<th>After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.573</td>
<td>3.859</td>
</tr>
<tr>
<td></td>
<td>0.609</td>
<td>2.178</td>
</tr>
<tr>
<td></td>
<td>0.674</td>
<td>1.296</td>
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<tr>
<td></td>
<td>1.282</td>
<td>3.474</td>
</tr>
<tr>
<td></td>
<td>47.47%</td>
<td>62.60%</td>
</tr>
<tr>
<td></td>
<td>52.53%</td>
<td>37.31%</td>
</tr>
</tbody>
</table>

About two weeks before admission, she began to notice numbness and spasticity, first of the hands, then of the feet. The spasms were at first intermittent, but were continuous for the two days prior to admission, and caused considerable muscular pain. Physical examination showed a poorly developed and moderately emaciated girl with hands and feet in severe carpopedal spasm, complaining of pain in the extremities. There were marked facial phenomenon and Trousseau's sign. Height 128.7 cm. Weight 24.2 kg.

On admission patient was given calcium lactate and full diet. Her symptoms were relieved somewhat under this treatment. After January 20, however, calcium lactate was discontinued, the patient put on the orphanage diet, and the symptoms quickly returned. The same procedure was followed in this case as in Case 1, except that from February 21 she was given 1,000 c.c. of fresh cow's milk in addition to the diet described on account of her poor nutrition. Shortly after commencing treatment with cod liver oil her spasms were relieved and the facial phenomenon and Trousseau's sign disappeared.

The electrical reactions during the control period showed the hyperexcitability characteristic of tetany. They became normal again after treatment.

Chemical studies of blood and cerebro-spinal fluid yielded very low values for calcium and phosphorus which were raised to normal by the cod-liver oil treatment as illustrated in Table 2. Results of the metabolic studies of calcium and phosphorus before and after treatment are tabulated in Table 4.
TABLE 2.—CALCIUM AND PHOSPHORUS CONTENT OF BLOOD AND CEREBRO-SPINAL FLUID BEFORE AND AFTER TREATMENT. (CASE 2).

<table>
<thead>
<tr>
<th></th>
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<th>After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mg. per 100 c.c.</td>
<td>Mg. per 100 c.c.</td>
</tr>
<tr>
<td></td>
<td>Calcium</td>
<td>Phosphorus</td>
</tr>
<tr>
<td>Blood serum</td>
<td>5.4</td>
<td>2.63</td>
</tr>
<tr>
<td>Cerebro-spinal fluid</td>
<td>3.8</td>
<td>1.44</td>
</tr>
</tbody>
</table>

TABLE 4.—THE CALCIUM AND PHOSPHORUS INTAKE AND OUTPUT BEFORE AND AFTER COD LIVER OIL TREATMENT. (CASE 2).

<table>
<thead>
<tr>
<th></th>
<th>Intake</th>
<th>Excretion</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Urine</td>
<td>Stool</td>
</tr>
<tr>
<td>Before Treatment</td>
<td>0.458</td>
<td>0.049</td>
<td>0.398</td>
</tr>
<tr>
<td>After Treatment</td>
<td>4.687</td>
<td>0.138</td>
<td>0.107</td>
</tr>
</tbody>
</table>

PHOSPHORUS.

<table>
<thead>
<tr>
<th></th>
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<th>After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>6.819</td>
</tr>
<tr>
<td></td>
<td>0.082</td>
<td>0.547</td>
</tr>
<tr>
<td></td>
<td>0.100</td>
<td>0.130</td>
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<tr>
<td></td>
<td>1.081</td>
<td>0.677</td>
</tr>
<tr>
<td></td>
<td>7.55%</td>
<td>80.81%</td>
</tr>
<tr>
<td></td>
<td>92.45%</td>
<td>19.19%</td>
</tr>
</tbody>
</table>

DISCUSSION

These two cases presented all of the clinical evidence and laboratory findings of idiopathic tetany. No parathyroid deficiency was present; no symptoms pointed to the gastric form of tetany; and they had never had intravenous injection of alkalis.

The recent paper of Pincus and Kramer states that normally the blood serum calcium averages 9.6 mg. per 100 c.c.; and
phosphorus, 2.9 mg. per 100 c.c. The values for cerebro-spinal fluid are just half as much as those for serum, namely calcium 4.8 and phosphorus 1.3. In these two cases in the active stage of tetany the calcium concentration in blood serum was 5.8 and 5.4 respectively, which were very low values. Cerebro-spinal fluid showed still lower results, namely 3.3 in the first case and 3.8 in the second, emphasizing further the importance of low calcium concentration as the cause of the hyperirritability of the nervous system. As has been mentioned before, the concentration of calcium ions in blood necessary to maintain the normal irritability of the nervous system is about 3 mg. In the cerebro-spinal fluid a greater proportion of the total calcium is probably present in ionic form so that about 3 mg. of free calcium ions may still be available. Since the protein concentration of the cerebro-spinal fluid is very low (0.02 per cent) in comparison with that of plasma (7.9 per cent) the protein bound calcium must be negligible in quantity. Any decrease of cerebro-spinal fluid calcium may be regarded as a clearer and more direct evidence of tetany than a decrease of the blood calcium.

After treatment with cod liver oil, the calcium and phosphorus contents of blood and cerebro-spinal fluid were raised to normal. This together with the disappearance of the clinical signs of tetany and the decreased irritability to electrical stimuli is taken as evidence that the cure of the tetany was brought about by cod liver oil alone, an observation which agrees with that of Brown, Maclachlan, and Simpson 13.

The action of cod liver oil in the cure of tetany may be better understood by analyzing the metabolism data on calcium and phosphorus. In the first case, calcium retention before the cod liver oil treatment was 12.62 per cent, and this became 15.58 per cent after the treatment. A comparison of the urinary and stool excretion of calcium before and after cod liver oil therapy reveals that as a result of the treatment there was a marked increase in the proportion of the total calcium output excreted through the urine with a correspondingly decreased excretion through the stool, showing that there was actually more calcium absorbed through the gastro-intestinal tract, metabolized in the body, and then excreted through the kidneys.
Phosphorus retention in this case, contrary to what was expected, was less after the treatment than before. However, there was a distinct increase in the urinary excretion of phosphorus at the expense of the stool excretion.

Figures for the second case are more clear cut. Calcium and phosphorus showed parallel results. In spite of the large increase in the intake of calcium and phosphorus during the period of treatment, the total excretion of both of these elements was much less than that before the treatment. The relatively high output and low intake in the active stage of the disease resulted in a low retention, especially of calcium. On the other hand, during the treatment period the retention of both calcium and phosphorus was tremendously increased. The urinary excretion of both calcium and phosphorus was greatly increased during the second period, indicating that a much greater proportion of the intake was absorbed into the system and the excess eliminated through the urine.

From this evidence we conclude that the low calcium in these cases was associated with defective absorption through the intestine, and that cod liver oil exerts its beneficial effect on tetany by promoting the absorption from the intestinal canal.

While it is assumed that cod liver oil increases the absorption of calcium and phosphorus from the intestine, it is perfectly possible that it may act by diminishing their re-excretion through the gastro-intestinal tract. Birk injected calcium intravenously into a rachitic child and found that it was largely excreted through the intestine. When phosphates were thus injected, very little was eliminated with the stool. Sjellema showed that rabbits on a low calcium diet might excrete three times as much calcium as that present in the food, and still give feces with about the same percentage of calcium as in periods of positive calcium balance. This was interpreted by the author as pointing to a physiological rôle for calcium in the production of feces. Cod liver oil acted by decreasing the amount of calcium necessary for this purpose. How far the results on rabbits under normal conditions are applicable to human cases of tetany cannot be stated. It seems altogether probable that calcium and phosphorus are absorbed together and that cod liver oil promotes that absorption of these substances rather than that it limits their re-excretion through the intestines.
We may conclude that in these cases of tetany the intestinal absorption of calcium was decreased with a resulting low concentration of calcium in the serum and cerebro-spinal fluid. Under the influence of cod liver oil, the absorption of calcium from the limited intake was increased so that the level of calcium concentration in blood and cerebro-spinal fluid necessary to maintain the normal irritability of the nervous system was restored and the tetany disappeared.

The mechanism whereby cod liver oil increases the absorption is influenced by two factors, namely, the reaction of the gastrointestinal tract and the amount of fat intake. Holt and his colleagues have shown that in infants and children calcium absorption depends not only upon the intake of calcium salts, but also upon the amount of fat ingested. The optimal absorption of calcium occurs when the intake of fat exceeds 3.0 to 4.0 gm. per kilo body weight. The fat present in the cod liver oil may be a contributing factor to the increased absorption.

With regard to the reaction of the gastrointestinal canal, alkalies diminish mineral absorption, while acids increase it. Babbott and his co-workers have recently shown that the normal pH of the gastric contents of infants is 4.2 and in infantile tetany this is increased to 5.3. With the disappearance of symptoms of tetany, the pH returns to normal. The gastric acidity in our cases of tetany was normal and seems to have had no bearing on the symptoms.

Conclusion

1. In certain cases of tetany, the low calcium content of blood and cerebro-spinal fluid is probably due to deficient absorption of this element through the intestines. Low calcium content means low calcium ion concentration, which is directly responsible for the symptoms.

2. Cod liver oil, when administered to such cases, increases the retention of calcium and, to a lesser extent, of phosphorus as well. The urinary excretion of these elements is at the same time increased, indicating an increased absorption from the intestines.

Note.—The writer wishes to express his thanks to Dr. G. A. Harrop, of Peking, for his encouragement and help in the preparation of this paper.
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PROTEIN THERAPY IN TYPHOID AND PARATYPHOID FEVER. *

JOHN H. FOSTER, M.D., Hunan-Yale Hospital, Changsha.

The "intravenous vaccine" or foreign protein therapy was only introduced nine years ago but it has been used in a great variety of conditions. Since then much experimental work has been done. As evidence of the extent of this work a book was recently published on protein therapy which contains a bibliography of over twelve hundred articles all of which have been written since 1915.

In the "Journal of the American Medical Association" for the past two years were found over sixty articles and abstracts dealing with this subject, perhaps the greater number coming from European journals. From China the only reports are from Dr. Cadbury who has used it quite extensively in Canton, and there are some references to its use in the Peking Union Medical College Hospital. It is also probably being used to a considerable extent in other hospitals and in private practice in China.

The types of cases in which protein therapy is used and recommended are most varied. Some of the diseases treated and with reported good results are: acute and chronic arthritis; chronic osteomyelitis with discharging sinuses; puerperal and pelvic infections; gonorrheal urethritis; chancroid; buboes; acute and chronic enteritis; dysenteries; keratitis; acute iritis; optic neuritis; conjunctivitis; corneal ulcer; skin diseases, such as psoriasis, leucoderma, eczema, erythema and lupus; myalgias; neuralgias; typhoid fever; typhus fever; chorea; influenza, and other conditions.

In the Hunan-Yale Hospital we have used foreign protein for the past three years in a variety of conditions, chiefly acute and chronic arthritis and some febrile conditions, with special attention to its effect on our cases of typhoid fever.

Typhoid fever is endemic in Changsha, but during the summer and early fall it is almost epidemic, and it is very depressing to
have a ward full of patients very sick with this disease and be so helpless to effect a cure. During 1922 we had ninety-eight cases with a mortality of seventeen per cent.

The treatment of typhoid fever is largely a question of maintaining the nutrition of the patient and, as far as possible, by careful nursing to avoid complications. We have very little in the line of active therapeutic agents at our disposal that have any effect on the course of the disease.

Miller, in his monograph on typhoid fever in "Oxford Medicine", mentions protein therapy as a rather dangerous method, to be used with great caution. He states that the results in general in typhoid can be classified as (1) about 20 per cent show recovery with a drop in temperature by crisis; (2) in about 20 per cent the disease is shortened with drop by lysis; (3) in about 20 per cent the temperature changes to a swinging type without affecting the course; (4) about 40 per cent show no effect. Miller states further that protein therapy if on further study it shows a lower mortality and is free from danger will be valuable, as it definitely shortens the course in a considerable percentage of cases.

During the past two and one-half years we have treated forty-eight cases of typhoid fever and para-typhoid fever with foreign protein. As it was felt the method was dangerous, involving at least some risk to the patient, and that there was danger of ascribing a normal recovery as being due to this special treatment, precautions were taken only to give the vaccine, (1) after the patient had been a few days in the hospital in order to observe the course of the temperature, so as to be sure there was no tendency of the temperature to drop normally; (2) when the case was uncomplicated; and (3) it was not given in cases evidently hopelessly sick. This means that only selected cases were treated, so that comparison of figures with the untreated is of no value in the study of the relative percentage of mortality or of complications; only by a study of the individual cases have we been able to come to any conclusion.

The procedure after selection of the case was to inject intravenously T.A.B. vaccine, properly diluted in normal saline, so that the patient received about 50,000,000 organisms. This is the form in which most of the therapy has been carried out. Lately, following suggestions of work recorded in foreign journals, we have used intramuscular injections of milk. Doses of 5-10 c.c.
of milk which has been sterilized are given into the gluteal muscle, using the same precautions to avoid entering a vein as in intramuscular mercury injections. In order to avoid possible anaphylactic symptoms, 1 c.c. is first given followed in one hour by the balance of the dose.

In the average case, in about one hour after the intravenous injection, or four to twelve hours after the intramuscular injection, there is a reaction with a chill and rise of temperature to around 39° C.—40° C. The temperature gradually declines during the next twenty-four hours and there is generally a definite improvement in the subjective feelings of the patient, irrespective of the future course of the temperature.

The degree of reaction has varied much. Twenty-five patients are noted as having had severe reactions resembling a severe malarial chill. Ten are noted as having moderate reactions, eight had none, and the remainder were not recorded. Accompanying the chill there is the usual drop in the leucocyte count, followed by a leucocytosis, although this has not been marked in our cases. In only five cases was the blood count followed during and after the reaction. In these the leucocytosis varied from 9,000 to 16,000.

Theoretically, the benefit is derived from the reaction, a stimulation of leucocytosis and of the body defenses, or an "activation of protoplasm", as one author puts it. As a rule the best results have followed when the chills have been severe, but many severe reactions were followed by no change in the course of the disease, and some have improved after little or no demonstrable reaction.

Results.

As may be seen by Table 1, there was considerable variation in the response to this form of treatment. In thirteen of the cases there was a rapid drop in the temperature curve, resembling the crisis of pneumonia. Nine patients were given a second dose and in three of them a crisis followed. Following are presented some typical cases of this series with the charts showing the effect of treatment. In all cases the subjective improvement was as great as the objective.
### Table 1. Effect of Protein Therapy in 48 Cases of Typhoid Fever and Para-Typhoid Fever.

<table>
<thead>
<tr>
<th>Series Number</th>
<th>Name</th>
<th>Hospital Number</th>
<th>Diagnosis</th>
<th>Age</th>
<th>Day of Disease Given</th>
<th>Duration of Fever after Treatment</th>
<th>Condition at Time of Discharge</th>
<th>Result of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ching</td>
<td>1250</td>
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**Protein Therapy in Typhoid Fever.**

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* Discharged before the temperature reached normal.

**Case No. 1.**—Ching, 金, a probationer nurse of this hospital, 19 years of age, was admitted September 5, 1922, with typhoid fever. He was given 50,000,000 T. A. B. vaccine on the 16th day of his illness. Had a recovery by crisis and an uneventful convalescence. (Fig. 1.)

---

**Fig. 1.**—Typhoid fever: crisis on 17th day following intravenous injection of T.A.B. vaccine.
Case No. 7.—Hsu, a student, aged 22, with typhoid fever, was treated on the 19th day of his illness. Recovery was by crisis and temperature was normal during the remainder of his stay. (Fig. 2.)

![Figure 2](image)

**Fig. 2.—Typhoid fever: crisis on 20th day following foreign protein therapy.**

Case No. 13.—Li, a woman of 54 was admitted with typhoid fever on October 14, 1922, in the third week of the disease. She was given 50,000,000 T. A. B. vaccine intravenously on the 31st day. Crisis followed a severe chill and temperature remained subnormal during the five days she stayed in the ward. (Fig. 3.)

![Figure 3](image)

**Fig. 3.—Typhoid fever: result of intravenous dose of vaccine on 31st day.**
Protein Therapy in Typhoid Fever.

Case No. 18.—Li, a student of 20, with paratyphoid fever, admitted on the 21st day and treated on the 26th day of his illness. Had a recovery by crisis. He left the hospital two days later insisting he was cured. (Fig. 4.)

Case No. 43.—D. G. F., a foreigner, with paratyphoid fever, 26 years of age, was admitted on the eighth day of the disease and treated on the 21st day with 10 c.c. of milk intraglutely. He had a good reaction with a drop by crisis and an uneventful convalescence. (Fig. 5.)

Case No. 16.—Hsieh, also had paratyphoid fever. His case illustrates the action in the few cases where a temporary drop in temperature was followed by a return of fever, but recovery by crisis occurred after the second treatment. (Fig. 6.) First injection was on the 21st day of the disease. After a return of symptoms, the second treatment on the 46th day was followed by a crisis and rapid recovery.
Fig. 6.—Paratyphoid A: Drop in temperature after first treatment with vaccine, but fever returned and persisted until a second injection 21 days later.
Case No. 34.—Huang, 黃, a wealthy Chinese, admitted on the 21st day of illness with typhoid fever. Treatment was given on the 26th day with vaccine. A good reaction and apparent crisis was followed by a return of fever. After the second treatment on the 37th day the temperature remained sub-normal. (Fig. 7.)

In eleven cases there was a definite change in the course of the temperature curve with a drop by lysis to normal within a period of three to five days. In three of the cases there was a change from a continuous to a swinging type of fever, and in a few there was a lowering of the temperature level but without any apparent effect on the duration of the fever. Twenty-one cases showed no effect. There were six deaths in this group.

