RAY'S "HEMOLYTIC" TEST IN KALA-AZAR.

RICHARD H. P. SIA, B.S., M.D. (Department of Medicine, Peking Union Medical College).

With the purpose of devising a simple test for the differentiation of severe malaria and kala-azar, Ray found that, when a small quantity (2 drops) of the patient's blood was added to ten times its volume of distilled water, the resulting mixture quickly cleared and became transparent in malaria, but in kala-azar it remained turbid and, on standing, formed a white flocculent precipitate. Tests on other diseases associated with splenomegaly were negative. The only condition other than kala-azar in which he obtained positive tests were certain severe forms of anemia of unstated etiology.

He believed that this turbidity produced by kala-azar blood was due to incomplete hemolysis of the red blood corpuscles, and that this in turn might be due to changes in the blood serum of kala-azar patients, the exact nature of which he was not ready to explain.

We have employed the test on 86 patients suffering from various diseases and ten normal individuals. The technique used consists of adding 20 c.mm. blood from ordinary skin puncture to 0.6 mils distilled water in test-tubes of 7-8 mm. in diameter. The mixture is thoroughly shaken and the reading made at the end of five to ten minutes.

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<tr>
<th>Diagnosis</th>
<th>No. of Cases</th>
<th>Result of Test</th>
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<td>Kala-azar</td>
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<td>Tuberculous Adenitis, extensive</td>
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2 The proportion of blood and distilled water used is of no great importance, as also was observed by Ray, but because of convenience and consistency we have used the concentration as given above.
METHODS
ONE STANDARD OF EXCELLENCE


KALTERID CATGUT, BOILABLE — Not only sterile, but, being impregnated with potassium-mercuric-iodide, exerts a local bactericidal action in the tissues.

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THE USE OF FINE SILK IN SURGERY.
Relapsing Fever

(a) Febrile stage ... ... ... ... 3 o
(b) Afebrile stage ... ... ... ... 1 o

Typhus Fever ... ... ... ... ... 4 o
Typhoid Fever ... ... ... ... ... 3 o
Lobar Pneumonia ... ... ... ... ... 2 o
Scarlet Fever ... ... ... ... ... 1 o
Leprosy ... ... ... ... ... 2 o

Hemolytic Streptococcus Septicemia ... ... 1 o
Acute Rheumatic Fever ... ... ... ... 1 o
Unclassified Fevers ... ... ... ... ... 2 o
Amoebic Dysentery ... ... ... ... ... 3 o
Amoebic Abscess of Liver ... ... ... ... ... 1 o
Malaria ... ... ... ... ... 5 o
Ankylostomiasis ... ... ... ... ... 1 o
Tapeworm ... ... ... ... ... 2 o
Diabetes Mellitus ... ... ... ... ... 1 o
Acute Nephritis ... ... ... ... ... 3 o
Cirrhosis of Liver ... ... ... ... ... 1 o
Cystic Goitre ... ... ... ... ... 1 o

Anemia, Secondary

A. Cause Unknown
Hemoglobin 30% ... ... ... ... 1 o

B. Chronic Nephritis with Edema
Hemoglobin 60% ... ... ... ... 1 o

C. Bacillary Dysentery
Hemoglobin 50% ... ... ... ... 1 o

D. Cardiac Decompensation
1. Hemoglobin 30% ... ... ... ... 1 o
2. Hemoglobin 40% ... ... ... ... 1 o
3. Hemoglobin 50% ... ... ... ... 3 o

E. Malnutrition
Hemoglobin 40% ... ... ... ... 1 o

F. Malignant Malaria
Hemoglobin 35% ... ... ... ... 1 o

G. Banti's Disease
Hemoglobin 35% ... ... ... ... 1 o

H. Malignancy (with jaundice)
Hemoglobin 50% ... ... ... ... 1 o

Acute Lymphatic Leukemia ... ... ... ... 1 o
Purpura Hemorrhagica ... ... ... ... 1 o
Pyorrhea Alveolaris with marked bleeding from
the gums ... ... ... ... ... 1 o

Beri-beri ... ... ... ... ... 2 o
Acute Eczema, generalized ... ... ... ... 1 o
Psoriasis... ... ... ... ... ... 1 o
Urticaria ... ... ... ... ... ... 1 o

Morphia Habit ... ... ... ... ... 2 o
Opium Habit ... ... ... ... ... 1 o
Amyotrophic Lateral Sclerosis ... ... ... ... 1 o
Duodenal Ulcer ... ... ... ... ... 1 o

Total ... ... ... ... ... 96

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3 This case listed under "Malaria."
Ray's "Hemolytic" Test in Kala-azar.

It will be seen from the accompanying table of cases studied that positive tests were obtained only in kala-azar patients. Furthermore, all the cases of kala-azar gave a positive result. In every instance, the diagnosis was proved by finding the Leishman-Donovan bodies in the stained films made from spleen puncture. They include early as well as advanced cases.

There were ten cases of anemia with hemoglobin ranging from 30 to 60% in which the test was performed, and all of them gave a negative result.

In cases of kala-azar which showed a clinical improvement under treatment, there was a decided change in the character of the "hemolytic" test. The turbidity became progressively less as patient improved, until finally the test was only faintly positive. With such findings, we believe that even if the test should be proved to be non-specific for kala-azar, it may still serve as a guide in the successful treatment of this disease.

It will be necessary to do tests on other parasitic diseases and primary anemias that are not included in the above table, in order to determine definitely whether the test is or is not specific for kala-azar.

**Summary.**

Ray's "hemolytic" test was performed on 86 patients suffering from various diseases, including ten cases of anemia. It was found that positive tests were obtained only in kala-azar patients, and that all the cases of kala-azar gave a positive reaction.

This is the diphtheria season. Records of the U. S. Public Health Service show that 16 States reported over 5,000 cases last October and more in November. Don't worry about the "flu" this winter; it is unlikely to return. Worry about diphtheria; worry enough, anyway, to have your doctor determine by a simple test whether you and your children are immune. If they are not, protect them by the new method of immunization.

Investigations by the U. S. Public Health Service show that practically all bottle-fed babies thrive as well on powdered milk as they do on natural cow's milk; and that some who do not thrive on the cow's natural milk, do finely on the powdered. The National commission on milk standards urges health and food-control officials to encourage and not to hamper the dried milk industry.
AGGLUTINATION TITER FOLLOWING REPEATED IN-TRAVENOUS INJECTIONS OF TAB VACCINE.

By C. H. Han and C. W. Young, M.D., Peking.*

The treatment of a patient suffering from polyarthritis, by means of repeated intravenous injections of TAB vaccine, offered an opportunity to study the reaction of man to such injections as judged by the agglutination titer of his blood to the homologous strains of the organisms in the vaccine. In presenting these data, it is recognized that no general conclusions can be drawn from one case, but as no account of exactly similar work has been found in the literature at hand, it seems worth reporting that the results may be added to others that may appear later.

Several investigators have worked on closely related problems. Katherine Howell (1916) studied in two healthy men, the results of three subcutaneous injections of U. S. Army vaccine (typhoid, paratyphoid A and paratyphoid B) at intervals of eight to ten days. The serum was collected at intervals of two or three days for five weeks and then at longer intervals. The serum from No. 1 showed no agglutinins before the first injection; a titer of 1-40 three days after the first inoculation; 1-640 after nineteen days; and 1-2560 after sixty days. This was the highest point. The serum from No. 2 agglutinated B. typhosus in a dilution of 1-10 before inoculation; 1-40 after five days; 1-160 after nineteen days; and 1-5000 after sixty-three days. Agglutinins decreased until the one hundred and thirty-fourth day when the last examination was made. This showed a titer of 1-80. In each case there was a slight fall in agglutinins after each inoculation. Howell concluded from a review of the literature that agglutinins are present in at least 90% of persons inoculated, that they appear within a few days of the first injection, reach their height within one or two months and persist at least a year, often two or more.

Cohn-Brauner (1915) studied 104 cases and decided that the one hundred and sixty-fifth day marked the dividing line between high and low agglutinin content.