In the very sick and toxic cases, with a pulse ranging from 100 to 120 and with marked prostration, there was little effect as a rule. Two exceptions to this were (1) Case No.46, a very toxic patient from the poor-house whose condition seemed hopeless, but who made definite improvement after an injection of milk, with a recovery by lysis; and (2) Case No.45, where the illness was complicated by intestinal hemorrhages and bilateral parotitis, and the patient seemed to be pulled through by protein therapy.

Dr. W. W. Cadbury, in 1922, reported ten cases of typhoid fever treated by intravenous vaccine injections, in which seven were cured by crisis, one by lysis; there was no effect in two very malignant cases.
Analysis of the stages of the disease at which the treatment was instituted shows that little effect was noted when treatment was given in the first week. About an equal number of good results were obtained in the later stages, although there was a higher percentage of recoveries between three and six weeks. The paratyphoid cases seem to respond better than the patients with typhoid.

Complications.

In the whole series of our cases of typhoid fever and paratyphoid fever, and in the other cases treated by this method, we have not seen any ill-effects directly as a result of the treatment. The chill is unpleasant and in some cases was accompanied by a degree of cyanosis and mild shock but the treatment has always been followed by subjective improvement.

In connection with the administration of the remedy we have had some narrow escapes. Once an interne was caught just as he was about to inject two and one-half billion organisms instead of the proper dose of fifty millions. No one knows what the result would have been. Another case had been selected as suitable for treatment, but the injection was postponed for a day for some incidental reason. That night the patient had an intestinal hemorrhage and died within 24 hours. If the vaccine had been given it surely would have been blamed as the cause of death.

Comment.

The cases are too few to permit any generalization but the results, as far as we have gone, fall rather closely into the percentage groups as given by Miller. In the others, no harm has been done. It seems that we must look further for the treatment of the very toxic or malignant cases of typhoid fever. We have tried emetin in a number (fifteen) with no effect whatever on the temperature curve. The use of serum of convalescent cases of typhoid fever has been suggested, but we have had no experience with it and apparently its clinical and experimental use has been disappointing.

Summary

1. Foreign protein therapy has been tried in a series of 48 cases of typhoid and paratyphoid fever in the Hunan-Yale Hospital, Changsha.
Protein Therapy in Typhoid Fever.

2. Intravenous injections of typhoid vaccine and intramuscular injections of milk were used.

3. The following results were obtained: in 27 per cent the course of the disease was interrupted and recovery occurred by crisis. In 23 per cent there was a drop in temperature and recovery by lysis. In 6 per cent there was a break in the temperature, but without shortening its course. In 44 per cent the course of the disease was not affected.

4. The very toxic cases, as a rule, showed little response to this treatment.

5. No ill effects from the treatment were seen.

References.


Protein Therapy in Pneumonia.—Attempts have been made to abort pneumonia by the injection of foreign proteins such as milk, typhoid, or gonococcic vaccines, phylacogens, peptone, etc, either intramuscularly or intravenously. Small series of cases have been reported, and they show that the immediate thermal reaction is often followed by general improvement and signs of beginning resolution. But the thermal reaction was often severe and even violent, and it does not seem justifiable to use these methods when better results can be obtained without these disadvantages. The specific therapy of pneumonia is making headway, but the decision between passive immunisation with serum and active immunization with vaccine cannot yet be made. Serum therapy has the disadvantage that it is highly specific, and so far only an effective serum against Type 1 infection has been prepared. Unfortunately two-thirds of the cases and two-thirds of the deaths are caused by infection with the other types. Before serum can be used the type of pneumococcus must be determined, and this means a delay from twelve to twenty-four hours and access to a well-equipped laboratory. The serum must be given intravenously in large amounts and at frequent intervals. The injection of this large amount of foreign protein is frequently followed by severe constitutional disturbances. To avoid the danger of anaphylaxis it is further necessary to do an intradermal test. With both active and passive immunization, treatment should be begun within the first three days and grave symptoms anticipated. Active immunization when given early appears to be quite safe and free from the disadvantages associated with serum, and its results appear to be more decisive, but so far it has not been tested on a sufficiently large scale.—Medical Annual, 1924.
INDICATIONS FOR OPERATION IN GLAUCOMA*

D. V. Smith, M.D., Methodist Episcopal Hospital, Peking.

The question, "What are the indications for operation in glaucoma?" can be answered in three words, namely, "a sure diagnosis." While we may spend much time in studying this question from its different angles, and it has many, we shall probably return sooner or later to the statement that as soon as a definite diagnosis of glaucoma is made operation should be performed.

The world owes a debt of gratitude to Von Graefe for his discovery of the curative action of iridectomy in glaucoma, which up to his time had been an incurable disease. Since his day many other methods have been employed, but still the iridectomy stands in the opinion of many premier among them all.

The student and the general practitioner often ask, "Is it necessary to operate in every case?" The patient often begs us to "spend our heart" and employ some less drastic measure. It is certain that every ophthalmologist can point to the apparent success of this or that conservative measure and can also recall plenty of failures following the radical operation. Let us, therefore, using the classification of primary and secondary glaucoma, consider the different types and the indications for and against operation in each.

I. PRIMARY GLAUCOMA.

In a light attack, where the vision is not seriously interfered with, one can hardly be justified in rushing the patient at once to the operating table. Conservative treatment will probably bring relief, especially if it is the first attack, and the patient will be pleased and will call the physician a wonderful man. If, however, the diagnosis is clear, I hold the physician to be negligent of his duty if he does not explain the case fully to the patient and urge operation. Often a "suspended sentence" regarding operation is given when an intelligent patient promises to use his drops faithfully and to come immediately to the physician when there is the

*Read before the Section on Ophthalmology at the Biennial Conference of the China Medical Missionary Association held in Shanghai, February 14-20, 1923.
Indications for Operation in Glaucoma.

least suggestion of anything wrong with his eyes. To be sure, we may find this or that person who has kept his glaucoma in abeyance for ten, twenty or even thirty years, but we also find over and over again patients who, having forgotten their drops (or, even despite their faithful use) come with a severe acute attack and with vision forever gone. The trouble is that we can never tell whether a light prodromal attack is going to be followed by several others of the same nature or by a more violent one. Hence, most ophthalmic surgeons agree that these prodromal attacks rarely become permanently arrested despite the general treatment and the careful use of miotics and that in the end the patient is compelled to submit to operation.

Abundant statistics show that in chronic cases the vision obtained after operation is generally that which the patient had immediately before the operation. In acute cases the vision may be restored nearly to what it was preceding the acute onset. Thus it follows as a corollary that the earlier the operation is performed the better will be the visual result and the easier will be the operation for the surgeon. If in a prodromal or first attack the symptoms do not clear under treatment in a day or so, the operation should be delayed no longer. If the patient is young and the attack clears readily, the surgeon may be justified in waiting, yet he is taking a fearful risk, for the glaucoma is sure to recur at some time in nearly 100 per cent of cases. The older the patient the greater the danger of early recurrences.

A. Acute inflammatory glaucoma.—In this condition the operation should be done as early as possible as every hour's delay may mean the permanent loss of some vision. This does not mean that no treatment at all should be used. On the contrary, while getting the patient into the hospital and arranging for operation it often is possible to alleviate the pain and to reduce the pressure somewhat by appropriate treatment. It is in this type of glaucoma that iridectomy, although often very difficult to perform, achieves its most brilliant results.

B. Chronic inflammatory glaucoma.—By this is meant the cases which at intervals have had more or less acute and prolonged attacks of glaucoma. The physician is fortunate if he is consulted when the eye is relatively quiescent, for then operation is somewhat easier, but no matter what the stage, operation should be performed as speedily as possible and the result is generally good.
C. Simple chronic glaucoma.—Here, except for poor vision, a contracted field and an excavated optic disk, the usual signs of glaucoma are lacking. Myopic eyes, while having an apparent immunity against ordinary glaucoma, seem to show a special tendency for glaucoma simplex. The pathology seems limited to a progressive atrophy of the optic nerve. If there is any increase of tension, it is only a symptom and hence operative treatment is of little benefit. But one should look very carefully for an increase of tension. It is interesting to note that glaucoma simplex has become much rarer since the introduction of the tonometer. If the tension is normal or only slightly elevated, iridectomy is almost useless. The greater the tension, the more the relief one can expect from operation, which may have to be repeated to maintain normal tension.

D. Hydrophthalmus.—Infantile glaucoma, depending as it often does on congenital intraocular malformation or inflammation, does not respond favorably to operative measures. At times the iridectomy or the trephine seems to help in arresting the process, but as yet no dogmatic statement regarding operation can be made. Certain it is, however, that when a case continues to progress despite the best of conservative measures, operation should be tried.

II. Secondary Glaucoma.

The temporary hypertension in secondary glaucoma arising from acute iritis or swelling lens masses may be relieved by puncture of the anterior chamber. Of course, if there is a traumatic cataract simple paracentesis often is not sufficient and an incision must be made to allow the extraction of the cataract.

The permanent hypertension in secondary glaucoma is best treated by iridectomy. If there is an anterior synechia with incarceration of the iris in an old ulcer scar, do an iridectomy on the opposite side where the iris is free, and where the cornea offers the best prognosis from the visual standpoint. If there is iris bombé with glaucoma, the transfixation method of Fuchs may be employed, where the incision is carried through cornea, iris and lens capsule at the one stroke.

Both primary and secondary glaucoma may progress until they reach either one of two stages which have been referred to as malignant glaucoma and absolute glaucoma.
Indications for Operation in Glaucoma.

MALIGNANT GLAUCOMA.

This at times unfortunately follows operations in the other types of glaucoma, and both conservative and radical treatment seem to have little or no effect on the disease. There may or may not be hemorrhage and in most cases the disease progresses to blindness. While various operations may be tried to reduce the inflammation, it may at length be necessary to perform an enucleation; or, in selected cases, an optico-ciliary neurotomy. Extraction of the lens may be tried, but as the eye is usually inflamed and hard, an expulsive intraocular hemorrhage is greatly to be feared. When one is confronted by what he believes to be a malignant glaucoma, the worse eye should be operated upon first to test the possible result. Yet this is not always a sure guide, for a successful operation on one eye may be followed by an expulsive hemorrhage in the other and vice versa.

ABSOLUTE GLAUCOMA

This at times is identical with malignant glaucoma. However, here in China we frequently see patients who have suffered for years from repeated attacks of inflammatory glaucoma until the vision is nil and the eyes stony hard and painful. In these eyes usually the only operation indicated is enucleation or in selected cases an optico-ciliary neurotomy. Here, as in many other instances, the situation must be fully explained to the patient, else he will expect restoration of vision in some miraculous way. Occasionally I refuse to operate because I am led to believe that no matter how carefully it is explained the patient still continues to hope for something which cannot happen and after operation would not only be greatly disappointed but also become an active opponent of Western Medicine.

SUMMARY

1. Operate at once if the diagnosis is made sure.

2. Consider if the eye is in danger. One must first convince the patient that it is necessary to operate. Thus while using miotics watch the tension, the visual field, the size of any central scotoma and the vision. These tests help to prepare the patient for operation. Sooner or later operation must come even though miotics have helped for years.
3. The earlier the stage of glaucoma, the easier the operation and the better the result.

4. In acute glaucoma immediate operation may preserve the vision for years.

5. In chronic glaucoma one may have opportunity to deliberate as to the time and kind of operation but the prognosis is not as good as in acute cases.

6. A bad complex is fair vision, a narrow field, normal tension and a deep cup.

ANOMALIES FOUND IN FECAL EXAMINATIONS IN CHINA*

Ernest Carroll Faust, Ph. D., Peking.

To all except those who make constant examination of stools and are familiar with the protozoa and the helminth ova likely to be found in such examinations, puzzles are continually being presented. Even the experienced clinical microscopist at times finds perplexing structures in specimens sent to him for diagnosis. This is particularly true in China, where the field of clinical microscopy is only partially developed and where strict search and intensive methods of examination frequently reveal forms new to a region or even new to science.

Of all these perplexing problems perhaps the most important of all is to know what structures are actual animal parasites and what are artefacts or anomalies. For convenience in presentation, anomalies found in human fecal examinations may be grouped as follows:

1. Physical artefacts.
2. Contamination from the examining medium.
3. Partially digested animal and plant cells in the feces.
4. Animals introduced by accident.
5. Harmless coprozoites.
6. Body tissues or cells produced by non-infective agencies.

*Contribution from the Parasitology Laboratory, Department of Pathology, Peking Union Medical College. Read in the Parasitology Section, C. M. M. A, Conference, Shanghai, February 19th, 1923.
Anomalies Found in Fecal Examinations.

1. Physical artefacts.—These would not trouble any one except the beginning student. They consist of air bubbles or drops of oil among the fecal debris. The former are usually caused by improper contact of the cover glass and the slide and can be avoided by more careful technic. The latter are usually the result of comminution of liquid paraffin, oleum ricini or other therapeutic agents administered per os. Both types can be recognized by their rounded contour and high refractive index.

2. Contamination from the examining medium.—These extraneous substances usually consist of microscopic objects introduced in distilled or tap water, or normal saline or Locke's solution. They are commonly infusorian protozoa, particularly ciliates, which live most profusely in hay infusions but are present at times in media with only traces of nourishment. If these ciliates are relatively large under the low power of the microscope they are likely to be mistaken for Balantidium coli, which, as far as I have been able to learn, is rare in China. Smaller forms may be regarded as some new parasitic protozoan, which, as a matter of fact, is probably some infusorian well known to the biologist. Other fresh-water organisms likely to be found are rotifers (wheel animals), or microscopic free-living nematodes. These forms have all come under my observation within the year, in most instances where I had been called into consultation to view a "new human parasite." Examination of the examining medium alone will readily confirm or refute the suspicion of contamination of the medium.

3. Partially digested plant and animal cells in the feces.—These offer a continual problem to even the most skilled. Certain vegetables have considerable cellulose matter which is not ordinarily digested in the human intestine. Long fibro-vascular bundles might be regarded as parasite bodies to the casual observer but can readily be detected by their spiral or tracheal tubes and conducting vessels. Such anomalies are constantly found in feces of individuals eating melons or bananas. In addition, the parenchymatous cells of the Cucurbitaceae may at times be mistaken for helminth ova, although their cell walls are never as regular nor their contour as exact as the parasite structures. Their color is usually a green tint, and, what is more diagnostic, each preparation usually has some field showing groups of several of these cells that have not separated from one another.
Another type of vegetable cell at times confused with helminth ova is the stone cell of such fruits as the pear. It is a small cell with a heavy outer wall, at times minutely pitted or striated and showing a cytoplasmic mass in its center. It may be mistaken for *Taenia* eggs. Still, measurement of several of them reveals a considerable variation in size, while careful observation shows that they lack the characteristic three pairs of hooks, and that their outline is not as regular as that of the *Taenia* eggs. Starch grains are at times confused with cysts, but their excentric pole and opaque substance rule them out of consideration. Of all the vegetable cells which have caused confusion among clinicians in China pollen grains are the most common. They consist of many types,—round, oval, elongate, with ends tapering and ends obtuse, both smaller and larger than human helminth ova, but more frequently about the same size. Their contours are regular, pitted or papillose, while at times a distinct cytoplasmic structure is clearly seen within the regular wall. The most ready means of detecting them is by rolling them over from side to side, when in most cases it will be seen that one side is flattened, and that the rounded contour is along one side only, or that the object has two or more prominent ribs.

The dead animal cells in human feces are equally diverse in character. Most of these are so well digested that they cause no confusion. At times regular oval objects, probably partially digested meat protein, confront the examiner. They are semi-transparent and are slightly yellowish or mauve in color. But their internal structure is obscure, and they lack a cell wall or membrane. Two other types of anomalies of this group deserve mention because of their uniqueness.

Three years ago a stool of a person from near Shanghai suffering from a digestive upset and urticaria was sent to me for examination. Under the microscope among many undigested objects minute oval bodies were seen which proved to be myxosporidia, a protozoan parasite not reported from mammals. Inquiry revealed the information that the patient had eaten uncooked fish salad the night before he took sick with the digestive upset. The only plausible explanation seemed to be that the patient had eaten fish infected with the myxosporidia, and that an anaphylactic reaction had been induced.
Anomalies Found in Fecal Examinations.

About a year ago beautifully stained slides of a possible parasite from the stools of man were sent to me for diagnosis. There was no doubt that the bodies were genuine animal cells, but tremendously large for protozoa. I was somewhat puzzled at first to account for the anomaly, until I found some of the cells in process of division. First I saw the dividing cell, then a two-cell stage, then a four-cell condition, and, less commonly, an eight-cell condition. The last of the series provided the clue, for it had a distinct animal pole and a distinct vegetal pole, with a sinistral rotation of the former. This is a phenomenon of the embryo of the mollusc. Upon inquiry the patient admitted having commonly eaten the edible snail, Viviparus. The embryos within the brood pouch of the snail had passed through the intestine without digestion and were the objects under suspicion.

4. Animals introduced by accident.—These may be introduced into the digestive tract as a contamination of food, water or dirt. The last is a common case in small children.

The cabbage worm, Mermis, is at times swallowed along with leaves of uncooked cabbage. The hair-snake may be taken in with water, or along with crickets and grass-hoppers, which are a food delicacy with the Chinese. No cases of these have been reported from China but there are such records for other parts of the world. Yeast cells, Blastocystis, and other fungus growths of a non-parasitic origin, frequently get into the intestine with food, particularly ripe fruits, and produce excess of gas within the gut. The condition can usually be remedied by changing the diet. Eggs of flies laid on food or in dirt, when taken into the digestive tract, at times hatch, and, after a period of growth within the body develop into larvae. These are sooner or later evacuated in the feces, usually as living worms or maggots, for they are coprozoites during this stage of their development and can apparently live equally well in fecal matter within or outside the intestine. If they cause irritation of the intestinal mucosa (and they undoubtedly do at times), it is accidental. The habits of this type of organism are similar to those of the harmless coprozoites found in fecal examination.