Russell (1910) studied 3,600 cases, each receiving three doses. He found agglutinins evident on the fourth or fifth day. The curve rose rapidly to 1-10000 or even 1-20000. The fall begins in about

*From the Laboratory of Clinical Bacteriology, Department of Medicine, Peking Union Medical College.
six weeks, and in one case at the end of fifteen months showed a titer of 1-80.

McDaniel (1915) found that very few of the 1,094 cases inoculated with TAB vaccine showed antibodies after six months, but that probably about 90% showed an agglutination of 1-50 (time after injection not stated).

Russel and Nichols (1921) found the agglutinations to reach their maximum about three weeks after third inoculation (usual intervals) after which they gradually diminished.

The patient under consideration in the present report was given seven intravenous injections of vaccine on the dates and in the amounts indicated in Fig. 1. The vaccine consisted of 1000 million B. typhosus, 500 million B. paratyphosus A, and 500 million B. paratyphosus B. in each cubic centimeter. The strains used in making the vaccine showed the following titers against monovalent sera (not prepared from homologous strains): B. typhosus, 1-6400; B. paratyphosus A, 1-6400; B. paratyphosus B, 1-3200.

The suspensions made for agglutinating with the patient's serum were made as follows: A twenty-four-hour culture of each organism was washed off the agar slant (16 oz. flat bottle) with physiological saline, and to each was added formalin to the extent of one per cent. These suspensions were allowed to stand one week before being tested for their agglutinability to known sera and to the patient's serum.

Technic: Twice a week on the dates indicated in Fig. 1, blood was drawn from the patient's vein by means of a syringe. The blood was allowed to stand over-night in the ice box and the serum was then removed with a pipet. The macroscopic method of agglutination was employed. 0.5 mils of bacillary suspension was mixed with 0.5 mils of a suitable dilution of patient's serum, so that the final dilution was that indicated in Fig. 1. The tubes were immersed in a water bath at 50° C. for two hours, placed in the ice box over-night and read the next morning.

Discussion: Agglutinins appeared first after eight days in the case of paratyphosus B, eleven days for typhosus, and twenty days for paratyphosus A. It will be noted that the number of organisms injected was very much smaller than in the usual prophylactic inoculations. The response to paratyphosus A was weak throughout. It dropped to zero immediately after the last inoculation; these agglutinins reappeared only eleven days later. The titer never exceeded 1-50. The drop in the agglutination titer following inoculation is not constant, however. In fact, so far as the observations in the present case show,
it was only after the seventh or last inoculation that any fall in titer was seen, and this only for typhosus and paratyphosus A. Paratyphosus B showed a slight rise in titer the same day.

More noticeable than any decrease in titer immediately after an inoculation, was the drop about sixteen days later. This occurred definitely after the third and sixth injections and was found for both organisms in which the agglutinin response had been marked, namely, B. typhosus and B. paratyphosus B. It will be noted that only after the third and sixth inoculations were there intervals sufficiently long to show such a drop. The same fall in titer apparently had begun following the seventh injection, but there was only one observation due to the patient leaving the hospital.

There was a marked response to B. paratyphosus B. and a very insignificant one to B. paratyphosus A, regardless of the fact that the dosage of the two organisms was the same. The agglutinin titer for B. typhosus was much higher than for B. paratyphosus B, the dose of the former being twice that of the latter. It is noticeable that this higher titer was attained only after the last dose of antigen. Before that time there was no constancy in this regard. Freshly prepared vaccine was used for this seventh inoculation. The strains of organisms and the technic were the same used in making the vaccine employed for the first six injections. It would seem that the antigenic power of the newly prepared vaccine especially of the B. typhosus was markedly higher than that of the old.

Summary: Recognizing the fallacy of generalizations from the one case studied, we may summarize the results as follows:

1. In the case of one patient inoculated with repeated small doses of a vaccine composed of B. typhosus, B. paratyphosus A, and B. paratyphosus B, there was a response with the formation of agglutinins which first appeared after different intervals (8 to 20 days).

2. The agglutinin response to the B. paratyphosus A. strain employed was weak throughout. That to B. typhosus and B. paratyphosus B. was stronger but varied both absolutely and relatively to one another, although the dosage of typhosus was twice that of paratyphosus B. throughout.

3. There appeared to be an increase in the titer for about sixteen days following an injection followed by a decline. This was repeated three times in the course of these experiments and was evident each time the intervals between the injections were sufficiently long.

4. There seemed to be a difference in the response to two different lots of vaccine especially as regards B. typhosus, but there are several factors involved which were not controlled in our experiment.
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<th>Date tested</th>
<th>B. typhosus Suspension.</th>
<th>B. paratyphosus &quot;A&quot; Suspension.</th>
<th>B. paratyphosus &quot;B&quot; Suspension.</th>
<th>Injection Number</th>
<th>Date of Injection</th>
<th>Vaccine</th>
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Agglutination limit of this suspension with immune serum 1:6400

Agglutination limit of this suspension with immune serum 1:3200

Agglutination limit of this suspension with immune serum 1:3200

Figure 1. Agglutinations of Suspensions of B. typhosus, B. paratyphosus "A" and B. paratyphosus "B" by the patient's serum.
Figure II. Response in Agglutinins to each Antigen.
THE PRESENT STATE OF THE SCHISTOSOME PROBLEM.*

ERNEST CARROLL FAUST.

The schistosome problem is only less important in tropical and Oriental medicine than ancylostomiasis. It is probably as old as the human race. Ruffer records the presence of schistosome eggs in sections of kidneys of Egyptian mummies from dynasties 1250 to 1000 B.C. The ancient medical papyri also contain prescriptions to ward off hematuria. The etiology of bilharziosis was discovered by Bilharz in his autopsies in Cairo in 1851, when he found the adult worms to which in 1852 he gave the name Distomum hematobium. The related Oriental species, Schistosoma japonicum, discovered by Katsurada in 1904 is the cause of katayama disease of the Far East. Schistosoma mansoni, at first confused with S. hematobium, was differentiated from the latter in 1907 on the basis of the lateral-spined egg. Since then the adults of S. hematobium and S. mansoni have been separated by Leiper (1915) and the cercariae have been shown to possess specific characteristics.

The geographical distribution of the three species is well established. Schistosoma hematobium and S. mansoni probably had their inception in the Nile Valley. S. hematobium was dispersed throughout the entire continent of Africa to Syria, Arabia, India (?), and the Malay Archipelago, and to the southern countries of Europe. It has been introduced into Australia from Singapore. S. mansoni was carried westward across the African Continent and found a new center for dispersal along the Gold Coast and in Guinea. With the importation of the negro to the New World S. mansoni was brought to the Americas. Here the disease found a new hold in Venezuela, Brazil, Central America, Porto Rico, and the Lesser Antilles. All of the New World cases were at first diagnosed as hematuria, but later investigation showed them to be caused by S. mansoni. Not a single case of infection with S. hematobium was found by the Porto Rico Anæmic Commission in 300,000 cases examined.

Schistosoma japonicum is confined to the Orient. It is found in four centers with no intimate geographical relation to one another, the Chinese provinces along the Yangtze Valley, the south-west provinces of Japan, Formosa, and the Philippines. The worm had been reported

*Contribution from the Department of Pathology, Peking Union Medical College.
at Singapore by Catto, but the case was imported from Fukien Province, China. The only locality where *S. haematobium* and *S. japonicum* have been positively recorded as over-lapping is at Singapore, although it is now thought possible that both the Egyptian and Japanese types occur in India. The record of *S. japonicum* in India is based on the discovery of a schistosome cercaria in many respects similar to that of *S. japonicum* but differing slightly (although perhaps specifically) in the structure and staining reaction of the cephalic glands.