5. Harmless coprozoites.—These are usually protozoa which live and feed on the fecal particles within the intestine. Probably several species of amoebae and several flagellates belong to this
group. Certainly *Endamoeba coli* is a harmless coprozoite and must be distinguished from *Endamoeba histolytica* and *Caudamoeba sinensis* before a correct diagnosis of amoebic dysentery can be made. Of the flagellates, various species of *Bodo*, particularly *Bodo caudatus* (commonly referred to in the literature as Prowazekia), are commonly found in China. This organism thrives in a diarrhoeic stool, but is not known to be responsible for the condition of the patient. In fact, it lives normally in putrefactive media outside the body.

6. — *Body tissues and cells produced by non-infective agencies*, At times motions contain red blood cells which are evacuated into the intestine from hemorrhages of the hemorrhoidal vessels following congestion of the large bowel. These must be attributed to their proper cause and not construed as a symptom of dysentery.

In fine, the clinical microscopist must be experienced and trained to recognize and identify many more objects in the human feces that are anomalies and not causative organisms of disease than he is likely to find that are disease producing. Time and patience and a keen eye are the essential requirements for such a person.

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**ON THE DIAGNOSIS OF ADENOCARCINOMA OF THE BREAST.**

H. P. CHU, M.D. Changsha.

Carcinoma of the breast is of common occurrence. Females are much more frequently affected than males. The diagnosis of carcinoma is an extremely simple matter in typical cases, but with some tumors even the best trained observer will not always be able to tell whether there is malignancy or not. The difficulty is particularly increased if the signs of malignancy are hidden in a small focus, as they may escape attention even when a minute scrutiny is made. It is in such cases that the opinion of the pathologist has great weight and it frequently depends on him whether or not in a given case there must be a radical operation or a mere excision of the mass. Notwithstanding innumerable reports that the diagnosis of breast neoplasms is steadily improving, mistakes are still occasionally made. Tumors diagnosed as innocent frequently turn
out to be malignant, and malignant tumors may undergo spontaneous disappearance. The difficulty and very great importance of being able to make a diagnosis of malignancy or otherwise in doubtful cases lead me to make a few remarks on the subject.

Among the Chinese in Changsha the epithelial tumors which we have met with most frequently are adenomas, adeno-carcinomas, and carcinomas. Following the general custom, tumors which reproduce the structure of a gland, we call adenomas; a tumor with masses of epithelial cells, atypical and proliferative, is a carcinoma; in adeno-carcinoma there are masses of epithelial cells and a glandular structure. As far as the definitions go the separating lines are sharp and distinct. But actual cases do not always present clear-cut characteristics, as adenoma may pass over imperceptibly into carcinoma. Then how can we decide whether malignancy exists or not? In order to answer this question, we must see what are the various methods proven to be of value in the differential diagnosis. Since the discovery of serological methods in the diagnosis of infectious diseases investigation of antibodies in cancer patients has become the subject of innumerable researches and has led to the invention of numerous diagnostic methods. Some of them have survived to this day, while others were forgotten soon after their discovery. It may be of interest to review a few of the methods which have, so far, yielded promising results.

The Meiostagmin reaction.—This reaction depends on the fact that when an individual suffers from carcinoma there develops in his blood a specific antibody, and when the antibody and its antigen are brought together there is a lowering of the surface tension of the mixture. Antigen is prepared from an alcohol-ether extract of cancer material and the serum of the patient is used as the antibody. According to Ascoli, who has made many observations, a negative reaction will exclude carcinoma, while a positive one is not necessarily indicative of malignancy. As the results obtained by many other workers are by no means uniform, the diagnostic value of the Meiostagmin reaction has not been firmly established.

Anaphylaxis.—The anaphylactic reaction depends on the fact that the blood of a cancer patient when injected into a guinea-pig will produce anaphylactic shock whereas the blood of a normal individual will not have this effect. This is due to the presence of
anaphylactic bodies in the former but not in the latter. Positive reactions, though suggestive of malignancy, are not absolutely diagnostic.

_Hemolytic reaction._—This reaction depends on the fact that in the blood of a cancer patient there are formed hemolytic antibodies which can dissolve alien red blood cells. It is positive in a great percentage of malignant cases, and is negative in normal individuals. The value of this test is much diminished by its non-specificity, positive results being obtained in diseases other than carcinoma.

_Hemolytic skin reaction._—In this reaction, the subcutaneous injection of 5 minims of a 20 per cent solution of washed normal red blood cells into the arm of a cancer patient will be followed in from 3 to 12 hours by the appearance of a slightly tender and red area, 1-3 cm. in diameter. This test also is not specific and its value is extremely doubtful.

Among the metabolic tests the following deserve mention.

_Salkowski's method._—This involves the relation of the nitrogen in the urine, precipitated by salts of heavy metals, to the total nitrogen output. In his laboratory investigations and experiments Salkowski found that the nitrogen average of ten healthy persons is 1.22 per cent in the urine, and that in ten cancer patients it averaged 3.03 per cent. Even the lowest limit, 2.15 per cent, has never been obtained in the urine of healthy subjects.

_Phosphate and uric acid ratio._—According to Royle the uric acid excretion is greater in cancer patients than in ordinary hospital patients under similar conditions, and phosphate excretion is lower in malignant than in non-malignant cases. If the phosphate and uric acid ratio falls below 4 it is suggestive, and if below 3 it is almost pathognomonic.

Of the foregoing methods, some seem to be sufficiently useful to justify their recommendation, while the results of many others, which are published every year in increasing numbers, are too conflicting to permit of definite judgment. Just how much practical value they have, or whether they will give satisfactory results in typical carcinomata as well as in incipient cases, is a matter of considerable doubt. In cases where the organ suspected to be the seat of carcinoma is difficult to reach it may be worth
while to try them, but there is hardly any thing to be gained by
the employment of them in a case of breast tumor, as exploratory
excision is by far the simplest procedure.

A histological examination should be made of every breast
tumor. It is generally accepted that in a tumor the new tissue is
composed of both tumor cells and stroma, but the malignancy of a
tumor depends on the behaviour of the tumor cells, not on the stroma,
which is looked upon only as the structure essential for nutrition
and support. The power of division and multiplication of tumor
cells is their intrinsic property. This can be influenced by tissue
environment just as much as the virulence of organisms can be height­
ened or lowered by a change of circumstances. In benign tumors
cells may reach their fullest differentiation; in tumors which tend
to become malignant the cells may exhibit variations sometimes
slight and sometimes marked. It is the unusual behaviour of
tumor cells which give the evidence we seek to discover for the
diagnosis of malignancy. A simple adenoma of the breast on
section shows epithelial structures which have the characteristics of
either acini or tubules. So far as the cells show uniformity in size,
shape, arrangement and staining reactions, it matters little whether
the tubules and acini are lined with a single layer or several layers,
whether the stroma is abundant or scanty, or whether the cells are
many or few. Atypical morphology and architecture, no matter
how slight, should always be regarded with suspicion. In our
cases, the presence of the features which we are going to describe
presently served as a guide in the diagnosis of malignancy.

The epithelial lining of a gland may look indented due to the
arrangement of cells in an irregular manner. The basement
membrane may be either ill-defined or absent. From the basal
layer columns of cells project in different directions. Embedded in
the stroma are small islets of cells which should not mistaken for
the cells as seen in an oblique section of a gland. As pointing to
the diagnosis of carcinoma it is not necessary that there should be
groups of many cells; one or two are significant. Papillary
projections which arise from the inner lining are accompanied by an
inconspicuous amount of stroma. This is because the growth of
connective tissue does not keep pace with that of the epithelial cells,
which, in cases of luxuriant growth, may be of any size and shape.
Cell borders may be indistinct. The cytoplasm takes eosin stain
strongly and the nuclei are homogeneously basic. Several nuclei, usually devoid of a definite membrane, may group together and frequently overlap one another. Thus individual nuclei will no longer be distinguishable. Nuclei may also differ remarkably in size and shape.

It is almost impossible to enumerate all the minute details characterizing the tumor cells of atypical type. Suffice to say that if there has been any departure from the normal, suspicion of malignancy should be aroused. The reasons why some adenomas remain benign while others become malignant are not well understood. Victor Bonney believes that there exists a relationship between the epithelial cells and the connective tissue, which so far as it is undisturbed will keep the tumor cells within control. Destruction of the elastic tissue in the basement membrane will give an exit to the tumor cells which then can invade the surrounding structures. This theory is thought by him to account for the fact that carcinoma of the breast often follows chronic mastitis and other changes in the breast incident to its involution and evolution. To what extent this will explain an adenoma becoming a malignant growth cannot be determined definitely. It seems more logical to say that irritation and injury of the breast, which occur so often, will stimulate the cells directly so that they remain in the vegetative stage. This, at least, is the view taken by Vaughan and he has clinical evidence to support it. All these explanations are largely hypothetical, but there is no question as to the fact that atypical growth of tumor cells indicates malignancy. At the present time, our means of fixing and staining the tissues have not reached perfection, and therefore minute and early changes in the cells are not always demonstrated. With steady improvement in histological technique, the time will come when exact diagnosis of malignancy will depend on the microscope alone. Though gross anatomy and the clinical history have their place in the diagnosis, they are of doubtful value in border-line cases.

Hereditary in Cases of Cancer.—Hereditary influence has appeared to exist in 5-10 per cent of various series of cases studied specifically for this purpose (Delbet). With more rigid criteria Guleke reduces the possible hereditary cases to 2.36 per cent. Williams found cancer in the family in 24.2 per cent, and quotes Sibley's observation of a mother and five daughters who died of cancer of the left breast. Ewing, "Neoplastic Diseases".
Judging by the scanty references in medical literature available in Korea, the ova of metazoan parasites have seldom been found in hernial sacs. The following report of a case is therefore interesting, all the more so as schistosomiasis japonica appears to be a rare disease in Korea.

Clinical history.—Patient, a Korean, male, aged seventy years, was admitted to Severance Hospital, Seoul, November 6, 1923, with a diagnosis of double inguinal hernia. Family history of no particular medical interest. Patient had measles at the age of seven years, smallpox at eight years of age, typhoid fever when he was twenty-four, and has had two attacks of dysentery and malaria, date of each not given. At the age of fifteen he noticed a swelling in the left inguinal region and five years later a similar swelling in the right inguinal region; both were reducible until a few years ago when the left mass could be reduced only partially. He is rather poorly nourished, but for one of his age the general condition of the heart, lungs and other organs is good. The blood examination reveals nothing abnormal. The urine shows no albumin or sugar. The sputum is negative. The feces show ascaris ova.

When the patient is standing, there is a marked enlargement in each inguinal region. The mass on the right side extends into the scrotum. It is about 6 cm. in diameter, resonant on percussion, gives a distinct impulse on coughing, and when the patient lies down it is easily reduced. Diagnosis: right indirect reducible inguinal hernia.

The mass on the left side distends the scrotum to a diameter of 15 cm. The lower portion of the mass is rather firm, dull, while the upper portion is resonant on percussion. When the patient lies down a portion of the mass, perhaps a third, is reduced.

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*Surgeon Case Reports. Article No. 34, Case report, No. 14, Research Department, Severance Union Medical College, Seoul.
directly into the abdominal cavity. Diagnosis: direct inguinal hernia, a portion of which is reducible, the remainder a mass of omentum adherent to the sac.

Operation

At the first operation, on November 7, 1923, both sides were operated upon simultaneously under local anesthesia (½ per cent novocain), the right side by my associate, Dr. Y. S. Lee, the left side by the writer. The sac on the right side was long but separated easily and was ligated high up. The internal oblique and transversalis muscles were sutured with silk to Poupart's ligament without transplantation of the cord. The portion above the internal ring was also reinforced. The external oblique muscle was overlapped. On the left side the sac was greatly thickened and contained a loop of intestine which was easily reduced directly into the abdominal cavity. There was also in the sac a large mass of omentum which was adherent to the sac. The testicle, cord, and thickened sac were all bound together in a mass so that it was difficult to make any lines of demarcation. With the consent of the patient we decided, after ligating the omentum, to remove the entire structures en masse. This was accomplished and the internal ring closed by drawing down and suturing the conjoined tendon and the internal oblique muscle to Poupart's ligament. The inner half of the aponeurosis of the external oblique muscle was also sutured to Poupart's ligament. The upper flap of the aponeurosis of the external oblique was then overlapped with the lower flap. A section made through the thickened sac was saved for pathological examination.

The patient suffered very little pain during the operation and was returned to the ward in excellent condition. Both skin incisions healed per primam. About a week after operation the left side of the scrotum began to swell. There was no pain or rise of temperature. Under local anesthesia the scrotum was incised and about 200 c.c. of bloody fluid was evacuated, and the wound packed. Two weeks later more bloody fluid collected in the lower portion of the scrotum and this also was evacuated by an incision under local anesthesia. The wounds healed and the patient was discharged in good condition on December 23, 1923.
Ova of Schistosoma Japonicum in Hernial Sac.

PATHOLOGICAL REPORT.

I am indebted to Dr. R. G. Mills, of the Peking Union Medical College, Peking, for the pathological report, with microphotograph, of the section of tissue from the sac. The tissue (Fig. 1.) in which the eggs of Schistosoma japonicum are imbedded is essentially a granuloma which in the periphery has formed a heavy fibrous capsule. The other structures present are those usually found in cases of hernia.

COMMENT.

Watson¹ in his excellent book on "Hernia", just published, enumerates several diseases which may affect the hernial sac and its contents.

1. Tuberculosis.—In 1923, Watson collected from the literature 222 cases of hernial tuberculosis. According to Cotte² an extension of an abnormal tubercular process is the most frequent cause of hernial tuberculosis; it occurs in 70 per cent of the cases.

2. Hydrocele.—This condition is often associated with hernia.

3. Mesenteric and intestinal cysts.—Lecène³ observed a cyst the size of two fists involving the mesentery of the ileum in an inguinal hernia.

4. Adrenal Rests.—In 700 operations on children, Maclennan⁴ found adrenal rests in the sac wall six times. All of these occurred in males with inguinal hernia. Saint and others have also observed adrenal rests in inguinal hernial sacs.

5. Non-Malignant growths.—Lipomata are frequently found in the inguinal canal along the cord.

6. New growths.—New growths involving the hernial contents and the sac are very rare. Gros-Devaud⁵ in 1902 was able to collect from medical literature only 14 cases of cancer in the hernial sac. Lejars⁶ observed a fibrosarcoma of the mesentery adherent to the intestine in an inguinal hernia in a man, aged 33 years.

7. Parasites.—Echinococcus occasionally occurs in hernial sacs, in patients living in tropical countries. The size of the swelling is variable; it is sometimes bilobed, and the mass may be fluctuating or solid depending on the tenseness of the contents. Deve⁷ states that the hernial cyst is due to secondary infection of
the peritoneum usually from the liver. Thomas' found a Porocephalus larva in a hernial sac. Although Dr. H. Kobayashi', of the Chosen Government Hospital, Keijo (Seoul), has seen no case of schistosomiasis japonica in Chosen, we have found in our past pathological records a report made by Dr. R. G. Mills, in 1917, of a specimen of tissue from a case of schistosomiasis sent to our laboratory from an out-station. Unfortunately the history of the case is not available. The tissue was from a tumour mass attached to the colon. It proved to be a granuloma containing ova of *Schistosoma japonicum*. This case was never reported. Our own case is therefore the first case of schistosomiasis japonica reported in a Korean, and the first reported in connection with an inguinal hernia.

**Bibliography**


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**ARTERIO-VENOUS ANEURISM OF LEFT POPLITEAL ARTERY AND VEIN FOLLOWING A GUN-SHOT WOUND.**

**John Jones, M.R.C.S., (Eng.) L.R.C.P., (Lond.). Sianfu.**

In describing the following case the object is not to record the performance of a difficult and at first successful surgical operation, but rather to describe a remarkable condition brought about by a gun-shot injury in the leg.
Microphotograph of a section of tissue from an inguinal hernial sac showing ova of Schistosoma japonicum. (JONES.)

Arterio-venous aneurism of left popliteal artery and vein. (JONES.)
The patient was a man named Ch'u Ch'uan Te, aged 40, from the county of Weinan, Shensi. He was admitted to Sianfu Hospital in the spring of 1923. About 17 months previous to admission, he was playing with a gun which discharged itself into the lower end of his left thigh, the bullet lodging somewhere in the limb. Much blood was lost at the time, the haemorrhage being arrested by binding the thigh above the wound. The knee has since gradually enlarged.

On April 17, 1923, when he was examined, there was found great swelling in the region of the left knee joint, especially posteriorly. The swelling extended from about the level of the knee joint articulation below, to about six inches above this point on either side of the thigh. The circumference of the left knee was 25 inches; that of the right knee being 15 3/4 inches. A bruit was well heard on the inner side of the swelling; a faint bruit was also heard in the upper part of the tibio-fibular compartment of the leg. Very slight pulsation was detected on each side of swelling. Varicose veins were present on left thigh and leg. The left foot could not be flexed on the ankle. There was numbness on the upper surface of foot, but not on the sole. The point of entry of the bullet was shown by a scar on the inner side of lower part of thigh.

Operation was performed on April 19th, 1923. A long incision was made down the middle of the back of the popliteal space, directly over the swelling. The external popliteal nerve was found stretched over the tumour. The tumour was opened, blood clot removed, and the opening in the popliteal artery discovered. The popliteal vessels were tied above and below this opening, and the popliteal space was packed with gauze.