Milton (1921) has raised the question as to why human schistosomiases have not become established in India and North America, large areas climatically suited to the completion of the life history of these flukes. The answer apparently lies in the fact that a sufficiently large infected population has not resided in those areas long enough to establish the miracidium-cercaria cycle of the life-history in a closely related but nevertheless new intermediate host. Laboratory efforts to infect species of gastecopods indigenous in these countries have thus far proved negative, but the return of large bodies of infected soldiers to India and the immigration of infected Japanese to the Western United States offer such a chance for natural adaptation to new species of intermediate host. It is against establishment of such endemic cycles that preventive measures must be urged.

In 1895 Looss published a careful study on the anatomy and histology of *Schistosoma haematobium*, the most significant points of which were concerned with the digestive, excretory, and nervous systems. But since Looss never admitted the validity of the two species of schistosomes commonly found together in infections in Lower Egypt, he likewise confused the worm in his descriptions so that his treatise is of generic rather than specific importance. Leiper (1915) has discovered the fundamental specific differences but careful detail of differentiation is a problem yet to be worked out.

The development of the Oriental schistosome in the definitive host has recently been studied by Cort (1921). Together with his earlier work on the cercaria (1919) and the miracidium of this species (1919a) there is provided an accurate account of the morphology of this worm. The various stages in the development of the fluke are traced from (1) the cercaria as it first enters the definitive host through the epidermis, dermis and subcuticula to (2) the sexually mature worm in the blood vessels of the liver, and, finally, (3) "from sexual maturity to maximum size." Interestning among the changes of development which Cort found are those of shape (from an elongate oval structure with a length three times that of body width to a ratio of 50:1 and even 90:1
in the case of female specimens). The form change in the male is concerned with the formation of the gynecephoral trough and the differentiation of the preacetabular region into a cylindrical structure. The digestive system develops rapidly from the non-functional ceca of the cercaria to a functional system with a long united portion in the posterior region of the worm. Differentiation of the reproductive organs occurs late.

Notwithstanding the caustic criticism of Milton (1921) regarding the lack of uniformity in description of organs and tissues among larval schistosomes, marked progress has been made in recent years in the fundamental characters on which specific distinction must be made. In 1915 Leiper stated that differentiation of the cercaria of *Schistosoma haematobium* and *S. mansoni* could only be made with positive assurance by experimental infection of susceptible hosts and examination of the adults. But careful study has shown that the cephalic glands of these fork-tailed larvae differ from one another with respect to number and chemical reaction while other features readily serve to differentiate the species infecting mammals from the non-mammalian forms. It seems safe to predict that the excretory system offers another definite means of differentiating these larval flukes of human schistosomiases just as it has proved among the non-human species (Faust 1919).

In regions where two or more human schistosomes are present or other mammalian schistosomes are common, error is likely to occur in experimental infections, unless both the cercariae and the adult flukes can be differentiated. As an instance of this I have found individuals of *Phyllopsis africana* from Natal to be infected at the same time with cercariae of *S. haematobium* and *S. mansoni* and a third cercaria which I have designated as *C. octadena*, which is probably the larva of *Schistosoma bovis*. Dr. R. T. Leiper has identified some of the adults of these forms from experimental guinea-pigs as *S. bovis* (fide Cawston), while I have found adult worms from similar experimental infections of Cawston to be *S. haematobium*. Such composite infections are not only likely to lead to difficulties in distinguishing the species concerned but to cause the clinical symptoms to be confused. Fortunately, differentiation of adults can be made from either males or females, while the methods for distinguishing the larvae are becoming rapidly recognized.

The infective stage of the schistosome is now well known to be the cercaria. Since no forms have been observed to encyst, it seems reasonably certain that infection must occur by penetration of the skin of the host or through the mucus membranes. Even short contact with
infected water will cause infection as demonstrated by the occurrence of Oriental schistosomiasis among American sailors in the Yangtze Valley, who had merely used water in an endemic area to scrub down the decks (Laning 1914). This is apparently true of all schistosome larvae, mammalian and non-mammalian forms alike. I have applied non-mammalian schistosome cercariae to my arm and secured the same type of rash described for human forms at the moment of penetrating the skin. This is effected by the mechanical action of the hollow boring spines, together with the cephalic-gland secretion poured out through them for the purpose of digesting away the host tissues. However, it is not yet known at what stage after penetration of the skin these salivary organs cease to function in the young fluke and the worm becomes semi-passive. For neither the exact route to the portal circulation nor the changes involved in the worm during this migration has been satisfactorily explained.

Cort (1921) is inclined to the view that sexual dimorphism is actually present in the cercaria although it has not been demonstrated in the human species. He suggests that it may even be determined in the fertilized egg (p. 9). This view coincides with the work of Lindner (1914) on the spermatogenesis of *Schistosoma haematobium*, where dimorphism was found in the chromosomes of the sperm, there being six chromosomes in the male-determining spermatozoa and eight (including two sex chromosomes) in the female-determining spermatozoa. Moreover, Cort's suggestion that this dimorphism accounts for the discovery of only males or females in some experimental infections receives further support from Braun (1901) in his description of *Bilharziella pulverulenta*, in which he states that only males were present. The problem can not be considered as settled, however, until the miracidium-sporocyst phase of the life cycle has been studied in detail.

Perry (1920) has offered an interesting explanation of the methods which might be used by the eggs of *Schistosoma haematobium* and *S. mansoni* in escaping from the portal system by tearing the tissues with the oval spine. This, however, does not explain the phenomenon in *S. japonicum* or other eggs which lack spines. Houghton (1921) states that the eggs of *S. japonicum* are set free into the submucosa of the bowel by the bursting of the mesenteric venules due to pressure when the adult worms occlude the venule. Tension in the submucosa causes slight hemorrhages and a consequent expulsion of the eggs into the lumen of the bowel. Too little yet is known of this moment in the life history. The same criticism applies to the bionomics of the eggs and the miracidia.
It is known that hatching may be prolonged for some length of time due to unfavorable conditions and that eggs may be hatched in the laboratory (1) by decreasing the tonicity of the medium, or (2) by increasing the temperature, or (3) by slight pressure of a cover glass. It seems highly probable that the miracidium, even when fully mature, does not exert enough pressure on the egg shell to rupture it, although such a larva has considerable movement within the shell. I have not seen any ciliary movements in miracidia within the egg shell of *S. japonicum*. In fully mature specimens the cilia commence movement in unison immediately the shell is ruptured. In immature specimens, however, a noticeable time elapses after the breaking of the shell before ciliary movement begins. In such larvae the anterior cilia are the first to start action. There appears to be a distinct group of these down to the region of greatest body breadth. Slightly later the movement is taken up by those posteriad. In some cases I have observed a bacterial infection within the egg shell before hatching. Miracidia which escaped from these were apparently normal.

It is known that miracidia of human schistosomes require a specific gasteropod host in any particular locality. But the exact stimulus which attracts the miracidium has not been analyzed. Will serum of the gasteropod in which the schistosome larvae develop attract these larvae as ovum-extract of Nereis and other marine animals attracts the sperm of those species?

Although lethal doses of a few common salts and acids have been found for the cercariae and miracidia of schistosomes, knowledge of the conditions under which the ova and larvae exist in night-soil, rice-fields, and drainage ditches is extremely meager.

The literature is filled with case reports of schistosomiasis from infected regions and from patients removed from such areas. Moreover, the data on the symptomatology of the three species are fairly full. Houghton (1921) and others have given very valuable descriptions of the course of the disease for the species of schistosome infection with which they have worked. From these data there has been built up a picture of the clinical pathology cases. However, the histological changes of the infected tissues are less well known. This phase of the problem offers a study well worth the effort.

The efficacy of tartar emetic as a therapeutic has been proved in spirochaetoses, kala-azar, and other protozoan infections, and is coming to be recognized in helminth diseases. The treatment has been applied to African schistosomiasis with relative success. Perhaps the most interesting development in the therapy of the disease has been the discovery of the complement-fixation reaction by Fairley (1917). It consists of a saline or alcoholic extract of the infected intermediate host concerned. This antigen has proved valuable as a diagnostic index in
the control of tartar emetic treatment. Work of this nature on *Schistosomiasis japonica* has been neglected and needs careful study.