Probably owing to the difficulty of making a Chinese patient observe hospital rules, or to the carelessness of Chinese nurses not fully trained and reliable, the operation unfortunately was not followed by recovery. The wound became septic, secondary haemorrhage supervened, and the man died soon after an operation for the arrest of haemorrhage. Septic absorption and loss of blood brought about a fatal termination. Amputation undertaken earlier would probably have saved his life.
RELATION OF ORIENTAL DIET TO DISEASE.

Periodically the question is raised as to whether the bulky vegetarian diet of the Oriental has any relation to the incidence of gastric and intestinal diseases. In India, Colonel Halliday, a surgeon of wide and varied clinical experience among the natives, writes to the Indian Medical Gazette (August, 1924) that during his two years service with Indian troops he never saw a case of appendicitis, gastric or duodenal ulcer or the sequelae of either condition, cholecystitis, gall-stones, nor a single case of cancer or malignant disease. In a district of over a million inhabitants containing thirty dispensaries, according to the statistical reports for which he was responsible there were no cases of appendicitis, gallstones, gastric or duodenal ulcer, and only three cases of cancer. It is not to be inferred that the people did not come to the hospital when they were ill, or were averse to submitting to operation; on the contrary, the surgical work was heavy and many abdominal operations were performed, such as suprapubic prostatectomy, nephrotomy, intra-abdominal operations for ovarian cysts, and so forth. His experiences therefore lead him to conclude that among Indians, who do not take to European diet and customs, intestinal stasis is practically non-existent; that such surgical diseases as appendicitis, cholecystitis, gall-stones with their complications, gastric and duodenal ulcers are all but unknown, and that intestinal cancer is of even greater rarity.

Other surgeons in India, in discussing the question, are not unanimous. It is pointed out that in India most of the hospital statistics covering the diseases mentioned are worthless, as diagnosis and treatment everywhere, except in the big towns, is of the most crude description; X-ray plants are not up to the standard of power necessary for barium meal work; facilities for chemical examination of test meals are non-existent, and there are comparatively few surgeons there who have sufficient knowledge and technique to justify them in tackling this class of work. Several surgeons
agree that appendicitis and visceroptosis are far less common among the poorer Indians than among Europeans, but statements vary as to the other diseases.

In China there is a similar diversity of experience and opinion concerning the diseases under discussion.

**Appendicitis.**—Jefferys and Maxwell ("Diseases of China", 1911) state that, relatively, appendicitis is a rare disease among the Chinese. This is also the opinion of Plummer, of Wenchow (Ch. Med. Jour., 1907); of Peake, of Hunan, (Ch. Med. Jour., 1912) and others. Todd, of Canton, in 1918 had only one case of appendicitis among 1,094 in-patients. The Canton Hospital during the same period, reports no case of this disease among 3,700 in-patients. According to its report for 1923, 3,528 patients were admitted during the year; 2,754 males with 8 cases of appendicitis and 774 females with 3 cases of the same disease. Weischer, (Ch. Med. Jour., 1923) states that during 1915-1923 there were 86,000 admissions to the Catholic Hospital of Tsingtao, Shantung, almost entirely from the poorer classes, and only two cases of appendicitis were among them. On the other hand, J.A.Snell and W.B.Russel, of Soochow (Ch. Med. Jour., 1916) are inclined to think the disease is as common in China as in the United States, and reference is made to an American record of 500 autopsies, wherein positive signs of past attacks of appendicitis were found in 36 per cent. And C.A.Hedblom, of Shanghai (Ch. Med. Jour., 1918) writes that compared with other intra-abdominal diseases such as peptic ulcer and gall-stones, appendicitis is of relatively frequent occurrence among the Chinese. At the P.U.M.C. Hospital, Peking, 2,589 patients were admitted during 1923 and among these were 139 cases (5.3%) of appendicitis.

**Gastric and intestinal ulcers.**—C. C. Elliot, of Paoning, Szechuan, in reporting 40 operations for gastric and duodenal ulcers, (Ch. Med. Jour., 1918) writes that these appear to be very common in China, at any rate in the province of Szechuan. Concerning the Chinese in Formosa, J. L. Maxwell (Ch. Med. Jour., 1923) says that gastric and duodenal ulcers are not specially rare. Among the 2,589 patients admitted during 1923 to the P.U.M.C. Hospital, Peking, there were 17 cases of gastric ulcer. Among 3,528 admitted to the Canton Hospital during 1923, there was only one case of gastric (pyloric) ulcer.
Visceroptosis.—References to this condition in the Chinese seem to be very few. Perhaps the bulky, irritating vegetable diet and the squatting posture during defecation prevent the intestines from sagging. In its report for 1923 the Canton Hospital reports one case of gastroenteroptosis among 3,528 patients.

Cancer of the Stomach.—J. L. Maxwell (Ch. Med. Jour., 1923) says that cancer of the stomach is seldom found among the Chinese of Formosa, but Guyders and Stroub (Ch. Med. Jour., 1923) state that among the Chinese in the Dutch East Indies cancer of the stomach is common. Turning to Burmah, where the diet and customs of the people are not very different from those of the Chinese, Barry and Crump (Ind. Med. Gaz., February, 1916) state that out of 4,164 consecutive post-mortem examinations, there were found only four cases of cancer of the stomach and one of the oesophagus; and out of 1,782 laparotomies cancer of the stomach was met with fourteen times. At the P.U.M.C. Hospital, Peking, among the 2,589 patients admitted during 1923, of the carcinomata, eight were of the oesophagus, one of the caecum, eight of the stomach and two of the colon.

It is plainly evident that we have not sufficient data to warrant positive statements being made concerning gastrointestinal diseases and their relation to the diet of the Chinese. This is a subject which might well be discussed in this Journal. Following the guidance of a writer in the Indian Medical Gazette, the main questions may be formulated as follows:

(1) Is appendicitis less common among Chinese than among foreigners in China? If so, is this a question of diet?

(2) Is there such a thing as visceroptosis amongst Chinese? If so, does it cause symptoms? Is this also related to diet?

(3) Are gall-stones, and gastric and duodenal ulcers, as common here as in the West?

(4) Is carcinoma as common among the Chinese as among foreigners? Does it affect the same parts?

If full and reliable statistics on this whole subject can be gathered from every province of China and collated with similar statistics collected from all parts of India, much valuable information will be gained, and it may be possible to decide the questions raised.
The importance of accurate vital statistics, in order to estimate aright the physical and social condition of a people or nation, is recognized by the government of nearly every country in the world. The Chinese, however, have not yet advanced to this point. They have no system of public registration of births, marriages, and deaths, and there is the fundamental difficulty that, like nearly all Orientals, the Chinese care nothing for perfect accuracy in numerical statements. Even the census returns are unreliable. As the author of "Chinese Characteristics" remarks: "The whole system of Chinese thinking is based on a line of assumptions different from those to which we (of the West) are accustomed, and they can ill comprehend the mania which seems to possess the Occidental, to ascertain everything with unerring exactness. The Chinese does not know how many families there are in his native village, and he does not wish to know. What any human being can want to know this number for, is to him an insoluble riddle. It is 'a few hundreds', 'several hundreds', or 'not a few', but a fixed and definite number it never was and never will be." It is left therefore to the private individual to collect statistical data concerning the Chinese in their own country as well as he can, and cautiously to form his own judgment.

As will be seen by Dr. Oppenheim's paper on the "Birth and Death Ratios of the Chinese", issued as an inset with this number of the Journal, an effort is being made to ascertain the proportion of males and females born in China. Even in such a simple matter if the statistician has to rely on Chinese statements only he must proceed very warily. Some years ago the present writer, while recording the physical measurements of several hundred school boys and college students, incidentally made inquiries as to the number of brothers and sisters in each family. According to the figures given, the boys outnumbered the girls to a surprising degree. What was the explanation? Were fewer girls born, or is the charge true that many undesired female infants are put out of the way as soon as born; or, owing to comparative neglect, do girls succumb more readily to the diseases of infancy than boys? None of these conjectures was correct. A casual remark by one of the students furnished the clue. To protect themselves from
the annoyance of their companions' indecorous jokes and ribald remarks, Chinese boys away from home prefer to keep silent about their sisters. In other investigations of this kind of course the difficulty may be different, but always in dealing with the Chinese it is necessary to be on guard against their characteristic disregard of accuracy.

In view of this unreliability Dr. Oppenheim wishes to obtain statistics regarding childbirth based on the direct and incontestable observations of foreign physicians and nurses who have attended obstetrical cases among the Chinese. For this purpose blank forms are sent out with Dr. Oppenheim's paper and all who can are asked to be so kind as to fill them in and return as directed. Chinese mothers very seldom consult foreign physicians in normal maternity cases, but if all will report the births they have actually attended, the material will be sufficient to determine the sex proportion of Chinese births. The result of the inquiry will be published in this Journal if the answers received are sufficiently numerous. The value of the inquiry is indicated in Dr. Oppenheim's paper.

Medical Reports.

PEKING, CHIHLI
Peking Union Medical College, 1922-1923.

Teaching Staff of College.—Medical School: Chinese instructors, 30; foreign, 39. Premedical School, Chinese, 6; foreign, 14. School of Nursing: Chinese, 1; foreigners, 2. Total, 57 Chinese instructors and 55 foreign instructors. Also several visiting professors.

The number of students now enrolled in connection with the College is as follows: Medical School, 53; Premedical School, 56; School of Nursing, 16; graduate and special students, 79. Total, 204.

In the hospital there has been a considerable increase in the number of patients during 1923. The in-patients numbered 3,403; out-patients (total visits) 77,301. The number of autopsies on hospital patients during this period was fifty.
The work of the China Medical Board in 1923 consisted mainly in the further development of projects initiated in previous years, particularly in the field of medical education and college science teaching. Some aid was continued to hospitals not connected with medical schools, but the movement for the elevation of hospital standards has now gained such strength as to justify confidence that it will continue to go forward with the help of the communities which the hospitals are serving. Since further progress must depend mainly on the supply of qualified doctors and nurses, a greater concentration of effort on the strictly educational features of the Board's program has seemed appropriate.

Special funds were provided during 1923 for a field study of kala-azar by Dr. C. W. Young, assistant professor of medicine at Peking, who has made notable improvements in methods of detecting and culturing the parasite; he will be assisted by the entomologist, Dr. M. Hertig. The main object is to learn, if possible, something of the way in which the disease is transmitted.

There has been valuable cooperation with other institutions, especially with the North China Union Medical College for Women, the Shantung Christian University, and the Hunan-Yale College of Medicine. In the field of premedical education marked progress was made throughout China during the year 1923, particularly in the provision of better laboratories and equipment for the teaching of physics, chemistry and biology in colleges of arts and sciences. Financial aid was given to a number of institutions doing this work in China.

In view of the difficulty of securing and preparing suitable material for the teaching of biology at many places in China, preliminary arrangements were made for the establishment of a biological bureau, which would collect, prepare, and distribute material at cost to the colleges of China. This project involves the sending out of a naturalist for two years to initiate the service and to give the necessary training to persons already in China who would afterwards carry on the work independently.

The China Medical Board has also rendered help to the movement for popular health education in China, a contribution of Mex. $13,500 a year for two years being made to the Council on Health Education.
TSANGCHOW CHIHLI.
Roberts Memorial Hospital, Report for 1923.

Hospital Staff:—One foreign and one Chinese doctor; one foreign matron, one qualified Chinese male nurse. In-patients, 395. Out-patients, 5,130. These figures are unusually low as bandits have made the roads unsafe for travelling. Operations, 287; several Caesarean sections and ovariotomies were performed.

Tsangchow is the nearest large town to Tientsin where there are foreigners. Two years ago during the fighting between Chang Tso-lin and Wu Pei-fu, brigands took possession of the city and demanded $10,000 under threat of looting and burning. The country is still disturbed, nevertheless, the work during the year has been quiet.

In the autumn a new form of work was tried which promises well if it can be developed. But it cannot be carried on independently of a good hospital. "It is only very seldom in the year that it is possible to get away from the central hospital when there is only one foreign doctor on the staff, but there is work that could easily keep one going all the year round in the thousands of villages for which we are responsible. Only a minute proportion of the sick ever think of making the difficult journey to Tsangchow for treatment, or to any of the nearer branch hospitals, but if one visits once or twice, there are always numbers who come for advice. Some of these have to be told that the only possible thing is a journey to Tsangchow, and a serious operation, and a few of these come along. Others can be given advice, and a prescription which they can send by someone else if they cannot go themselves. Moving about from village to village, instead of staying in one central town as we used to do, has many advantages. The existence of the independent branch hospitals has relieved the necessity for taking a large operative outfit with one for ordinary operations. In the evenings, lectures on health subjects as well as gospel talks help to prevent unnecessary illnesses. There is a great field for Phonetic literature on health questions. The peasants are utterly ignorant of the most elementary laws of health and cleanliness, but they are always interested in what one has to say to them. Health literature in anything but the very simplest language is quite useless."
By means of this Phonetic system Dr. Peill is also accomplishing a great religious work among the people. The Matron's report refers to the development in the work of training nurses, and to the general work of the hospital, medical and religious.

TSINAN, SHANTUNG

Shantung Christian University Bulletin.—President's Report, June, 1924.

This report covers the work of all the departments of the University. Of special interest to the medical profession is the reference to the efforts made to obtain an official charter from the Dominion Government of Canada empowering the University to confer academic degrees. The charter has now been granted.

The success of the experiment in co-education by this institution shows that we should not be too much afraid of Oriental conservatism. The following statement is made on this subject:

"In the report which was presented to you last year, mention was made of the successful negotiations which had resulted in the amalgamation of the North China Union Medical College for Women with this University. The amalgamation went into effect in September last, when the first class of women medical students was received. At the same time a large class of women premedical students was admitted, and, by special action of the Field Board, the School of Theology was permitted to open its doors to a small group of women students who wished to avail themselves of the opportunities afforded there. Thirty-two women students were received altogether during the autumn semester, whilst in February of the present year the remaining two classes from the Women's Medical College, consisting of 15 students, were transferred to our School of Medicine. At the same time our staff was greatly reinforced by the accession of six women teachers, detailed references to whom is contained in another section.

"A special Women's Committee has been formed in China, with representation upon the Field Board of the University, in order to look after the special interests of our women students; whilst a similar committee has been organised in North America and has already made a large contribution towards the support of women's education in this University.
"In spite of the sincere doubts which had existed in some quarters as to whether the time was ripe for so wide an experiment in co-education, the results have abundantly justified the foresight of those who advocated this step. The women students have taken their place in the life of the University with a quiet dignity and self-possession which it would be difficult to match in any other country, and their presence on the campus and in the class-rooms has brought a new influence into our midst which is quite out of proportion to their actual numbers. In embarking upon this experiment we have been peculiarly favoured in having the presence of two experienced administrators, Dr. Luella Miner and Dr. Eliza Leonard, and it is to their wise counsel and efficient management that we owe the striking success of this new enterprise.

"In scholastic ability, and in faithful work the women students have easily held their position with the other students, to whom their competition has provided a valuable stimulus."

Canton Hospital, Canton. Report for 1923.

Hospital Staff: Seventeen physicians, thirty-four nurses.

Number of hospital beds, 238. Number of in-patients, 3,528: males, 2,754 (80%); females, 774 (20%). Average stay of patients in hospital, 19.34 days. Operations, 2,226. Dispensary patients, 15,184. In the X-ray Department there were over 1,000 examinations. Total number of persons treated, 20,864. Cost per patient per day: private patients, $2.33; ward patients, $1.57; average for all patients, $1.67. Income, $130,727.46. Expenditure, $122,769.52.

All members of the Hospital Staff are engaged in gratuitous medical education; the students from the three medical schools attend regularly, as part of their curriculum, the lectures and clinics. There is a proposal that the Canton Hospital should co-operate in co-educational work with the Hackett Medical School.

During the year the hospital cared for thousands of sick and wounded soldiers of the different provincial armies fighting near Canton.

Of the total admissions about 80 per cent were injuries, and of these about 80 per cent were gunshot and shell wounds. These included about 100 perforating wounds of the chest, with a mortality of 13 per cent; sixty of the abdomen, mortality of 20 per cent; and
twenty of the brain, with a mortality of 45 per cent. In about 1,000 serious injuries among the soldiers admitted to this hospital, the mortality was 7 per cent. Eighty soldiers had multiple gunshot wounds; the mortality in these cases was 5 per cent.

As an act of appreciation and in recognition of the great service rendered to the people of South China during a period of 88 years since its foundation, the Government has presented to the Canton Hospital a splendid new site for new hospital buildings and residences. The area of the land is about 127 mow (20 acres). It was chosen by the Hospital's representatives, and is splendidly situated for the purposes of hospital, medical school, and residences for staff, and provides ample space for all. A new motor road, to be immediately constructed, brings it to within 15 minutes of the present site of the Hospital. The presentation is a very remarkable proof of the prestige and importance of the Canton Hospital. It was a free gift, there being no question of debt.

THE MORBID ANATOMY AND PATHOLOGY OF SPRUE, AND THEIR BEARING UPON AETIOLOGY.*

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One of the outstanding problems in tropical medicine at the present day is the true pathology and aetiology of sprue. All attempts up to the present to isolate a specific agent or organism have failed, nor has any really clear idea of the true pathology of this mysterious disease been formulated. This is a question of primary importance, for sprue is a widespread tropical disease, and in certain endemic areas, as in India and Ceylon, the number of sprue cases amongst European residents appears to be much greater than was formerly the case.

The geographical distribution of sprue has peculiarities which may have a very distinct bearing on its aetiology. Sprue is common in the Eastern Tropics as well as in South America, Southern United States, and North Australia. On the other hand, as has been remarked, but not, I think, sufficiently emphasised, sprue

is entirely absent from tropical Africa. Another point of prime importance is the predilection of the disease, in endemic areas, for the European in preference to the light or dark-skinned Asiatic.