While great strides have been made in the working out of the schistosome problem, especially since 1913, when the first successful experimental work was published, whole phases of the problem remain practically untouched. The increased recognition of the value of biological and bio-chemical methods applied to schistosomiases and the need for further work on this line should stimulate other investigators to attack the problem and should call forth the hearty co-operation of the physician and the medical zoologist.

I desire to express my hearty gratitude to Dr. H. S. Houghton for kind permission to read the copy of his paper on Asiatic Schistosomiasis now in press.

**LITERATURE CITED.**


"Why waste time in teaching students the refinements of modern Surgery, which most of them will never have an opportunity to practise?" This question, so frequently asked in Europe and America, takes on a different complexion in China. In the West there is not enough surgical work to "go around." In China it is safe to predict that for fifty years, perhaps a hundred, we and our successors shall not be able to train enough competent men to supply the demand.* And while it is to Preventive Medicine and Public Health work that we must look for the greatest amelioration of the suffering about us, it will probably always be for surgical help that most patients come to our hospital. Thus, instead of needing one surgeon to, say, a dozen general practitioners as at home, every graduate of our medical colleges might well be a surgeon if he had the training and the nous.

It was said by them of old time that the Chinese language was an invention of the Evil One to prevent the zealous young missionary from propagating his beliefs. Might we not say that surgical technique as "taught" at home seemed like a cunning scheme of the surgeons themselves to frighten off any young Prometheus who might be contemplating a raid on these sacred regions after his graduation, to the possible detriment of their own practice? We should be mistaken, of course, if we said so or thought so, but did it not look like it? Who among us cannot recall his feelings as he watched the white-robed priests and priestesses of this strange cult moving about the floor of the theatre in the performance of their weird ceremonies, and anon retiring to the sterilizing room where, no doubt, still more mysterious rites were being observed; rites which only the esoterics might witness? "The ritual of surgery has become like the magic rites of old, of which, if a point were dropped or a word changed, the virtue went out." All this is admittedly an improvement on the methods in vogue fifty years ago when, as Allbutt writes, "the friendly fingers of curious colleagues were popped in and out of the operative incision with no apprehensions about 'the infinitely little.'" But the pendulum has swung too far.

The object of the present paper is to urge upon those who teach Clinical Surgery in our medical colleges, and upon those who have Chinese graduates or under-graduates working with them in hospitals,

*Since writing the above, a former student of this University reports that during the month of March he has done fifty operations under anaesthesia, including six for inguinal hernia and three for gastric or duodenal ulcer.
that something more is required of us than the kind of teaching most of us received in our student days. I am not forgetting that operative technique is only a small part of the subject of Surgery; nor do I forget that the amount of practice which can be given to any student before graduating will by no means make a surgeon or even an "operator" of him. It is rather that one would protest against the conventional idea that if the student has attended at the performance of a variety of operations and if he has sometimes been allowed to assist, then there is no more to be done. If others retort that surgical technique is no longer taught in a haphazard fashion at home, I can only say that a friend who has recently been doing post-graduate work in one of the very best universities of North America tells me that the under-graduates are so over-loaded with laboratory work that no time is left for other things. Nor can the need be supplied by operations on the cadaver, or on animals dead or living. The conditions are too unnatural; too much imagination is required to bridge the gap.

During my own student days, I had rather exceptional opportunities of assisting at abdominal operations. Nevertheless, when faced with my first ovariotomy in inland China, and under primitive conditions, I was decidedly nervous. Patient, assistants, room and instruments were all in order but it seemed as if, away from that accustomed atmosphere of a home operating room, no patient could survive. I realized as never before what a hero was Ephraim McDowell. The third day came and with it no signs of infection. I rubbed my eyes. It was not a dream. Nothing was going to happen after all. What a revelation! But what days of agony before the revelation came! Now, it is because of this vague uncertainty that many young graduates cannot bring themselves to attempt any surgical operation worthy of the name. And if not attempted, then they will certainly not begin in later life. A good friend of mine, who has spent about twenty years in China, once told me that the only big (sic!) operation he had ever done was an amputation above the knee.

My first point is, then, that while our students are still with us we must find ways of familiarizing them not only with every detail of the treatment of the patient before and after operation, but also with the whole routine of the operating room—the preparation of the room itself, the sterilizing of dressings, etc., the sharpening of knives and needles (scissors are beyond me), the preparation of catgut, the proper strength of all solutions and the particular use of each. Here we are at once faced with the difficulty that the theatre sister, being responsible for all preparations, has her own staff under her and has no room for
"prentiss hands." Nevertheless, the students should, for example, not merely have the working of the autoclave demonstrated to them; they should operate it themselves, and that repeatedly. After a student has sharpened a scalpel to his own satisfaction, the surgeon should use it in the student's presence (with a spare one at hand to fall back on). Where classes are large and clinical material limited, the duties assigned to any one student will be few. Still he will be reminded that all such things are within his province and are not to be despised.

As a corollary of the above, we must make the operating room routine as simple as possible. Simple, not because simplicity is "good enough for China" but because intricacy is not good enough. A medical missionary in Central Africa sent home an hysterical appeal for two tall glass cylinders so that he could immerse his arms in an antiseptic before operating. He said that without these he could not hope to do aseptic surgery. Poor fellow! No doubt he was right.

Leave a trained nurse to prepare a patient for an operation for fistula in ano. The skin will be sterilized for a foot in all directions and the whole body swathed in aseptic sheets until one cannot find, much less approach, the field of operation. If one dares to ask the reason, one is told that lest the nurses should ever be tempted to use their own discretion as to where great care is, or is not, called for, the full ritual must be observed in every case.

There always have been, always will be, men who delight in prescriptions with as many ingredients as Warburg's tincture, men who add to their culture media every ingredient not positively harmful, men whose operating rooms bristle with every form of instrument, appliance, and article of furniture ever described in a catalogue. But true progress has usually been in the direction of simplicity. Where is now the carbolic spray of Lister's time, where the pneumatic cabinets for thoracic surgery, where the elastic ligatures, the decalcified bone plates, even the Murphy buttons for gastro-intestinal work? Why has the iodine method of skin disinfection come into such wide vogue? It is not ideal; it is not even the best method known; yet it has come into very general use, and rightly so. Is it not because the patient's skin, if dry and "socially" clean, can be painted before our eyes with an assurance of safety that amounts to perhaps more than ninety-nine per cent? If not the ideal method it is at least the right kind of a method.

Students must be taught that Surgery is not only a science but also a fine art, and that every procedure should as far as possible be pretty, dainty, "feather-edge"—nice in the proper sense of that word. From time to time, when an assistant has sterilized his hands and just before he puts on his gloves, scrapings should be taken from under his nails (and from those of the surgeon) and smears made to test their sterility. This will help to bring home the truth of a remark once
made by a surgeon to his assistant—"Your conscience may be aseptic and yet your hands not so." Needles, silk, etc., should always be called for by number. The description "fine silk" conveys very different impressions to different minds. They must be taught that it is a disgrace to make an incision with a dull knife, to ligate any tissue en masse if the bleeding point can be isolated, to interrupt an operation because an instrument has been forgotten, to wantonly pour an irrigating solution over wound and patient so that all clothing has to be changed at the close of the operation, to tie skin sutures with that little flourish that a grocer gives when tying up a pound of tea, as much as to say "the tighter the better," causing the patient days of needless suffering.

A servant in a foreigner's household in a certain city went to the hospital to have a deep whitlow lanced. He was handed over to some senior medical students who, without using any anaesthetic, made two vain attempts to open the abscess with a knife that was more than dull. At the second attempt he fainted, had to be carried home and chose to suffer rather than risk another such ordeal. Their own traditions would have made these students ashamed to be slovenly in dress or in, say, writing Chinese characters, but as to Surgery they had no traditions whatever. Surely, if we cannot acquire the delicacy of touch of an engraver we can at least emulate the carpenter's pride in doing neat, precise work with well-kept tools.

"There is many a true word spoken in jest." The best illustration I know of the truth of this old saw is the "jest" that, in learning to operate for cataract, a man "must first ruin a hatful of eyes." And yet the required dexterity can be acquired in other and gentler ways. Lawson Tait once said that if he had a son who was to be a surgeon he would first apprentice him in turn to every trade in Birmingham. The modern student scarcely needs so heroic a training. All through his course he has laboratory work. He dissects, he uses instruments of precision, he draws, and in all this trains his fingers. Coming now to the operating room, if he is properly supervised, there ought to be only an easy gradation to the simpler and then to more difficult operations.

It is not easy to impress students sufficiently with the fact that for many operations there is one, and only one, proper position for the part to be operated on and for the surgeon; that these positions are not matters of opinion or of whim but of long experience; that they must be learned, and that they must be assumed before the operation is begun. It is scarcely an exaggeration to say that one simply cannot tie the external carotid in the living subject unless the head and shoulders have been properly placed. In order to emphasize this, it is often worth while wasting a little time before an operation in insisting on its importance. Last year, when the hospital was full of wounded soldiers, we had occasion to amputate through the left thigh of a patient,
whose right hip joint was somewhat stiff. I explained that while one ought to stand at the right side, in this case the right limb would be in the way, so I would stand at the left. A month or two later the same operation had to be performed again and the students all maintained that one ought to stand at the left. When reminded of the previous case, they said: "We do not remember what you said, but we do remember that you stood on the left side of the patient when amputating through the left thigh!" "Longum iter per præcepta . . . etc."

Others may be disposed to ridicule the statement that in the present year of grace we must still labour to teach the student a wholesome fear of pus, whether in or out of the operating room; that only in an emergency may surgeon, assistant, or nurse touch pus or pus-contaminated dressings, clothing, etc., with the ungloved hand. Sad to say, some foreign doctors who are by no means "back numbers" in other respects, are great sinners in this. "A man's foes shall be they of his own household." I have known such a one (not in this district, however) to simply soak his fingers in pus while dressing an infected wound and then, after a perfunctory wash with soap and water, bid one good-bye with a cordial shake of the hand. Oh, that our friends would adopt the Chinese custom of shaking their own hands instead of ours!

There is a very natural tendency among those who practise Surgery to confine their interest to difficult cases, and to feel that the ordinary humdrum of "small stuff" is beneath their attention. We shall not discharge our debt to our students, however, unless we pay much attention to the teaching of minor surgery. The man who removes Gasserian ganglia and tumors of the cerebello-pontine angle will add to his reputation and may even, from time to time, help a patient, but the benefit to his students will be negligible. Even Huxley was willing to forego the distinction which might have been his in research work in order to devote himself to teaching. The young graduate whose surgical foundation has been well laid can very well learn from text-books the steps of even complicated operations and can perform them without having seen others do so, but if he has formed the habit of leaving artery forceps clamped on skin edges, of using forcible retraction of tissues instead of making his incisions of adequate length, of pulling and tearing where he ought to employ sharp dissection—it he begins thus he will in all probability continue to do so all his life. Solon said that his code of laws was not the best that he could make, but the best that the Athenians could keep. We must put aside our own predilections and teach what the students will be able to practise. To this end, we must allow senior students to do a certain number of operations while we assist and thus learn of the faults that need to be corrected. When the operations are simple and straightforward one can often have two tables in use at the same time, leaving this group
of students to finish a case while one watches that group begin another. Speaking from an experience of a good many years of this method, in Chengtu and elsewhere, one can testify that patience and self-restraint called for are amply rewarded by the gratifying progress seen from week to week.

Many of us will remember how, in our student days, we envied fellow-students whose fathers were themselves experienced practitioners, often working in country districts. We remember that although they may not have had any great flair for passing examinations, they yet knew much that we could only hope to learn after years of effort, if even then. We longed for the old days when we could have been apprenticed. Those days are gone forever. We can, however, reproduce to a certain extent the environment in which the apprentice found himself. Not long ago a young graduate wrote to one of his former instructors that no surgical work was being done in his hospital because, forsooth, their steam sterilizer had been lost on its way up river. Why did he not know that dressings and even gowns could be boiled and then baked dry if enough care were taken? Why did he not know that towels for the immediate neighborhood of the wound could be boiled and then wrung nearly dry, or boiled and then wrung out of a weak carbolic solution, with as great safety as if they had come out of the autoclave?

No better lesson in technique could be given than to perform a number of "clean" operations each winter as nearly as possible under the conditions prevailing in a private house—using such tables and forms as might be found in any home, boiling basins, gloves and instrument in a ko (囓) and sterilizing towels in the way mentioned above. It is true that for some years most of our graduates will be absorbed into mission hospitals where the paraphernalia of an operating room will be at hand, but this will not always be so, and if it were we still do not want them to be like those pathetic creatures we sometimes see at home who can do nothing unless waited on hand and foot as the red African ants are said to be by their black slaves.

In his recent address on the life and work of John B. Murphy, Moynihan refers to the unfortunate fact that Murphy, while reaching the very pinnacle of achievement as a surgeon and as a teacher, had not attracted to himself, and inspired, disciples worthy of carrying on the traditions of their chief. After all is said and done, this is the thing most to be desired and hardest to attain. If we can, in our smaller spheres, arouse in our students an enthusiasm for the science of Surgery and a delight in practising the art thereof, we shall be able without anxiety to see them strike out for themselves. And, above all, let us seek to impart to them that true sympathy with suffering which Lister himself regarded as the first qualification of a surgeon.
This school was founded in 1906 by three missionary societies and supported by them and three more until July 1, 1915, when the China Medical Board of the Rockefeller Foundation purchased the property and assumed the full support of the school. At present these buildings are used for the Pre-Medical School begun in 1917.
MAIN ENTRANCE TO THE NEW PEKING UNION MEDICAL SCHOOL.

The period from 1915 to 1921 has been one of reconstruction, both of the physical plant and of the organization of the teaching staff. The present institution, opened in 1924, is under the control of a Board of Trustees of thirteen members, six of whom represent the organizations interested in the old School. The new buildings are just beyond the corner on San Tsu Hsing.
To the left is the Anatomy building and to the right the Chemistry building. This court is really divided into four squares each one of which is bounded by a marble walk. Three sides of the court have an elevated walk. A pleasing gradation to the court level is effected by the use of shrubbery and wide marble steps. These with just enough grass plot areas add a touch of natural beauty which enhances the effect of the carved marble around the sides.

The Dedicatory Procession formed in the Chemistry building to the right, marched through the court and gate-house to the chapel across the street.
ENTRANCE TO THE ANATOMY BUILDING.

Reproductions in black and white fail to give an adequate idea of the wonderful color effects produced by the expanse of green tile edged by exquisite painting in many colors of the delicate patterns used by Chinese artists centuries ago. In the construction of these buildings there was an effort made to combine the best in Chinese art and architecture with the present-day requirements for a modern medical school and hospital.
CHOLERA AT TZELIUTSING.

Wallace Crawford, Tzeliutsing.

Just a year ago now, we were in the throes of a severe cholera epidemic. As is always the case, the epidemic came up the river Yangtze to Luchow, and then branching up the tributary there, reached the county seat of Fushun and on up the small river to Tzechow, Iang Hsien, and other up river cities. The disease was brought in here by the soldiers, who retreated from Tzechow, and Luchow, and the trial of the afflicted could be followed wherever they went.

The second epidemic, came in also with the soldiers, just at the time when the first outbreak would have probably died down, but it was revived by the incoming Szechwanese. As Tzeliutsing is what may be well called an inland town, despite the fact that we are on a small stream, it might have escaped with a very few cases. The small river running through here does not bring up enough traffic to have made any material difference to the carrying in of the disease, as the boats take from one to three months to come the last stage of the journey, hence the river is not to be counted in carrying the disease in here. But the soldiers were undoubtedly the chief carriers of the disease, and failing anything approaching a sanitary corps, or adequate medical attention, their condition was pitiable. The roads are lined with rice fields, and the water from these was freely drunk, and as freely polluted by the diseased soldiers, who could still be moved along the road with their comrades. Hence the disease was spread most prodigiously.