A third point is the close clinical resemblance of some cases of pernicious anaemia to sprue, especially as regards their onset.

Pathology of Sprue.

Existing accounts of the morbid anatomy and pathology of sprue are very meagre. Much of the older literature treats of naked-eye changes in the intestines and organs which are obviously the result of post-mortem decomposition. It has been realised for some time that the true pathology of sprue cannot be based upon the appearances of cases dying of atrophy after a wasting illness prolonged over many years. The post-mortem appearances seen in these latter cases are the result of long starvation, and probably the early essential lesions of the disease have long since disappeared.

Emphasis has mostly been laid upon the marked attenuation of the small intestine, and the complete stripping of the mucous membrane. From time to time the liver, on account of the remarkable wasting this organ undergoes, and the pancreas, on account of the fibrotic changes observed, have been incriminated. But clinical observations lend no support to these views. On clinical grounds one is at least justified in surmising that the primary lesions are in the small intestine, and that the well-known ulcerations of the mouth and tongue are of a similar nature. In order to ascertain whether this is true it is necessary to examine at autopsy early and rapidly fatal cases of sprue. I have always been of the opinion that in early cases only will the true aetiological cause be discovered.

We have in bacillary dysentery an almost analogous case. We know that in this disease the appearance of the intestines in the chronic stage bears no resemblance to the acute necrotic, congested gut of the early infection, so that it would be impossible, without extensive experience, to say that the one was the outcome of the other. We further know that, as fibrotic and atrophic changes in the gut walls take place, so the aetiological cause—the dysentery bacillus—entirely disappears. So may it be in sprue.
Fig. 1.—Lower portion of ileum, showing ulceration with production of patches of diaphanous and attenuated bowel. The enlarged and dilated nutrient vessels can be seen in the submucosa. The bowel is viewed as a transparent object.

Fig. 2.—Section through base of ulcer (camera lucida), showing deposition of lipofuscin, dilatation of capillaries, and round-cell infiltration. × 175. Arrows indicate the pigment-containing cells.

Morbid Anatomy and Pathology of Sprue. (Manson-Bahr)
Evidence is now accumulating that the essential primary lesion of sprue is an ulceration of the small intestine, chiefly affecting the lower end of the ileum. It is possible that in the mild cases the ulceration is superficial, leading merely to a catarrhal state of the mucosa, while in more serious cases the ulceration may be more extensive and involve the submucous tissue of the gut, and may, on occasions, perforate the gut wall and lead to general peritonitis and death, as in the two instances cited below.

Previous cases.—Faber in 1904, and Justi in 1913, have published accounts of carefully conducted autopsies, in which a specific ulceration of the small gut was found, together with widespread destruction of the villi. Fischer and von Hecker in 1922, published a study of a case dying of acute sprue, in which small linseed-shaped ulcers were present in the mucosa of the lower jejunum and ileum. In the caecum numerous attenuated patches were present. No micro-organisms were demonstrable in the ulcers, nor could yeast cells be cultured from the lesions. In the bowel wall a diffuse haemoschromatosis, due to lipofuscin, was present. These investigators consider the ulceration of the bowel specific of the disease.

Two Cases Described.

Within the last three and a half years I have had the somewhat exceptional opportunity of observing two rapidly fatal cases of sprue, and of making complete investigations with both of them.

Case 1.—An ex-soldier, aged 40, who had served with the Yeomanry in Salonica, Palestine and Syria. This is the first case of this disease to be recorded from those countries. A year after demobilisation, in the early part of 1920, diarrhoea commenced; this was of the usual type—i.e., white, frothy, liquid stools passed in the early hours of the morning, together with progressive emaciation. The tongue and mouth symptoms appear never to have been well marked; the patient complained mostly of great sensitiveness of the mucous membrane of the lower lip, the tip and sides of the tongue. When first seen on September 7th, 1920, the patient was in a very emaciated condition, his voice was husky, the skin was dried, the abdomen was distended with gas, the liver dullness was much reduced, being barely perceptible to percussion.

He was admitted to hospital on September 9th, and was placed upon purely milk diet. The stools then rapidly assumed typical sprue-like characters, being semi-solid, large, white, and greasy. In spite of the milk treatment, the patient continued to lose weight and to suffer from acute
indigestion and flatulence. His weight, which was normally 168 lb. fell to under 98 lb. Various changes of diet were tried, without any ascertainable effect. At the beginning of October dark patches appeared on the tips of both toes, which resembled incipient gangrene. Subsequently he complained of great pain in the right iliac fossa, and on several occasions vomited large amounts of undigested food. On November 25th, 1920, there was little doubt that general peritonitis had set in; an exploratory laparotomy was therefore performed, and general plastic peritonitis was found present throughout the whole abdomen, but no perforation could be located. Death occurred two days later. The blood pressure, which was systematically taken, was observed to fall from 120 mm. Hg systolic, till it reached 90 mm. Hg. The gastric juice contained no free hydrochloric acid. The blood examination showed a slight degree of anaemia, the haemoglobin being 90 per cent, the red cells 4 million. Little assistance was obtained from sigmoidoscopic examination, which showed a diaphanous condition of the lower bowel and superficial reddening of the mucous membrane.

Post-mortem Examination.—General atrophy of all the organs, and especially of the liver, was noted. The small intestine was distended with gas, the walls were transparent, and there was one large ulcer in the ileum six feet from the ileo-caecal valve, situated on the surface of the bowel opposite the mesenteric attachment. It measured one inch in diameter and had perforated in two places where recent plastic peritonitis had set in, and had become adherent to neighbouring coils of small intestine. The contents of the small bowel were similar to the stools observed in life.

The microscopic appearances of the organs were in the main similar to those described in the next case.

Case 2.—An engine driver, aged 41, from Ceylon, where he had resided for 13 years. His illness commenced in June, 1920, with sudden explosive early morning diarrhoea and the passage of frothy, light-coloured stools. In August, 1920, he returned to England, but the diarrhoea continued, and in fact got much worse. It was accompanied by great emaciation, and in October—i.e., four months after the commencement of the illness—the tongue symptoms set in, and at the same time small yellow and very painful aphthæ made their appearance on the sides and tip of the tongue, as well as on the mucous membrane of the mouth.

He was admitted to hospital on October 14th, 1920. The condition on admission was as follows: He was a big made man, who had obviously lost weight—according to his statements already 28 lb.—and now weighed 152 lb. The tongue was pointed, glazed, and intensely hyperaemic. There was one typical sprue ulcer, almost the size of a threepenny piece, at the tip. The mucous membrane of the mouth was engorged, especially at the inner surface of the under-lip. The abdomen was distended with gas, and the stools were large and quite typical of the condition. The patient looked extremely ill, and his skin was loose and inelastic. Secondary anaemia
The Morbid Anatomy and Pathology of Sprue.

was present in a marked degree; haemoglobin, 70 per cent normal; red blood corpuscles, 3½ million. The stools, numbering between three and four in 24 hours, were large, frothy, and light-coloured, weighing 20 to 30 oz. and in every way typical. The urine was highly coloured and contained urobilin. The physical examination of the patient revealed little save some diminution in liver dullness and tympanitic distension, especially of the small gut. On being placed on milk treatment immediate improvement took place, increase of weight, and quiescence of symptoms. After six weeks in hospital he was discharged to convalescence, but returned on January 4th, 1921, with an exacerbation of the condition. He was then desperately ill, and the diarrhoea continued in spite of several kinds of treatment, with loss of weight approximately averaging 3 lb. a week. The diarrhoea varied, but was apt to recur suddenly without any apparent cause. The stools become liquid and curdled, being very offensive and greenish in colour, and from time to time contained thick mucus and blood. Sigmoidoscopy of the rectum revealed merely a superficial pink hyperaemia. Towards the end the stools became more bilious, while pigmented spots appeared around the hair follicles on the abdomen, and haemorrhages on the back of the hands and forearms. At this time the patient complained of great pain in the lower part of the abdomen. Throat symptoms were also noted, the gullet appeared raw, and the patient had great difficulty in swallowing. Considerable diminution of the liver dullness took place, reaching merely from the eighth rib to the costal margin. Death took place suddenly on April 28th, 1921. He then weighed 91 lb.

Post-mortem Examination—At autopsy, 12 hours after death, the skin was bright lemon-coloured, with entire absence of subcutaneous fat. Petechial haemorrhages were present, especially on the arms and legs. On opening the abdomen peritoneal pus was found in the right iliac fossa. Small petechial haemorrhages were noted in the posterior peritoneum, as well as on that covering the large intestine. General plastic peritonitis was noted in the pelvis as well as the last two feet of the ileum, which was haemorrhagic and covered with solidified lymph; the descending colon and the rectum were in a similar condition.

The mucous membrane of the large gut appeared normal, and the surface was covered with thick viscid mucus. The mucous membrane of the caecum was plum-coloured and partly haemorrhagic. The main interest centred in the ileum. The mucous membrane was acutely inflamed, with diaphanous transparent patches. Twelve ulcers of varying sizes, situated on the surface opposite the peritoneal attachment, were found, separated from each other at regular intervals of about 9 inches. The greatest number of ulcers was found in a length of gut about 4½ feet. These ulcers were more or less of the same size, roughly oval in shape, with puckered, rolled margins, and haemorrhagic bases. When held up to the light they were found to be translucent, and in all of them actual perforation of the bowel had occurred. In size they varied from 0.5 to 1 cm. (Fig. 1). The ulcers
had no relation apparently to Peyer's patches, which were normal in appearance. The upper part of the ileum and the jejunum were slightly hyperaemic, and in the upper part of the jejunum one small ragged ulcer, 3 mm. in diameter and similar to those already described, was present. The mucous membrane for an area of 3 inches around this spot was inflamed. The mucous membrane of the duodenum showed catarrhal changes.

The faecal contents of the intestinal canal were also of interest. The lower part of the duodenum and ileum were filled with light-coloured, fluid, sprue-like feces, which were entirely odourless. In the large intestine the colour was similar, but they were more consistent and offensive. The mesenteric glands were enlarged, pink, and injected. As regards other organs there is little to note, save a diminution in weight, as shown by the following table: the liver weighed 34½ oz., spleen, 4½ oz., lungs, 17 oz., kidneys, 4½ oz., each; heart, 5 oz. The liver gave a marked blue ferrocyanide reaction, indicating that an extensive haemolysis had taken place. The gall-bladder, which was collapsed, contained a few c.c.m. of amber-coloured bile.

Cultures were made from all the organs, as well as from the mucus, throughout the whole intestinal canal, both in nutrient as well as in glucose broth. No yeast cells were seen or growth obtained from any of these situations. Scrapings were made from the ulcers themselves, and examined under a darkground illumination for the detection of spirochetes or other characteristic appearances without success. Tuberculous infection was definitely excluded. The tissues were all examined microscopically, of which the following is the report:

**Morbid Histology.**

*Tongue.*—There is an almost total denudation of epithelium, and the subepithelial papillary structures are irregular, with hyperplasia of the connective tissue. Brownish-yellow pigment is present, either as fine granules or in aggregated masses up to 10 microns and over. These are sparse in the deeper layers of the epithelium, more numerous in the subepithelial connective tissue. The larger individual granules are situated in the upper part of this tissue, the aggregations in the deeper layers. In the muscle area they are very rare, and, when present, are in the inter-fibrillar connective tissue, not in the muscle itself. The capillaries generally are congested.

**Small intestine: Jejunum and Ileum.**—Save at the site of the ulcerations, no general loss of surface epithelium appears to have taken place, though, on account of post-mortem changes, this point is difficult to determine. As I have already pointed out in my studies on this disease in Ceylon, there is a general atrophy of the villi themselves due to fibrosis, and a diffuse round-cell infiltration of the whole of the mucosa. There is also a general fibrosis of the submucosa and dilatation of the capillary vessels. In the tissues underlying the ulcers are numerous granular masses
of a yellowish-brown pigment (haemofuscin), but beneath the lateral margins pigmentation becomes more scanty. In the tissue itself lymphocytes are the predominating cells, while fibroblasts are few, eosinophils scanty, and polymorphonuclears almost entirely absent. Masses of pigment can be distinguished in the neighbourhood of the muscularis mucosae, where it is for the most part enclosed in endothelioid cells, the nuclei of which in some cases appear to have been displaced or destroyed by the accumulated pigment granules. Appropriately stained sections failed to reveal any microorganisms, save in the superficial necrotic layer forming the base of the ulcer.

**Pancreas.**—The pancreas is to all appearance normal; cells and nuclei stain well, there is no infiltration, no atrophy of cells, and no pigment seen.

**Liver.**—Some degree of fatty metamorphosis of the liver is seen in the periphery of the lobules, and in these parts also many cells contain a very finely granular yellowish-brown pigment. In certain areas all the cells show this, but here, too, the peripheral cells are much more densely packed with it.

There is no increase of connective tissue, nor any indication of inflammatory reaction.

**Kidneys.**—There is very little change in the kidneys. In some areas the epithelial cells stain badly—probably a necrobiosis condition. The vessels generally are congested and few of the convoluted tubules contain hyaline material.

**Spleen.**—The spleen shows increase in connective tissue, trabeculae prominent. Vessels congested, and here and there are minute extravasations. Many of the pulp cells are filled with finely granular dark-yellow pigment, or with round masses similar to those seen in the small intestine. In some areas every cell contains this pigment. The interstitial tissue does not show any.

**Large intestine**—The large intestine does not show in this case any subepithelial vascular infiltration, nor any pigment-bearing cells as recorded by Fischer and V. Hecker.

There is evidently a remarkable similarity in the gross pathological changes and finer histological details to the description given by the last named workers. The essential anatomical lesion in sprue appears to be an ulceration of the small intestine which, if it continues long enough, leads to the complete atrophy of the villi, such as is observed in the chronic stage of the disease, and one may surmise that the aphthous ulcers which commonly occur in the mouth and on the tongue in sprue are part of the same pathological process. But probably the complete denudation of the tongue, the shrinkage of the various viscera, and the extreme atrophy of the small intestine which is seen in these cases are to some extent ascribable to malnutrition.
Pathological Lesions in Relation to the Clinical Phenomena

Are the pathological lesions in these cases sufficient to account for the well-recognised clinical phenomena of sprue? First, as regards the stools, these are characterised by their large size, their gaseous character, and absence of the customary faecal pigment or stercobilin. The bulk of the faeces can be accounted for by the large amount of non-absorbed fat which they contain. Recent analyses seem to show that an explanation may be found in failure to absorb the fats already digested by the pancreatic juice. The total fat content of the faeces in sprue varies from 34-57 per cent, (sometimes as high as 63 per cent [Willmore] of total fat in the faeces, a figure which is greatly in excess of the normal (15-25 per cent), while the fatty acids preponderate over the neutral fats and soaps in a proportion of 3:1 or 5:1 (J. D. Thompson). The fat has therefore been digested, but cannot be absorbed through the villi of the small intestine; this may be due either to their actual destruction or to the chronic inflammation interfering with the passage of the digested fat into the lacteals. Sections of the small intestine show a widespread round-celled infiltration throughout the mucosa.

Recently, attention has been drawn to the close similarity between coeliac disease in children and sprue. The resemblance really lies in the stools, for in many other respects the two diseases are distinct. In coeliac disease the essence is a mal-absorption of fat in the diet, probably due to a digestive fault. The faeces contain 30-80 per cent of fat, of which the greater proportion, as in sprue, is a fatty acid. There is some evidence that in this disease the pathological lesion lies in an obstruction of the lacteals themselves, not in the mucosa, as in sprue.

It has long been known that cases of tabes mesenterica may pass copious greasy offensive stools somewhat resembling those of sprue. Ryle has recently pointed out that the inability to absorb fats in this instance is to be ascribed to obstruction of the lacteals by tuberculous mesenteric glands, and it is probable that this is also the essential lesion in coeliac disease.

In complete destruction of the duct of Wirsung copious, pale, greasy stools are passed, and in this case the amount of unaltered fat in the faeces may rise to 50 or even 90 per cent of the total, while the neutral fats are greatly in excess of the fatty acids, but
in this case stercobilin is present in the faeces, although its colour is masked by the fat. In pancreatic disease the diastatic test of the urine affords aid in diagnosis, but in cases of sprue that I have investigated the diastatic value is invariably low, thus indicating that it is not the pancreas that is involved. The pale colour of the sprue stool is to be attributed to the excess of unaltered fats and fatty acids. The normal faecal pigment stercobilin is present, but has become reduced, apparently by abnormal or excessive bacterial action, into a colourless compound, but which on oxidation rapidly becomes converted into brown pigment. The appearance, size, and chemical composition of the sprue faeces, as well as the pigmentary changes, can, on the basis of our present knowledge, be ascribed to destruction of the absorption surface of the ileum, and to hurrying on the contents of the jejunum through the large gut.

Should this view be correct, and the main phenomena of sprue be attributable to a mechanical interference with digestion, then symptoms similar to those of sprue should be reproduced by other diseases involving the mucous membrane of the ileum. That this may be so is illustrated by the following case which, through the kindness of Dr. J. G. Willmore, I am permitted to quote. The case was generally regarded as one of sprue, the faeces were quite typical and contained 53 per cent of fat. Later, as symptoms of intestinal destruction supervened, a laparotomy was performed, and a malignant growth of the ileum removed, after which the faeces resumed a more normal size and colour, and the fat content was reduced to 25 per cent. And, apparently in extensive tuberculous ulceration of the ileum, a similar fatty sprue-like stool is produced.