The disease was on the street several days before any cases were brought to the hospital. Many deaths were reported, and some of them, we are inclined to think, were heat stroke and not cholera at all. Even the first cases which came to the hospital we were loath to diagnose as cholera, there being absent some of the cardinal symptoms, such as the leg pains. But shortly after the cholera cases which came in great numbers were undoubtedly the real thing. One cannot forget the characteristic smell, the hands, cramps in the legs, and later the facial expression which is peculiar to the disease.

We had telegraphed for Kaolin to give it a fair chance but alas, with the soldiers at war, the parcel mails were irregular and our Kaolin was held up till after the epidemic had ceased. Failing this we tried several kinds of medicines, and found that "Squibb's Cholera Mistura" gave the best results, Squibb's Mixture is as follows:

\[
\text{Squibb's Cholera Mistura:}
\]

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R/ Chloroformi, fl. dr. 1
Tinct. Opii fl. dr. 3
Spts. Camphorac fl. dr. 3
Tinct. Capsici fl. dr. 3
Alcoholis q.s. add fl. oz. 2

Sig.—thirty to sixty drops in water. Repeat if vomited.

We found that the usual stimulants, e.g.—Digitalis, strychnia, camphor, were of little use, and even in the saline intravenous which we used the Tr. Nix Vom, which is recommended by some authors, was of little assistance.

For the intense thirst which some complained of, we used a weak solution of potassium permanganate. I believe this had a psychological effect, as well as an intestinal antiseptic effect. We used a one in five hundred solution and let the patients drink as much as they liked. Only a few objected to the drink.

One of the tasks of the nurses was to keep the patients who were a little better, from eating solid food. More than one patient lost his life by surreptitiously securing and eating food. We made all patients refrain from any food for at least thirty-six hours after signs of relief from the disease, and then commended each on a milk diet.

In casting about for something to use in place of kaolin, we had a number of samples of earth, gotten locally brought in, and at last found one, which answered well. It was baked in an oven, then cooled and ground finely, and sifted. This powder, called by the people herabouts, "Goddess of Mercy powder" is not unlike kaolin, being lighter in colour but having also a great water absorbing power. We later succeeded in getting a quantity of the Luchow porcelain works powder, which I believe is imported from Kiangsu.

Undoubtedly kaolin is of great value, but it is an absolute failure if not taken EARLY in the disease. We had numbers of cases where it was of no avail, and the joint use of kaolin and saline was of no use either.

To combat with the disease more widely, we made up the kaolin powders in three ounces, and put them in packets which contained directions for their use, on the outside. We supplied all our schools and chapels with these, and while we have no definite reports, there are instances of cures which are claimed for the kaolin so distributed. This, by the way, was the "Goddess of Mercy powder" which was found and prepared locally.

Massage to the legs, especially the calf of the leg, is of great value in our hands, even without any vehicle, the plain hand massaging the limb allays the pain, and brings relief to the sufferer.
Cholera at Tzeliutsing.

In our hands every opium smoker was a fatal case. There was some question about one chappie, who had opium on his person, and who denied being a smoker. He survived the disease.

For the saline injections, in our opinion, the veins of the arm and at the elbow afford the best avenue for the saline injection. The leg does not answer as well, in our experience.

We used two kinds of saline, one the tablets as prepared by Messrs. Parke Davis and Co., No. 365, sodium chloride pure; and the other, normal saline made up with local salt. We were unable to make up Rogers' Hypertonic Solution owing to lack of the ingredients.

With the P. D. & Co. saline one got the physiological reaction after the injection, and the patient rapidly regained, but with the saline made from the local salt, there was not that expected physiological reaction, and the recovery was not as quick, nor as lasting as from the foreign product. One is inclined to believe this to be due to other ingredients in the local product. Unfortunately, we have not had time to analyze the local salt, but one can be sure that other chemicals are present in it, and thus the expected results were not forthcoming. As soon as this was discovered we discontinued the use of the local salt solution, and used only the P. D. & Co. Salt.

No cases were contracted in the hospital; 231 cases in all were treated with a mortality of 28.7%.

Below will be found a rough table of some of the cases, their treatment, and the results of treatment in each case:

<table>
<thead>
<tr>
<th>Cases</th>
<th>Medicine</th>
<th>Cures</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>Squibbs</td>
<td>37</td>
<td>9</td>
</tr>
<tr>
<td>25</td>
<td>Kaolin</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>61</td>
<td>Saline</td>
<td>44</td>
<td>17</td>
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<td>2</td>
<td>Squibbs and Sal.</td>
<td>2</td>
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<tr>
<td>4</td>
<td>Kaolin and Sal.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Opium smokers, three died, one questionable</td>
<td></td>
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</tbody>
</table>

We were unable to go into the whole 231 cases treated, but the results presented herewith may be of some help to others in the future treatment of the disease.

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THE INVESTIGATION OF SOME CHINESE FOODS.


By HARTLEY EMERY. From the Laboratories of Food Chemistry, Union Medical College, Peking, China.

In the May number of this journal we published the analyses of thirty-six typical Chinese foods, together with a description of these materials, and of their methods of preparation. This paper will give a brief summary of the present status of vitamins, and will present the results of our feeding experiments on white mice, employing five of the foods previously analyzed, viz., mung beans (小绿豆), mung bean sprouts (豆芽菜), red kaoliang (红高粱), white kaoliang (白高粱), and the Chinese persimmon (柿子).

We have also started a series of analyses of the mineral content of the ash of some of the foods just named. It was our original intention to present these results in this paper, but unfortunately there were delays in the arrival of chemicals and supplies from America, so that we cannot give the complete table at this time.

We would like, however, to call attention to the large increase in calcium that apparently takes place during the sprouting of beans.

The calcium content of the yellow soy bean, calculated as CaO and reckoned as per cent of the total ash, is 7.77%; that of the yellow soy bean sprout is 11.08%. The calcium content of the green mung bean, the Phaseolus aureus Roxb. is 5.71%; whereas the calcium content of the corresponding sprout, the "tou ya t'sai" of the Chinese is 10.09%.

The beans were sprouted in the Peking city water—a hard water with an abundance of calcium and magnesium salts. Later on, we will attempt to sprout these beans in distilled water.

In view of the importance of calcium in physiological functions, and of the deficiency of calcium in most beans, this is of especial value in nutrition. It has long been known that the sprouting of beans increases their antiscorbutic properties. Our results show that there is also a decided increase in the water soluble B, as well as in the calcium content.

It is an established fact that in various diseases, especially those of children, there is an inadequate reserve of calcium; when this affects nerve tissue the effects are serious. In rickets, for instance, the calcium content of the blood may be high, thus masking an actual calcium deficit in the tissues.
The Investigation of Some Chinese Foods.
Calcium deficit is said to play an important role in tetany. The deficit of calcium here, apparently deprives the cells of their defense, facilitating the entrance of toxic products of metabolism which gives rise to tetany.4

If it is true that small quantities of calcium, and of certain other mineral materials, are absolutely essential to the health of man, it is now proved beyond the shadow of a doubt that life itself is dependent on an adequate supply of the three food accessories—the so-called vitamines.

No longer can one take a table giving the percentages of proteins, fats, carbohydrates, and ash, and make out a diet which will conform to the recent advances in science. Other questions must be answered satisfactorily first: Is the protein selected of a good quality? Are the essential amino acids present? Are the necessary minerals present, and are they in the right proportions? And still more important, perhaps, are all the vitamines suitably represented?

Only during the last few years has the necessity—the tragic importance—of vitamines been brought to public attention. At present three vitamines are recognized, viz., fat-soluble A, the absence of which often causes the eye disease, xerophthalmia; water-soluble B, the absence of which causes beri-beri; and water-soluble C, whose absence causes scurvy.5

Fat-soluble A is found in butter fat, whale oil, cod liver oil, but not in olive oil, bean oil, or in most of the vegetable oils. It is found in liver and kidney tissue, in spinach, cabbage, carrots, and in smaller amounts in peas, and in many other seeds.

Not only is the absence of this food accessory said to cause xerophthalmia, but some investigators claim also that rickets is the result of long continued diets deficient in fat-soluble A.6

Water-soluble B occurs less widely in animal food than in plant food. Milk and muscle tissue are somewhat low in this vitamine, but heart, kidney and brain are efficient sources of supply. Yeast, seeds of cereals, spinach, cabbage, onion, turnip, tomato, beet, carrots, all contain it. In fact, its distribution is much wider than that of fat-soluble A.

McCarrison in India has shown that in a diet lacking water-soluble B, pigeons lost body weight; their temperature fell nine or ten degrees Fahrenheit, their digestion was affected, the starches not being assimilated. All of the organs except the adrenals lost weight. Generally sterility of the male occurred. The pigeons were also an easy prey to all kinds of bacteria.

The antiscorbutic vitamine, or water-soluble C, is present in many fresh vegetables, and in most fresh fruits. It is much less stable
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than the other two vitamins—both the water-soluble B, and the fat-soluble A are stable up to 100 degrees C., and are only slowly destroyed above this temperature, while the antiscorbutic vitamin is gradually destroyed above 50 degrees C., and rapidly above 80 degrees C. From this data we conclude that the fat-soluble A, and the water-soluble B are only slightly, if at all, impaired by the ordinary cooking processes, while the antiscorbutic vitamin is always greatly diminished, and often completely destroyed by the usual methods used in household cooking. It is clear, therefore, that our diets should always include oranges, lemons, carrots, cabbage, tomatoes, bean sprouts, or some other food known to contain this vitamin, and that this food should be served either raw or else sterilized by some quick process.

The watersoluble B and the antiscorbutic vitamin are unstable in the presence of alkalis, even at room temperature; the fat-soluble vitamin, on the contrary, appears to be fairly stable under these conditions. In dilute acids, at room temperature, all three vitamins are apparently stable.

It is interesting to note that canned tomato juice still has an appreciable amount of the antiscorbutic vitamin, which must have been protected from destruction during the heat of canning by the presence of the acids of the tomato juice.

Since these vitamins can not, as yet, be determined by chemical means; since they can only be detected by feeding experiments, we decided that any investigation of Chinese foods which did not include a number of tests on living animals would be incomplete, and not in accord with modern ideas.

In our work in Peking we have used white mice. We would have preferred white rats, both because they are hardier, and because most of the feeding work done in America, and elsewhere, has been done on rats, and our own results could thus be compared more advantageously to those obtained elsewhere. But, unfortunately, we were unable to find white rats in China, so we acquired one thousand mice from the small dealers who sold them as pets for children.

We soon found that the local mice are much smaller than those used in America by Robertson and Ray in their experiments on Growth. The adult American mouse weighs from 26 to 30 grams, while the Pekingese mouse seldom reaches 15 grams. In order, therefore, to have a standard on which to base our subsequent experiments, we selected twenty baby mice—ten males and ten females—paired them, and fed them a diet which we believe to be adequate in every respect. Their weights were taken each week, and curves drawn based on the
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average weights obtained. The weights of pregnant mothers for the three weeks before the birth of the young were omitted from the averages struck. The number of births were recorded. All curves obtained from subsequent experiments on new Pekingese foods were compared to these normal growth curves as a standard.

For the detection of the antiscorbutic vitamin, we followed the general practice of using guinea-pigs, since mice and rats do not have scurvy.

In our experiments on mice, as far as possible, we used the technique of Osborne and Mendel. As our standard protein we employed casein. This was precipitated from skimmed milk by dilute hydrochloric acid, dissolved in dilute alkali, reprecipitated and redissolved until the ash content was less than 0.7%. The casein thus obtained was extracted with eighty per cent alcohol and then with ether, and dried at 100 degrees C.

Our standard salt mixture consisted of: NaCl 0.173 grams, MgSO4 0.266 grams, NaH2PO4 0.347 grams, K2HPO4 0.954 grams, CaH4(PO4)2 0.540 grams, ferric citrate 0.118 grams, and calcium lactate 1.300 grams.

Butter was melted below 45 degrees C., the clear liquid was decanted and centrifuged an hour. This butter fat was used as the source of fat-soluble A.

Dextrin was prepared as follows: A paste was made from corn starch and 0.5% citric acid, which was heated for four hours in an autoclave at fifteen pounds pressure. The dextrin was subsequently washed with alcohol and dried.

The Chinese foods investigated, unless otherwise stated, were cooked forty minutes in an autoclave at fifteen pounds pressure, and dried in a current of air below 60 degrees C. The ingredients used in our diets were ground so fine that the animals were unable to separate them.

The animals were numbered—the males by the odd numbers, the females by the even ones—and paired.

Our cages were made locally, being two-storey glass boxes with removable glass floors and glass fronts. The upper and back parts of the cages were wire screening, which was also removable. In this way every section of the cage could be taken apart, cleaned and sterilized, thus preventing epidemics. The mice nests were of fluffy cotton placed on the lower floor; the food and distilled water for drinking were placed in small porcelain cups on the upper floor. A small hole in one corner afforded passage between the floors. A revolving metal wheel in the upper story proved a very satisfactory method of providing exercise in the limited quarters.
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Each week a few drops of 0.2% KI solution were placed in the distilled drinking water.

The method of testing a new food was the usual one. A diet was made which was adequate in all but one essential, and that essential could only be supplied by the food under investigation.

The foods we fed were: mung bean, mung bean sprout, red kaoliang, white kaoliang—the kaoliang is a sort of Sorghum Vulgare used for grain, often called Barbadoes Millet—and the Chinese persimmon.

We came to the following conclusions:

**MUNG BEAN AND MUNG BEAN SPROUT.**

1. Mung bean as the sole source of protein gave normal growth. Reproduction was subnormal, and none of the second generation lived.

2. Mung bean contains sufficient amounts of fat-soluble A, and of water-soluble B for normal growth, when used as the sole source for these vitamins. Forty-five per cent was the minimum amount which supplied enough water-soluble B for normal growth. Reproduction, however, was not normal under 50%.

3. Mung bean is deficient in calcium and sodium. Two animals, however, were able to withstand this calcium deficiency. They lived more than a year on a diet deficient in calcium which killed twelve other mice in a few mouths.

4. Small quantities of casein added to the mung bean improved the quality of the protein to such an extent that reproduction was increased. The second generation lived and grew to normal weight.

5. Mung bean sprout, as the sole source of protein, enabled the fully grown mice to maintain their weight, but proved inadequate for growth and reproduction.

6. Twenty-five per cent of mung bean sprout supplied sufficient water-soluble B for growth and reproduction. The sprout, then, is almost twice as good a source of water-soluble B as the original bean.

7. The mung bean sprout—as shown both by analysis and by feeding—has a larger calcium content than the original bean.

**RED AND WHITE KAOLIANG.**

8. Neither the protein of the red kaoliang nor that of the white kaoliang is quite adequate for normal growth. The protein of the white kaoliang is of a better quality than that of the red kaoliang.
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These results are in accord with the experience of the Chinese. Only the poorer classes here eat the red kaoliang, but since the kaoliang crop constitutes almost 40% of the entire crop of Chihli, and since many of the Chinese are exceedingly poor, there are numerous families who use red kaoliang, together with a little salted vegetable as their only food.

9. Both the red and white kaoliang contain adequate water-soluble B and fat-soluble A for life. In fact, both the red and white kaoliang are richer in water-soluble B than the mung bean. Thirty percent of red kaoliang, and twenty-five percent of white kaoliang supply enough of this vitamin to protect from beri-beri and to give normal growth, while 45% of mung bean had to be given to afford the same protection.