Secondly, as regards the anaemia. A certain degree of blood destruction is present in nearly every case of sprue; as a general rule, it is most marked in long-standing cases, and in them appears to be consequent upon the intestinal symptoms. In extreme cases the blood picture may resemble that of pernicious anaemia and is of the aplastic type. But, on the other hand, in some advanced cases anaemia is not always noticeable. It has been suggested that the presence of anaemia is dependent upon achylia. But it is not in every case of profound sprue-anaemia so far investigated that a normal or even excessive hyperchlorhydria
is present; on the contrary, fractional gastric tests in the majority of ordinary cases give a normal acidity curve. (Recent analyses of my own cases).

In my opinion the haemolysis is consequent upon the ulceration of the small gut, and that a very considerable degree of blood destruction takes place in the gut wall at the base of the intestinal ulceration can be gathered from a study of microscopic sections (Fig. 2), where destroyed blood pigment can be distinguished within the phagocytic cells. That a very active haemolysis occurs in sprue can be judged by the ferrocyanide reaction in the liver, which was most intense in the two cases which form the basis of this study. I have also previously remarked upon the presence of Russell's bodies in sprue tissues, especially in the spleen pulp; these bodies are regarded by Woodcock as the result of haematophagy and as possibly due to some specific haemolysis, but, at any rate, they are present in tissues in which rapid blood destruction is taking place.

The Question of a Specific Organism.

Is there any evidence that a specific micro-organism is responsible for the specific lesions of sprue? The presence of yeast fungi in the intestinal contents, the buccal cavity, and faeces of sprue has attracted a considerable amount of attention. Originally these organisms were considered by Kohlbrugge as identical with Monilia albicans, a view I have always endorsed. At present I regard these organisms as merely a superimposed secondary infection, such as is liable to occur in any prolonged wasting disease, such as diabetes, tuberculosis, carcinoma, etc., and as by no means peculiar to sprue. Furthermore, I am of the opinion that a yeast infection in sprue is much more likely to occur within the tropics, and then only in advanced cases of this disease. It will be noted that in the two cases under review these organisms were entirely absent, both from the faeces during life and the viscera after death, although cultures on appropriate media were made under the most favourable conditions.

Ashford, on the other hand, considers that sprue is a mycosis of the intestinal canal superimposed upon some food deficiency, and that the pathogenic agent is a specific species of yeast cell—Monilia psilosis, distinguishable from Monilia albicans—
The Morbid Anatomy and Pathology of Sprue.

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the thrush fungus. His theory is that in sprue there is a glandular deficiency in which the pathogenic fungus *Monilia psilosis* finds a congenial medium in which to multiply. This view has not received any great measure of support.

McCarrison has shown that atrophic changes in the small intestine of monkeys may be produced by a vitamin-free diet, but, on clinical grounds, there is no evidence that the lack of vitamins plays any part in the production of sprue, at any rate, in Europeans in the East. Scott has put forward, as a plausible hypothesis, that sprue may be due to an error of calcium metabolism. Many of the symptoms may be ascribed to calcium deficiency, which ultimately produces an ulceration of the small intestine and the passage of an excess of calcium salts in the faeces; and in a recent paper, Ryle ascribes tetany and other symptoms of coeliac disease (which are also common to sprue) to excessive excretion of the same substance. These suggestions, though somewhat indefinite at present, afford food for reflection, and indicate lines upon which future research should be based.

I am greatly indebted to Dr. H. H. Scott for critical examination of the histological specimens, while to Dr. H.B. Newham, C.M.G., Director of Pathology at the London School of Tropical Medicine, for the preparation of microscopic sections and to Dr. A. L. Gregg, superintendent of the Hospital for Tropical Diseases, for material assistance, my best thanks are due. Dr. J. G. Willmore has assisted me with suggestions based upon his own recent experiences of sprue.

References

The China Medical Journal.


C.M.M.A. KULING BRANCH: SUMMER MEETINGS.

The Secretary takes pleasure in reporting herewith some of the 1924 activities of the Kuling Branch of the C.M.M.A.

In all eight meetings have been held at which there was an average attendance of 27. Fourteen papers have been presented on the following subjects: Industrial hygiene in China, Hygiene in China, Schistosomiasis, Disinfection of fruits and vegetables, Tuberculosis, Appendicitis among Chinese, Hookworm disease in China, Translation and terminology, Problems of disease distribution in China, Practise vs. study in the training of nurses, Newer work on Scarlet Fever, Prenatal care in relation to the prevention of eclampsia, Use of White Phosphorus in China, and the Health of Missionaries.

A valuable feature of the summer was the presence among us during August of the Executive Secretary, Doctor James L. Maxwell, to whom we are indebted for much light and help.

A library of current medical journals, both British and American, has been maintained and used by the members.

The following are the officers of the Association for 1924-25:
President: Dr. Agnes Gordon Murdoch, Huai Yuen, Anhwei.
Vice-President: Dr. Henry Fowler, Shanghai.
Secretary: Dr. W. Clayton Grosvenor, Yale Mission, Changsha.
Treasurer: Dr. H. Oxford Chapman, Hodge Memorial Hospital, Hankow.
Trustees: Drs. F. J. Tooker, W. B. Russell and W. L. Berst.

We are glad to report a real refreshment medically from our associations in the Branch which is in a healthy condition.

REGINALD M. ATWATER,
Secretary.
PLAQUE IN JAVA.


The author is the head of the Plague Prevention Service in the Netherlands Indies, and in this long report he describes the efforts to stamp out epidemics by evacuation of the houses, fumigation and disinfection, after the introduction of the plague in 1911. Twelve years' experience has demonstrated the futility of such measures. Warehouses can be disinfected effectually but not human habitations in that country; rat-proof construction is the only remedy. Preventive vaccination proved disappointing (Haffkine vaccine). The mortality was reduced by it scarcely 50 per cent and the morbidity much less. Of the total 81,599 cases during the twelve years, nearly a third were in the last four years, and included about 2,000 cases of pneumonic plague. He states that the biological relations between domestic rats and other species prevent transmission of the plague by this means. The transmission is by commercial traffic. The virus is distributed to all parts of the world by ship and rail and is then conveyed to the smallest hamlets by cart, horse, bundle or basket. Human intercourse does not seem to be a significant factor in the transmission of the disease.

SODIUM PHOSPHATE IN THERAPEUTICS

Vetlesen, Norsk Magazin for Laegewidenkaben, May, 1924.

Vetlesen has been loyal to sodium phosphate for thirty years, and says he has never had any reason for abandoning it for newer remedies, especially in the hundreds of cases of neurasthenia, psychasthenia and general weakness in which it has been his main reliance. In over 100 cases of simple goiter, the enlargement of the thyroid has been arrested if it did not retrogress to some extent. In seventy cases of exophthalmic goiter, there were never any signs of intolerance and no contraindications were discovered. These patients are advised to take the drug indefinitely, for months or years, with short intermissions. With a few exceptions, they took the sodium phosphate according to the usual prescription, namely, a tablespoonful four times a day of a 15:250 solution; that is, about 4 gm. a day. He cites Embden's clinical and experimental research (1915) which apparently confirmed that phosphoric acid not only sustains and promotes muscular work but promotes all the vital functions in general. Von Noorden has been applying it of late in convalescence and as a general tonic in tuberculosis and diabetes, but did not find it of much use in exophthalmic goiter. In the latter disease, however, Goldscheider, Brugsch and His reported last year excellent results with this drug. Vetlesen says...
that under sodium phosphate treatment the nervous balance is restored, the heart tranquilized, the pulse rate slowed and the tremor subsides, while the goiter ceases to enlarge or grows smaller and softer.

**DIAGNOSIS OF APPENDICITIS.**


The author found the diagnosis wrong in 18 per cent of the patients sent to the clinic for an operation for acute appendicitis, and in 35 per cent of the supposed chronic cases. Affections of the female sex organs were the most frequent cause of error. Vaginal examination should precede appendectomy in women as well as rectal examination in men. The shifting of the pain from the epigastrium to the right hypogastrum is a very important sign of appendicitis. Bilateral pains may point to salpingitis. The two affections may be combined. The pain follows the whole extent of the colon in colitis. Pneumonia in children and typhoid are to be thought of as possibilities when there is high fever. Typhoid should be suspected when headaches are present. The face is flushed in pneumonia, and there may be herpes. There is no facies abdominalis in these patients. Spasms of the bowel and umbilical colics of nervous children, without increase in temperature, have caused many unnecessary operations. The pain in affections of the gallbladder stops after infiltration of the right tenth thoracic nerve. An idiopathic serous peritonitis—perhaps of influenza origin—causes, in the young, acute diffuse abdominal pains, vomiting and other signs of perforative peritonitis. Hematuria does not exclude appendicitis. Surgical treatment is necessary whenever the diagnosis is certain or probable. It should be omitted in all other patients.

**RESULTS OF SURGERY FOR MIGRAINE.**


Seventy-five per cent of 1,335 patients were operated on by surgeons all over the United States from one to seven times for the relief of migraine. The operations varied in magnitude from cerebral decompression and colectomy to circumcision of the clitoris. The end-results from all angles of surgical attack were the same. Not a single patient operated on was cured or relieved more than temporarily, while those patients who were unfortunate enough to have their reproductive organs removed, or have a gastro-enterostomy performed, were made much worse not only so far as the migraine was concerned but generally. In those cases in which a gastro-enterostomy had been performed, the general health was partially or wholly restored to the original status.
by the undoing of the gastro-enterostomy. Two cases are reported by Buchanan. Many operations had been performed on one of the patients: amputation of cervix, rectal operation for hemorrhoids, appendectomy, gastro-enterostomy undone. The headaches continued unabated. The five operations to which this patient had been subjected only tended to debilitate her generally, and had no good influence on the primary condition. In the second case only one operation was performed, an appendectomy. It had no influence on the course of the trouble. Buchanan asserts that migraine is hereditary in man and is transmitted from generation to generation according to the laws of Mendel.

VACCINATION BY THE MOUTH AGAINST TYPHOID FEVER
Gauthier, Bull, de l'Académie de Médecine, April 15, 1924

The author is surgeon general for the French army, and he here reports his experiences with refugees and others in Greece—a total of nearly 4,000 vaccinations by the mouth. The vaccine was taken fasting on three consecutive days. In one town where there had been 200 cases of typhoid in two months, only one new case developed after 1,000 persons had taken the vaccine. The previous repugnance of the populace to vaccination was overcome by the change to buccal administration, and the entire population was thus protected although nothing was done to purify the drinking water, the source of the contagion. In two large villages the entire population took the vaccine, and the epidemic of typhoid was arrested at once, only four new cases developing, all during the negative phase. The reaction to the vaccine by the mouth was slight or nil.

FEVER IN UNRECOGNIZED SYPHILIS
Bloch, Presse Médicale, May 17th, 1924.

Bloch calls attention to cases of persistent fever, with absence of physical signs, which are often labeled tuberculosis or malaria, but for which old syphilitic infection is responsible. He says that in a case of indefinitely prolonged fever of pseudomalarial type, when an infection process is not manifest, and the examination of sputum, blood urine, and the serologic tests, hemocultures and radiography are negative, syphilis has to be considered.

FORMOL-GEL TEST FOR KALA-AZAR

Out of a total of eighty-one proved cases of kala-azar, 23.4 per cent gave a completely negative formol-gel test, while 12.3 per cent of proved cases gave a doubtful positive formol-gel test. Therefore in 35.7 per cent of this series of proved kala-azar cases
the formol-gel test was of little or no value. There is a certain group of cases clinically kala-azar and which reacted to treatment with potassium antimony tartrate in which the formol-gel test was positive, but Leishman-Donovan bodies could not be found, although some of these patients had liver puncture performed no less than three times. It remains doubtful whether these cases were true kala-azar, or some similar disease giving the formol-gel test and which reacted to potassium antimony tartrate. In 100 cases the Wassermann reaction was tested owing to its similarity to the aldehyd test. Only thirteen of the cases proved positive.

LATE RICKETS AND OSTEOALACIA.

The authors review the literature and record their own observations on late rickets and osteomalacia in India. Their conclusions being as follows: (1) In osteomalacia the existence of pregnancy does not produce symptoms differing in any essential way from those occurring in non-puerperal cases. The presence of pregnancy, therefore, does not entitle osteomalacia to be regarded as a separate clinical entity. (2) The existing differentiation of early rickets, late rickets, and osteomalacia, according to age incidence, does not appear to be justifiable. The evidence points to the conclusion that these conditions are identical and represent rickets at different ages. (3) The primary causal factor of early rickets, late rickets, and osteomalacia is environmental. While lack of sunlight may be regarded as an important factor, life in purdah, which entails a diminution in muscular activity, is of predominating importance. (4) Pregnancy is of subsidiary importance in the causation of osteomalacia.

DIFFERENTIAL DIAGNOSIS OF LOBAR PNEUMONIA AND APPENDICITIS IN CHILDREN

This is an interesting article on the differential diagnosis of lobar pneumonia and appendicitis. The authors studied 145 cases of lobar pneumonia in patients from 2 to 15 years of age, and sixty-three with proved appendicitis. In 17.5 per cent of cases of pneumonia, acute appendicitis, or some surgical condition in the abdomen, had been diagnosed, and in 4.8 per cent cerebrospinal meningitis. A history of cough or pain in the chest indicates pneumonia, but the absence of respiratory symptoms does not rule out this disease. A history of vomiting, abdominal pain and diarrhea is of no value, as these symptoms are as common with pneumonia as with abdominal disorders. The patient suffering from pneumonia always seems more ill, and presents a
characteristic general picture not seen in the abdominal cases. If recognised, this is a very important differential point. The systemic reaction is more severe as seen by the pulse and the temperature chart, than in the abdominal cases. Careful examination of the lungs may reveal a small area suggesting early consolidation, but if it is located in the upper half of the chest, or if the patient does not otherwise present the picture of pneumonia, it must be interpreted with caution. Abdominal tenderness and spasm are relatively common with pneumonia, but are dissimilar to the types found in acute abdominal conditions. A high leukocyte count is suggestive of pneumonia except when peritonitis or appendiceal abscess is suspected, in which case it is of no value in differentiation. In the presence of symptoms or signs of meningeal irritation, lobar pneumonia should be ruled out before lumbar puncture is performed.

CANCER RESEARCH.


In Great Britain a further memorandum on cancer has been sent to local authorities by the Ministry of Health. It surveys the main lines of experimental research during recent years, and summarizes the broad conclusions which seem to be deductible. It is hoped that such a statement may be serviceable to those who are now considering experimental cancer investigation as a whole, and the directions in which particular researches require to be started or continued. This memorandum is, in the main, the work of Dr. J. A. Murray, Director of the Imperial Cancer Research Fund.

Commencing with an outline of the history of cancer research, reference is made to the chief theories which held the field at the opening of the present century—namely, the irritation theory of Virchow and the embryonic rest theory of Cohnheim. Very little success has attended the experimental work concerned with the second theory; but since 1915 the continued application of tar has been shown to induce the formation of a growth displaying the two typical features of cancer—unlimited power of multiplication and ability to form metastases. This step, supporting the first theory, constituted a great advance, and is dealt with in some detail in the memorandum. Two main subjects are considered.

In the first place, the properties of cells already cancerous have been investigated after experimental transference from one animal to another. This line of research was started as early as 1889, but its importance was first properly appreciated in 1902; it indicated that it was unnecessary to cite the hypothesis of altered metabolism to explain the continued growth of a cancer—the seed rather than the soil was the important factor. The question of immunity or
The study of cancer metabolism brought to light the fact that there were slight but constant differences between normal and cancerous tissues outside the body. The water content of cancerous tissues was found to be greater than that of normal tissues, and the more rapidly growing tissues had a higher proportion of water and of potassium salts, and had a lower calcium content, a feature common to young and embryonic tissues.

Accessory food factors in relation to cancer were studied, and it was not found that deficiency of vitamins A and B exerted any marked influence on the growth of transplanted tumours.

Tissue culture outside the body showed that tumours produced substances poisonous to themselves, and frequent replacement of the culture medium was necessary if growth was to continue. These toxic substances were innocuous to the growth of normal tissues. Embryonic tissues and tumours proliferated immediately when planted out in a suitable medium, but adult tissues only began to grow after an initial delay, which could be cut out by adding to the culture medium an autolysate of normal damaged tissues. Rapidly growing transplantable tumours extracted without autolysis gave an extract with the same properties. Thus the process of malignant new growth was brought into close relation with the processes of tissue repair after injury. The investigation may possibly result in a method of distinguishing true new growths from rapidly growing tumours due to other causes, such as tuberculosis and syphilis.

The second part of the memorandum deals with the experimental study of the changes by which cells become cancerous. This was based on two possibilities—the hypothesis of a microbic, embryonic, or gametic origin, and, secondly, the conception of Virchow, that chronic irritation was of great importance in the production of cancer. None of the experiments under the first heading led to the production of a new growth of more than temporary character, but radiant energy, certain animal parasites, and chemical irritants, such as tar, proved to be effective in producing new growths. This line of research is being actively pursued at present.
INFLUENCE OF PREGNANCY ON MALIGNANT GROWTHS.

Lederer, Zentralb. für Gynakol., June, 1924.

A sarcoma in the right temple of a woman, aged 25, was cauterized and treated with radium, as a radical operation seemed out of the question on account of the diffuse infiltration of the dura and the base of the skull. For nearly three years she was apparently healthy, free from all disturbances, but then the sarcoma flared up again toward the close of a pregnancy, and proved rapidly fatal. In one of seven cases of cancer in a gravid uterus, Lederer merely removed the uterus at the seventh month of the pregnancy, regarding the case as hopeless for the radical operation applied in the other cases. Examination two years later showed the parametrium free from trace of malignant disease; this certainly does not indicate that a pregnancy has an inevitably unfavorable influence on cancer. Wertheim has even reported 60 to 70 per cent of absolute cures in cases of uterine cancer complicating pregnancy. It seems plausible to assume that the transformation in the organism from the pregnancy may have some depressing influence on the defensive forces. This may be connected in some way with the cholesterolemia of pregnancy.

RADII\![/n]UM AND ROENTGEN RAY IN CERVIX CANCER.


In a report of a committee of investigation of which Greenough was chairman, it is recorded that of 829 cases of cancer of the cervix, 94 were free from disease three or more years after treatment. More than half of these “cures” were obtained by the use of radium and roentgen ray without radical operation. There were no “cures” by cautery alone. In 243 early favorable and borderline cases, hysterectomy alone cured one in three with an operative mortality of one in five; radium with palliative operation (cautery) cured about one in three, and radium alone (or with palliative operation) about one in five. Under these conditions it may be said that the choice between operation and radium in the treatment of early and favorable cases of cancer of the cervix is an open one. In more advanced cases the “cures”, either by radiation or by hysterectomy, were very few. The duration of life in the unsuccessful early cases is somewhat greater after radium treatment than with operation. The formation of rectovaginal and vesicovaginal fistulas occurred with nearly equal frequency with all methods of treatment. Radium, with or without roentgen ray or palliative operation, was the most important agency in the destruction of local disease in cases in which there was failure to obtain a “cure.” The value of radium as a palliative measure in advanced cases is beyond dispute. In the treatment of recurrent cases after hysterectomy, and in cancer of the cervical stump, radium is to be preferred to other methods. A sufficiently large dosage of radium
The treatment of cancer of the cervix with inadequate amounts of radium should not be encouraged.

HYPERTROPHY OF THE BREAST.

According to Bartlett, breast hypertrophy is a clinical entity to which have been accorded some thirty different names, including chronic cystic mastitis, senile parenchymatous hypertrophy, abnormal involution, and Schimmelbusch’s disease. Its anatomical characters are different from those of tumours or infections, and non-surgical treatment is invariably successful. From analysis of a series of 125 cases of breast hypertrophy, of which 68 earlier ones were treated surgically and studied histologically, the following conclusions are drawn. Breast hypertrophy is a disorder chiefly of the ages 20 to 50, more especially of the fourth and fifth decades; marriage, virginity, lactation, and pregnancy have little etiological bearing.

Differential diagnosis is based on four points: pain, multiplicity, position, and shape. Pain is almost invariably reported usually in combination with tenderness; pain or tenderness is present in about 50 per cent of benign breast tumours, while cancer is not tender except in the presence of ulceration, and is painful only in the later stages when convincing signs of malignancy are present. Multiplicity of the lumps, or occurrence in both breasts, practically excludes a diagnosis of malignant disease; both these features are very common in breast hypertrophy. Hypertrophy frequently involves a whole lobulus from nipple to periphery, giving a radial Indian club shaped mass; where more than one lobulus is affected a quadrant, a hemisphere, or the whole breast may be thickened. The shape of the lump is significant in that hypertrophy follows the form of the gland tissue. Often the lump is flat and of equal thickness throughout, or variations in thickness can be shown to be due to superficial projections; on the other hand, a buried lump, if cystic or cancerous, is always thickest towards its middle point, giving the impression of a spherical mass. Superficial breast lumps are either benign tumours or hypotrophies. In the absence of pain or tenderness and of multiplicity about 25 per cent of buried tumours must be explored in order to determine their cystic or cancerous nature or to prove that a cyst is not associated with cancer.

OPERATION FOR CANCER OF THE RECTUM.

The author points out that few parts of the body are so favourably situated as the rectum for complete removal of all the tissues involved in cancerous invasion. Cancer of the rectum spreads by direct extension, through the venous and lymphatic
systems. The radical operation imposes a great strain upon the vitality of the patient; it is perhaps the largest operation in surgery. The author considers the operation which he has evolved to be the best and safest type of the two-stage operation, which fulfils all the necessary requirements. The first step is common to all cancer operations. The abdomen is exposed through a right rectus incision, and the operator, having decided to do the radical operation, isolates the sigmoid and ties the superior haemorrhoidal artery. The sigmoid is severed between the clamps and the proximal end brought out through the left rectus muscle to make a permanent colostomy. A rectal tube is now passed up through the sigmoid and fixed in position; it is then pulled on, the gut is inverted, and brought out through the anus. All raw surfaces are closed, and the abdominal wound sutured. At the second stage, an incision is made from the sacrum encircling the anus, and the last joint of the sacrum and coccyx are removed. The hand is then inserted into the wound, and the growth and the rectum are peeled out with ease and completeness. In extensive cases a large dose of radium is packed into the wound. In 47 cases operated on in this way two have died, and the ultimate results in the others appear good so far.

TUBERCULIN IN DIAGNOSIS AND TREATMENT OF TUBERCULOSIS


In discussing the diagnosis of tuberculosis by the cutaneous and percutaneous methods, Philip states that the observations based on the Pirquet and allied procedure proved of epidemiologic rather than of immediate clinical value, proving that the occurrence of infection takes place usually in childhood. The reaction indicates that the individual is tuberculized, and under treatment is not detuberculized as long as the reaction remains positive.

Tuberculin administered by inunction (percutaneously) is of great value in a variety of tuberculous manifestations, is free from pain, and therefore of use in children; cutaneous and glandular foci show its curative influence in a few weeks. In children, when used for months, not only the enlarged gland becomes normal but there is evidence of benefit to the enlarged glands throughout the body and a general improvement in health, an expression of progressive tuberculinization, as shown by the records of many children. He advises this treatment in the earliest indication of chronic glandular enlargement in children. (Koch's or Béraneck's tuberculin from 10 to 50 per cent strength in an excipient of 95 per cent paraffin and 5 per cent oxycholesterin from wool fat). Approximately 0.1 c.c. of tuberculin may be thus used in inunction on one or two square inches of clean skin, applied with a glass rod.

An address given by the author on September 26, 1923, at the opening session of the College of Physicians and Surgeons, Columbia University, New York City. He supports Dr. G. E. Vincent, of the Rockefeller Foundation, in holding that scientific medicine in its pre-occupation with the diseases of the body has too much neglected the psychic and social factors in disease, and this is all the more to be deplored in view of the statistics which show that one person in ten in the State of New York who reaches adult life is admitted to a mental hospital before he dies, and that the number of beds in public hospitals for the insane in the United States equals those occupied by all other sick persons combined. Dr. Salmon analyses the causes of this seeming indifference and urges that medical education should train physicians to deal with the total reaction of human beings—mental, physical and social. The statement is quoted that “the human mind, the human will and human personality will be as important for the medical student of today when he comes to full practice as typhoid fever, small-pox and cholera have been for the physicians in the past. Moral and spiritual qualities play as large a part as do the more physical of the biologic processes.” Education of this kind will endow physicians with new and powerful resources not only for the treatment of disease but for its scientific study, and their contributions to social medicine will vastly increase in effectiveness.


In these days of rapid advances in all branches of medical science and constantly changing opinions as to the causation and treatment of disease, we are apt to lose sight of the underlying, abiding facts with which the bodily functions, habits, modes of life and environment must be brought into harmony to ensure the maintenance of health and recovery from disease. It is generally the elderly physicians who see the permanent beneath the fluctuating most clearly. Unfortunately, the wisdom they acquire, based on long practical experience, only too often passes away with them. In the book under review the author, with his rich experience, ranges over a very wide field—the physician himself and his professional methods, Consultations, psycho-therapy, hygiene, the physiology of digestion, the blood plasma, infection, and a variety of other subjects. The young physician starting in practice will find here very useful advice, and there are few physicians, whether young or old, who will not be interested and profited by browsing over the book. Perhaps not all will agree with everything said, but as the author tells us, it is most important that “the physician should preserve throughout his career a receptive attitude of mind and should combat with all his strength the fatal tendency to become stereotyped; he should be ready to abandon the most cherished convictions as soon as it is proved they do not square with facts, no matter how disturbing may be the process to old habits of thought, nor how laborious a rearrangement of ideas it may compel. At the same time he must beware of running into the opposite error of indiscriminately embracing every new idea without carefully weighing the evidence for and against it. To preserve an open mind—that is the true scientific spirit.” It is in this spirit that the author has endeavored to enunciate fundamental principles likely to be helpful to physicians in the treatment of disease.
Book Reviews.

Journals and Reprints

La Bacteria de la Tuberculosis.—Por Joaquin Ravetllat, veterinario y R. Pla y Armengol, doctor en medicina. The Tuberculosis Bacterium. (English summary at the end). Publicaciones del Instituto Ravetllat-pla, Barcelona. (No. 2). Mayo. 1924.

In this monograph the author contends that the tuberculosis bacterium in the organism, and in the natural virus, presents itself in three different forms and they are those which influence the evolution of the disease. These forms are (1) the bacterium of attack; (2) the intermediate bacterium or transition form; (3) the Koch bacillus or resistance form. These three forms are revertible among themselves and are constantly to be found in the lesions. They constitute different forms of one single bacterial species. These forms are described in the monograph together with cultural methods and the lesions produced by each form.

The Reminder.—Issued by the Emmanuel Medical Mission, Nanning, Published bi-monthly. 2/6 per annum, post-free.

An interesting little paper, intended for the laity, describing the work of Dr. Lechmere Clift and his helpers in the city of Nanning, West River, South China. Visiting Pakhoi after an absence of twenty years, he writes that “for years the great hospital, beautifully equipped, has had no doctor, and one nurse has carried on single-handed until she is worn out.” Among the present patients are lepers who first went there more than twenty years ago.

The Quarterly Journal For Chinese Nurses:—Vol. V. No. 3. July 1924. Editor, Esther Love, Hwai Y’uen, Anhui. Single yearly subscription, $1.00. Six subscriptions to same or different addresses $5.00. Subscriptions and business communications should be addressed to Miss Cora Simpson, 700 Dixwell Road, Shanghai.

This instructive and well-illustrated journal, containing articles both in English and Chinese, is published by the Nurses’ Association of China for the benefit mainly of Chinese nurses. In the present number, among other good articles, is one by Mrs. F. M. Auld, entitled, “Notes on Kitchen Management, Weihaiwei Hospital,” which physicians throughout China may find very useful.


The Prophylaxis of Diphtheria, by the Determination of Susceptibles and their active artificial Immunisation in the United States. By Dr. Louis Van Boeckel, Director of the Laboratory of the Belgian Public Health Department

THE REPUBLIC OF CHINA AND THE OPIUM QUESTION.

A Memorial from the Medical Profession in China to The League of Nations.

Whereas, the League of Nations is endeavouring to promote the Public Health of every country by means of international regulations and agreements; and

Whereas, special efforts are being made to diminish and eventually eradicate the opium evil in all its forms, and important
conferences on the subject will be held by the League of Nations next November; and

Whereas, it must greatly strengthen the work of the League of Nations, and powerfully influence public opinion in China when it is known that the medical practitioners of China condemn the cultivation of the poppy and the unnecessary use of opium and its derivatives; therefore

The National Medical Association of China with five hundred members, representing the scientific medical opinion of the Chinese, and the China Medical Missionary Association with a membership of five hundred and fifty composed mainly of British and American physicians practising in China, representing foreign medical opinion on the subject, respectfully present the following memorial to the League of Nations:

1. We heartily approve the purpose of the Committees and Sub-committees of the League of Nations to determine the legitimate requirements of various countries in regard to narcotic drugs and to restrict the world production to the amount actually required for medical and scientific purposes. Further, we desire to co-operate with the League of Nations in whatever other measures it may recommend for the suppression of the narcotic drug evil.

2. We hereby record our opinion that the habitual use of opium, and still more of morphia and heroin, is unnecessary, deleterious and morally degrading; we repudiate entirely the suggestion that the habitual or continual use of these drugs (except when prescribed by physicians in cases of advanced and painful diseases such as cancer) can ever be anything but harmful.

3. Recognizing that a certain proportion of the victims have acquired the drug habit in connection with the medicinal use of drugs, and as the habit so acquired is often worse than the disease itself for which it was prescribed, we desire to emphasize once again that the greatest care should be exercised by physicians in prescribing such drugs, and that no lay person should be permitted to purchase opium in any form except upon the prescription of a properly qualified medical practitioner.

4. We hereby record our conviction that owing to the nature of morphia and the other narcotic alkaloids, no measures to prevent smuggling can ever prove efficient, and therefore we heartily endorse:
In place of the usual "With the Secretary" items, I propose this month to give a few notes of what the Chinese Red Cross is doing in Shanghai in connection with the present war as this may be of interest to not a few of our readers.

Perhaps what strikes one as strangest of all is the entire lack of responsibility that the military authorities in this part of China assume with regard even to their own troops when wounded. How far this may be common throughout China I do not know, it certainly was not the case when I was in Canton last year, and is further evidence, if such were needed, that this is no war of the people.

A soldier when wounded, at least when wounded seriously enough to produce incapacity, ceases to be of any interest to the army authorities, his scanty pay stops, and he is left to the charity and care of the local Red Cross organization to dispose of as best it can.

Under these circumstances and in view of the difficulties that such a sudden strain must throw on any organization the work of the Chinese Red Cross in Shanghai has been beyond praise. I doubt whether with the material at its disposal it would have been possible for any of our highly trained army organizations at home to have improved much on what has been done by the Chinese Red Cross working alone.
The Red Cross here in Shanghai has from the first and very wisely, handled the situation entirely alone. True, as is the case elsewhere in time of war, they have gladly accepted the assistance of outside individuals working under their orders, and the liberality of outside organizations such as the British Women's Association in providing clothing and dressings for the wounded. But for the handling of the wounded and for the raising of the monetary assistance needed they have been alone responsible and have tackled the situation most successfully, despite a lack of much that we have come to think almost essential for such work.

Thus, in ambulances the Red Cross has been greatly handicapped. There was nothing but the most meagre supply of these when the war began and no possibility of securing more. Covered vans were lent for such use by generous Chinese firms and it might have been possible to have converted these into tolerable ambulances but the firms could only lend such vans for a week or two at a time, which precluded any extensive refitting of the interiors. For the most part then the wounded have had to be transported from the front lying out on the bottom of the vans.

Skilled orderlies could not of course be provided to travel with these primitive ambulances, and to meet the difficulty the Red Cross very wisely provided a series of emergency stations on the roads where the ambulances stopped en route for the base and where medical attention could be given to any urgent cases.

In Shanghai itself the Red Cross hospital in Tientsin Road was made the distributing centre and all motor ambulances called there first, had the wounded overhauled and redistributed to the different hospitals in Shanghai. These number some twelve in all of which the two main ones for surgical work have been the central Red Cross Hospital in Avenue Haig, where the writer has had the privilege of doing some work, and St. Luke's Hospital which has given up fifty beds for special surgical cases.

Happily the large bulk of the wounds have been by rifle and machine-gun fire only; bad shell wounds have been conspicuous by their absence and not a few of the wounds, even when bone lesions have been present, have remained aseptic throughout.

The greatest lack of all from the surgeons' point of view has been the limited amount of X-ray work that could be done; good
Notice of Motion: Hongkong Conference.

sets of apparatus have been few and skilled technicians rarer still, with the result that even urgent cases have often had to be held up.

Again, from the surgeons' point of view, the abdominal wounds have on the whole yielded very poor results. The patients have arrived in a very unsatisfactory condition for operation and the mortality of such cases has been high. A contributing factor to this has doubtless been the universal presence of ascarides in the intestines of the Chinese. Were I in medical charge of a Chinese army I should like to give my men a treatment all round with santonin before a battle took place. To have to spend most precious time picking ascarides whole or in pieces out of wounds in the bowel, or removing them from the pelvis after the intestinal wounds are sutured, does not help to successful results.

Let me repeat, however, that despite the inevitable weaknesses that must arise in connection with any emergency, such as this, the Chinese Red Cross, here in Shanghai at least, has emerged with flying colours and has been a wonder to me of successful organization.

JAMES L. MAXWELL.

NOTICE OF MOTION: HONGKONG CONFERENCE.

In accordance with the C.M.M.A. by-law which requires that all principal motions to be moved at a Conference shall be published in advance in the "China Medical Journal", notice is given that the following amendments to the Constitution will be proposed at the next Conference.

ARTICLE VI:
Third line: delete "Council on Public Health Education".
Fifth line: alter "Publication and Terminology Committee" to "Council on Publication".
Add: "Council on Hospital Administration".

BY-LAW 7.
Fourth line: alter "seven days" to "fourteen days".
Insert the following new and additional by-law:
"Facilities shall be offered for the voluntary registration of any medical schools in China desirous of being recognised as
approved schools of the Association, and the Executive Committee shall take the necessary steps to provide for the investigation of such schools and for the registration of those which conform to the required standards.

Proposed by John Kirk.
Seconded by James L. Maxwell.

Correspondence.

Correspondents are requested to write on one side of the paper only, and always to send their real names and addresses. The Journal does not hold itself responsible for the opinions or assertions of correspondents.

Medical Missions and Mission Schools.

To the Editor of C. M. J.

Dear Sir,—The July issue of the China Medical Journal has been received and read with interest, especially the articles dealing with medical missions in relation to educational institutions.

I agree fully with Dr. Maxwell that our mission is primarily to the sick, and that the bulk of our time should be given to them. My observation is that mission hospitals are doing a very good part by the schools located near them, but that with rare exceptions the schools are not reciprocating as they should. I have yet to see an educationalist encouraging his best pupils to enter the profession of medicine or nursing. The stupid ones are not deterred from entering. In view of this, whence are to come the Christian Chinese doctors and nurses who are to give their time to the health of the schools? The further fact may be considered that some schools do not even see to it that the cost of medicines used by their pupils is paid for to say nothing of the services of a special nurse that an understaffed hospital can ill afford to spare. Certainly let us have a discussion of the relation of medical missions to mission schools. It is not a one-sided question.

Yours truly,

J. M. G.

Laichow, Shantung.

September 10th, 1924.

The Treatment of Sprue.

The following abridgment with alteration of form of a letter by Dr. Mabel Panton formerly of Dong-kau, Fukien, who suffered for ten years from sprue and has recently recovered, may be both interesting and instructive to physicians in China who are treating cases of this disease. The letter was sent to Dr. J. C. McCracken of Shanghai and is dated June 16th, 1924.

In November, 1914, the patient had an attack of dysentery, for which she administered to herself a course of emetine treatment, following Manson's dosage. She recovered from the dysentery but shortly afterwards noticed that the stools, though formed, had become the white stools of sprue; these gave place to looser clay-colored stools, alternating with pale-yellow watery discharges.

Yellow Santonin Treatment.

On returning to her station the patient wrote to a fellow missionary who had been cured of almost fatal sprue by Dr. Begg's yellow santonin treatment. She was sent some powder of yellow santonin with full directions for treatment, and took a two weeks course but did not rest from duty. The santonin did not cure.

Milk and Fruit.

The patient then went on a milk diet (from Buffalo cows) and such fruit as she could get. Also pig-
Correspondence.

bile tabloids and other medicines, and special foods. In the summer of 1915 she was so ill that another physician thought she would soon die.

**Special Diet of Liver, etc.**

Patient then went to Shanghai where she came under the treatment of Dr. Marshall who prescribed a special diet but no drugs. The diet was as follows. Breakfast: porridge with half a cup of cream, fat bacon, toast and tea. Tiffin and supper: liver soup with the ground-up liver left in the soup, cod liver, raw steak or haggis. She took this treatment for four months, gained a little weight and the diarrhea lessened. She returned to Dongkau in February, 1916. Despite the greatest care of her health, by Christmas, 1916, she was losing weight again, and went to the Tuofer Memorial Hospital in Soochow to do lighter work. Here she remained for one year. She then started with a fellow worker, Miss Graham, for South Africa, on her way to England.

**Autogenous Sensitised Vaccines.**

Crossing to Manila the patient heard of the treatment of sprue by Dr. Stafford (of U. S. A.) with autogenous sensitised vaccines. The treatment lasted about three months; residence in hospital was not advised. The vaccine was prepared from her own blood and put up in capsules with dosages varying from very low to very high strength. She was much improved by this course of treatment but was liable occasionally to lose pale-yellow stools.

In May, 1918, patient reached South Africa. While on duty in the General Hospital, Johannesburg, an epidemic of influenza occurred. There were many severe cases in the hospital, and she had a slight attack herself. Some sprue-like symptoms supervened, so she again took several doses of autogenous sensitised vaccine. The result was a severe return of sprue diarrhea.

**Milk Diet and Sodium Cacodylate.**

Arriving in England in February, 1919, the patient consulted the Director of the London School of Tropical Medicine, who told her there was no specific remedy for sprue. The old treatment of a purely milk diet, as practised by Sir Patrick Manson, was still used, but it was exceedingly tedious and apparently only temporarily successful. Thereupon she treated herself with large doses of sodium cacodylate, a form of treatment she had read of in the "China Medical Journal" as being used in Korea for sprue. This treatment resulted in symptoms of arsenical poisoning (huge, stinking, almost black motions) alternating with the pale-yellow diarrhea of sprue.

**Yellow Santonin Treatment.**

In August, 1919, the patient went to Dr. Begg, of Bath, England, for the yellow santonin treatment. She took yellow santonin (grains 5, night and morning) and even went on to 10 grain doses until she collapsed one morning and Dr. Begg stopped the drug. She had gained a little in weight but was certainly not cured.

**Strawberry Treatment.**

In January, 1920, the patient went to Shanklin, Isle of Wight, because of its mild climate. There her physical condition went from bad to worse. She became swollen and paretic, and was removed to a Nursing Home where she nearly died. When the strawberry season began and she could obtain this fruit regularly she began to pick up. During the summer she was out of hospital, able to walk a little, but was not cured. In the autumn she got worse again with a return of profuse offensive diarrhea.

**Milk Diet, "Batavia Powder," and Strawberries.**

In February, 1921, the patient was taken by ambulance to the Hospital for Tropical Diseases, London. She
was placed by Dr. Low on the old milk treatment of Manson's, combined with an astringent powder called "Batavia". She was then very anaemic, the hemoglobin content of the blood being extraordinarily low, so low that a fatal issue was again expected. She felt she was literally being starved. The milk was increased and two rusks daily were added. But it was not until the strawberry season that she began to make real progress. A friend procured strawberries for her from the south of France long before they were ripe in England, and she was soon eating 2 lbs. daily, with cream and sugar. By degrees fish and sago were added to the diet and then eggs and toast. When the English strawberry season ended she was given bananas mashed up with cream. After being in the hospital seven months she left in September, having gained 56 lbs. in weight. She then went to South Africa to escape the English winter. Her weight had now increased to 145 lbs. In June, 1922, she returned to China and was sent to Siang-tan in Hunan to take up non-medical work. The living conditions were very unfavorable there and she had a sharp attack of dysentery. This was treated with emetine and quinine, but on recovery, from the dysentery the symptoms of sprue supervened as before. In 1923 a summer holiday in Japan aggravated her condition, so that when she arrived in Shanghai she was once more suffering from pronounced sprue.

Subcutaneous Injections of Sea Water.

Treatment at the hands of a French doctor in Shanghai by subcutaneous injections of sea water served only to aggravate the disease.

Calcium Lactate and Parathyroid.

In November, 1923, patient heard of Dr. Scott's treatment of sprue by calcium lactate and extract of parathyroid gland. It was being used by Dr. A. W. Tucker and Dr. McCracken of St. Luke's Hospital, Shanghai. Dr. McCracken undertook to treat the case, and advised her removal to a Nursing Home. Weight of patient, 79 lbs. Hemoglobin content of blood, 30 per cent. She was placed on the new treatment and allowed a generous diet which included vegetables rich in vitamins, e.g., spinach, carrots, celery cooked and in soup, and fresh fruit. At first she was given tabloids of suprarenal extract to raise the blood pressure, in addition to the calcium lactate and extract of parathyroid. She was allowed oyster soup, underdone beef, fish and eggs. According to the season she had grapes, sweet orange juice, canned strawberries and mangoes. From November, 1923, to May, 1924, she remained in the Nursing Home. From being almost in a dying state she improved till she had but one stool daily, formed and of good color. Her weight had increased from 79 lbs to 96 lbs.

On May 9th, 1924, patient left Shanghai for England being carried on board in an invalid chair. On the voyage she was allowed to drop all drug treatment. From the first day she developed a huge appetite and was able to eat almost everything provided on the ship's menu, and had two mangoes daily until Ceylon was reached. Three weeks after leaving Shanghai she weighed 112 lbs. The symptoms of sprue had disappeared and she felt better than she had been for ten years. Arriving in England she went to see Dr. Harold Scott. He took a sample of her blood for the ionic calcium estimation and found the percentage 10.4 mgm., i.e. practically normal. The stool also was normal in size, color, and content, with no excessive fat, and the ratio of neutral fats to fatty acids was 1:2.5, a result to be expected considering she was now on ordinary diet. The patient had gained in weight and felt well.
NEWS AND COMMENT.

DEATHS

McClure.—At Oberlin, Ohio, on August 21st, 1924, Margaret Baird McClure, wife of Dr. W. McClure, Canadian Presbyterian Mission Tsinan, Shantung.

Whitney.—In U.S.A., during October, 1924, H.T. Whitney, M.D., formerly of the A.B.C.F.M., Hospital, Foochow, and President of the C.M.M.A., 1897-1899. (By cable.)

THE CHINA MEDICAL JOURNAL.—The editor has almost reached the last of the papers sent in for publication, and will be greatly relieved if members of the C.M.M.A. and others will be so good as to send in a few more original articles, sufficient to tide the Journal over to the next Conference. Papers prepared for the Conference will be gladly accepted as early publication will be an advantage to all concerned; it will enable those who intend to take part in the discussion to study them carefully beforehand and thus make their remarks more pertinent and valuable, and authors who desire reprints for distribution can obtain them at a very small cost.

N. A. C. CURRICULUM.—In reply to many requests for information concerning the curriculum of the Nurses Association in China, it is announced that the curriculum is now printed and ready for distribution. It can be obtained by sending an order to the Kwang Hauh Publishing House, C. 445 Honan Road, Shanghai. The report of the Nurses' Canton Conference, and all text-books and literature of the N. A. C., may also be obtained from the same publishers.

HANGCHOW MEDICAL COLLEGE.—"We opened the College on September 22nd, 1924, although on account of the war all our students have not turned up; for this we are very sorry. Although the College has not been officially opened some of the students are in residence. We were hoping to open it with great éclat on October 8th with H.B.M. Minister from Peking and the Admiral of the Fleet in China and other big dignatories present but our long-thought-out plans have all been upset by the prevailing unrest and upheaval. We still mean, however, to have a quiet private opening on that day, and dedicate the building to the Lord, and have a big public function when peace is declared and the state of fear and unrest in the City has subsided."

MEDICAL EVANGELISM.—"I was present at a meeting in the hospital the other day when some of the country leaders were entertained by the hospital staff. At that meeting one after another rose to give definite testimony to the value of the hospital as an evangelistic agency. We were told of case after case of both men and women returning home cured, and then seeking out the church to join it. An arrangement was made at this meeting to inform the church leaders when patients leave the hospital, that they may be visited. In this way it is hoped to conserve the excellent evangelistic work done in the hospital.—Choutsun Hospital Notes.

OPIUM MONOPOLY, FORMOSA.—In a report by the Chief of the Monopoly Bureau, Formosa, it is said that in maintaining an opium monopoly the Government-General of Formosa pursues a policy of gradually prohibiting the drug. Since 1885, when Formosa came into Japan's possession, the question of how to deal with opium smokers and the policy that should be followed have received the careful attention of the authorities, as this is a very
important problem from hygienic and economic points of view. In spite of the close historic and geographical relations between Japan and China, the Japanese people have never smoked opium, and because of this there was a general expectation that the authorities would prohibit opium smoking by the Formosans. This expectation, however, has not been fulfilled.

"The Japanese authorities realised the difficulty of enforcing strict prohibition at once. This consideration, coupled with the facility afforded by the system for control of the Formosans, led to the establishment in 1896 of the opium monopoly, under which only habitual opium smokers, of whom there is evidence of the inveteracy of the habit, are permitted a certain regular amount of the drug this being sold by the authorities. This policy has served to decrease the number of smokers by degrees."

"At the end of March, 1921 the number of opium smokers was 45,000, compared with 170,000 at the time of the establishment of the monopoly. Based on the present rate of decrease it is expected that there will be no opium smokers left on the island at the end of 20 years.

**SUMMER DISEASES HOSPITAL, SHANGHAI.**—The Red Cross Hospital, Tientsin Road, Shanghai, ceased to function as a Summer Diseases Hospital at the end of August. The total number of inpatients for the year was 401 (mostly cases of dysentery, colic, and diarrhoea) as against 682 last year, and 1007 in 1922.

**THE TRAINING OF NURSES.**—Every year we become more impressed by the importance of the training of Chinese nurses. The patients, in being cared for by educated women from among their own people, and the nurses, in undertaking this work, learn more of the Christian ideal of service than they could perhaps in any other way. The nurses, too, have an intimacy of contact with the minds of the patients which it is almost impossible for a foreigner to gain, and lessons both spiritual and hygienic come home with greater force from their lips and lives than they do from ours. As a woman medical missionary said when the training of Chinese nurses was in its very early stages, "I can see in this movement one of the greatest healing and evangelising agencies in the whole of China."—E. B. M. Hospital, Taiyuenfu.

**HANGCHOW MATERNITY STUDENTS.**—During September, 1924, a very nice service was held when sixteen maternity students graduated and received their diplomas. Only ten were able to be present; the other six were hindered from being present by the war. Mrs. Main distributed the diplomas and gave a short history of the Maternity Hospital, etc. Dr. Main said a few plain words to the graduates and advised them to go forth as life-savers and not as money-makers. They have had three years' teaching and a great deal of practical work, and are very efficient, so it is easy for them to make money.

**MEDICAL MISSIONS IN INDIA.**—A medical missionary breakfast, organised by the Medical Prayer Union, was held in London on July 23rd, 1924, under the chairmanship of Dr. Mary Scharlieb. The address was given by Dr. H. T. Holland of Quetta on the subject of a doctor's work on the north-west frontier of India.

Dr. Holland described the medical missionary's work as an extraordinarily interesting job. Some people, he said, laboured under a misapprehension of the whole missionary question and of the function of the medical missionary in particular. The preaching of the gospel must be the basis of all missionary work, yet modern missionary enterprise was very much broader than that. The modern missionary was in the field, not to take a narrow message only
to the soul, but to try and interpret the spirit of Christ and to show that He had a definite word of healing for the body as well. Dr. Holland said that he had lived twenty-four years in Quetta as a missionary attached to the Church Missionary Society. It was sometimes said that British opinion in India was against missions; but the few British in Kashmir had probably given more towards medical missions within their own borders than any parish in Great Britain. In Baluchistan, at one time, every political officer except one was subscribing to the Mission, and throughout its history the work had received extraordinary kindness, sympathy, and support from British officers. He protested against the idea that medical mission enterprise was merely a means of creating an evangelical opportunity. Medical missionaries were simply there to fulfill, as far as they were able, their own part in the dual mission of Christ, which was to both soul and body. He then went on to describe pioneering on the frontier, in the region always to be associated with the name of T. L. Pennell, one of the most interesting and picturesque figures in modern missionary history. He spoke in detail of how, in connection with the hospital at Quetta, it had been possible to open some interesting work at a place some two hundred miles from Quetta called Shikarpur, which was originally a city closed to missionary effort. The work was opened up on the verandah of the house of a friendly Hindu banker, and during a visit of three weeks Dr. Holland, working under the most unfavorable conditions due to crowds and dust, performed 250 operations—very largely operations for cataract. In the following year, 800 operations were performed in the course of a six weeks visit, and eventually he signed a contract to go there for six weeks every year for ten years. A hospital has been built, with an out-patients block, two operating rooms, and a certain amount of in-patient accommodation.

EXORCISM IN CHINA.—Some of the ways in which exorcism of demons is accomplished are, throwing round biscuits (撤旁粑), sprinkling holy water (酒水), imitating the crow of a rooster, setting off fire-crackers, and pasting up, wearing, or burning charms. In some villages south of Suifu geese are kept because it is thought that their cries frighten away the demons. There are many demons living in rivers and streams, whose evil aim is to drown people. They themselves have been drowned and must cause the drowning of others in order to escape from their demonic condition. There are demons who have committed suicide by hanging, and can only escape by inducing others to hang themselves. Ts' an Lan Kuei (巫娘鬼) are the spirits of women who have died in childbirth, and they can become reborn as human beings only by causing others to die in childbirth. Mirrors are hung above doors and elsewhere to keep out demons. When the latter attempt to enter, they see their own reflections in the mirror, and they look so horrible that they become frightened at their own reflection and go away. Sometimes the mirror is circular and has the Tai Chien Tu (太極圖) in the center, which makes it more efficacious. The Bah Kua (八卦) is very widely used in protecting against evil influences. Amber, when worn on the body, protects from disease and pestilence, which are always caused by demons. Paper charms written in fantastic ways and having such inscriptions as “God Of Thunder Cut Off Ear,” are pasted above doorways, in different parts of houses, on bed nets, and are worn on the clothing. Some charms are burnt and the ashes eaten. Such instances could be indefinitely multiplied. It is obvious that the fear of demons is a powerful factor in the religion of the Chinese of Szechwan.—Graham, Jour. West-China Border Res. Soc., 1922-1923.
The China Medical Journal

Published by
The China Medical Missionary Association.

EDITOR—Edward M. Merrins, M.D., St. John's University. Office address, Missions Building, 23 Yuen Ming Yuen Road, Shanghai. Medical papers and other literary communications for the Journal, books for review, and exchange medical journals, should be sent to the Editor, P. O. Box 1124, Shanghai.

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MANUSCRIPTS.—Authors should put name and address on MS., which should be typewritten, double-spaced, and sent to editor by registered mail. Number the leaves of MS., consecutively, beginning with title page. Translate Chinese characters, and when romanised Chinese terms or phrases are used give also the Chinese. If time permits, every author is stated in dollars, Shanghai currency.

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ILLUSTRATIONS.—Illustrations should be clear. If photographs are used send a good print rather than a negative. Write title or short explanation on back of each picture or table. See that text references and "figures" correspond. It is strongly recommended by our printers that all drawings, charts, sketches and photographs should be simply in black and white. This will ensure the best effect in reproducing them as illustrations. No drawings or photographs should be marked with colored pencils or colored inks, as when the copy to be reproduced is so marked, satisfactory results cannot be produced. The lines of all blocks should be uniform in color. All words and figures inserted in drawings should be distinct, and sufficiently large so that if it is necessary to reduce the drawing in size the wording and figures will still be decipherable.

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BIBLIOGRAPHIC REFERENCES.—As the Journal is printed by Chinese whatever method is adopted should be as simple as possible consistent with clearness. The Harvard system, in which all references are arranged at the end of the paper according to the alphabetic order of authors' surnames, and reference numbers are not required, is therefore to be preferred. But any good system of references may be used.

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The Quarterly Journal for Chinese Nurses.

Published by the Nurses' Association of China. Editor: Miss Margaret Deiter, R.N., Luchowfu, via Wuhu, Anhwei.

Annual subscription to Journal $1.00. Subscriptions and other business communications should be sent to Miss Cora E. Simpson, R.N., General Secretary, Nurses' Association of China, 760 Dixwell Road, Shanghai.