These experiments were all done on the unpolished kaoliang. These grains are also often eaten in the polished condition. Later on, we propose to feed the polished grains, to determine whether or not most of the water-soluble B—as is the case with rice—is lost by the polishing process.

10. The mineral content of both the red and white kaoliang—as shown by feeding—is better than that of the mung bean. In fact, the animal attain normal weight with these substances as their sole source of mineral matter.

CHINESE PERSIMMON.

11. The Chinese persimmon fed ad libitum in the raw natural state provides enough antiscorbutic vitamin to protect guinea-pigs from scurvy. The minimum amount which affords immunity will be determined when this fruit is again in season.

12. The raw, undried, Chinese persimmon—even when fed ad libitum, in separate dishes—does not furnish enough water-soluble B to protect mice from beri-beri. They all die in a few weeks.

13. Persimmon, when given to mice supplied with an adequate diet, has no toxic effect on them. The deaths, therefore, are due to deficiency in water-soluble B, and not to the poisonous nature of the persimmon.

The charts which follow give the diets used, and the growth curves from which the above conclusions were deduced.

In all of this work we gratefully acknowledge the help of our chief assistant, Mr. Tsau Ch'ing Wang and that of our laboratory technicians, Mr. S. C. Wang and Mr. W. T. Yü.
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EXPLANATION OF THE CHARTS.

Chart 1. These curves represent: 1. The average of ten female growth curves. 2. The average of ten male growth curves.

The diet was given in three separate containers ad libitum. The first container consisted of a homogeneous mixture of: yellow soy bean 45%; casein 3%; butter 5%; salt mixture 3%; dextrin 44%. The second container consisted of cabbage or spinach; the third, of milk one day, and hard boiled egg the following day.

During the time of this experiment more than 40 young were born, and 31 lived to normal weight.

Chart 2. Diet: mung bean 97.0%; calcium carbonate 1.5%; sodium chloride 1.5%. The growth was normal. Reproduction was subnormal, and only one young mouse was raised on this diet. The mung bean contains enough fat-soluble vitamine for life.

Chart 3. Diet: mung bean 89.3%; salt 3.7%; dextrin 2.0%; butter 5.0%. Growth was normal, but reproduction decidedly subnormal, and none of the young born lived through the period of lactation.

Chart 4. Diet: mung bean 89.3%; dextrin 2.0%; salts 3.7%; butter 5.0%. At the time designated by the arrow, the mung bean was reduced to 84.3% and dried egg albumen 5.0% was added. A very small increase in growth was noticed, but no improvement in reproduction.

Chart 5. Diet: mung bean 89.3%; casein 3.0%; salts 2.7%; butter fat 5.0%. The growth is normal and six of the second generation grew to normal weight.

Chart 6. Diet: mung bean 87.3%; casein 5.0%; salts 2.7%; butter 5.0%. The reproduction was increased by the addition of the casein, and eight young were suckled successfully by mothers fed this diet.

Chart 7. Diet: mung bean 84.3%; casein 8.0%; salts 2.7%; butter 5.0%. On this diet the reproduction was practically normal, and sixteen young were suckled successfully by mothers fed this diet.
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Chart 8. Diet: mung bean 35.0%; casein 10.0%; salts 3.7%; dextrin 46.3%; butter 5.0%. All of the mice died from beri-beri in a few weeks.

Chart 9. Diet: mung beans 40.0%; casein 10%; salts 3.7%; dextrin 41.3%; butter 5.0%. All of these animals died from beri-beri, except 172 and 173. These grew below normal rate for the first three months.

Chart 10. Diet: mung bean 45.0%; casein 9.0%; dextrin 38.0%; equal weights of sodium chloride and calcium carbonate 3.0%; butter 5.0%. The growth was normal, but there was almost no reproduction, due possibly to the fact that almost half of the protein supplied by this diet comes from the mung bean, which is not good for reproduction.

Chart 11. Diet: mung bean 45.0%; casein 9.0%; dextrin 41.0%; butter 5.0%. This diet is deficient in mineral matter, probably calcium and sodium, since the addition of these materials (see Chart 10) stops the high mortality. It is interesting to note the curves of Nos. 98 and 35. These two mice must have had a large amount of calcium in their bodies at birth, or else they must be able to make use of all the calcium in their food.

Chart 12. Diet: mung bean 50.0%; casein 10.0%; salt mixt. 3.7%; dextrin 31.3%; butter 5.0%.
The growth on this diet is good. Reproduction is normal. Of the second generation, seventeen were suckled successfully by mothers fed this diet. Seven of the third generation grew normally on this diet, and ten of the fourth generation.

Chart 13. Diet: cooked mung bean sprout 63.3%; salts 2.7%; dextrin 29.0%; butter 5.0%.
The growth is normal for the older mice, but the high mortality of the younger mice is another evidence of the fact that a better quality of protein is necessary for growth, than that required for the maintenance of adult animals.

Chart 14. Diet: cooked mung bean sprout 63.3%; casein 9.0%; salts 2.7%; dextrin 38.0%; butter 5.0%.
The growth is normal, but reproduction is subnormal. None of the young lived through the nursing period. The addition of 3.0% of casein has not improved the quality of the protein to any appreciable extent.

Chart 15. Diet: cooked mung bean sprout 45.0%; casein 9.0%; dextrin 41.0%; butter 5.0%.
All of these animals grew normally. These curves show that the mung bean sprout is more satisfactory as a source of mineral matter than the mung bean. See Chart 11 and the analyses on page 2.

Chart 16. Diet: cooked mung bean sprout 45.0%; casein 9.0%; dextrin 38.0%; calcium carbonate 1.5%; sodium chloride 1.5%; butter 5.0%. Only one of the second generation was raised, probably due to the poor quality of the mung bean sprout protein.

Chart 17. Diet: cooked mung bean sprout 25.0%; casein 18.0%; salts 3.7%; dextrin 48.3%; butter 5.0%. Growth was normal, ten of the second generation grew to normal weight on this diet. The ordinary processes of cooking do not affect the water soluble B appreciably. See Chart 18.

Chart 18. Diet: uncooked mung bean sprout 25.0%; casein 18.0%; salts 3.7%; dextrin 48.3%; butter 5.0%. Growth and reproduction are both
normal. Ten young were suckled successfully by mothers fed this diet.

**Chart 19.** Diet: cooked mung bean sprout 30.0%; casein 18.0%; salts 3.7%; dextrin 43.3%; butter 5.0%. Growth was normal. Seven of the second generation lived to normal weight on this diet.

**Chart 20.** Diet: red unpolished kaoliang. The subnormal growth curves is evidently due to the poor quality of the protein. None of the second generation lived.

**Chart 21.** Diet: red kaoliang 91.3%; salts 3.7%; butter 5.0%. The subnormal growth here proves that the deficiency of red kaoliang is largely due to the poor quality of its protein.

**Chart 22.** Diet: unpolished red kaoliang 45.0%; casein 9.0%; dextrin 41.0%; butter 5.0%. Growth was almost normal. None of the second generation lived. The red kaoliang used here is the sole source of mineral matter.

**Chart 23.** Diet: casein 9.0%; butter 5.0%; salts 3.7%; red kaoliang 20.0%; dextrin 61.3%. Twenty-five per cent of red kaoliang is not sufficient to protect from beri-beri. No. 367 who devoured his mate.

**Chart 24.** Diet: casein 9.0%; butter 5.0%; salts 3.7%; red kaoliang 25.0%; dextrin 57.3%. Twenty-five per cent of red kaoliang supplied sufficient water-soluble B to protect from beri-beri, but not enough for normal growth and reproduction.

**Chart 25.** Diet: casein 9.0%; butter 5.0%; salts 3.7%; red unpolished kaoliang 30.0%; dextrin 52.3%. Growth is normal, but none of second generation were raised on this diet.

**Chart 26.** Diet: white unpolished kaoliang, growth was almost normal, but none of the second generation lived. Growth was better than when the red kaoliang alone was used. See Chart 20.

**Chart 27.** Diet: white unpolished kaoliang 91.3%; salts 3.7%; butter 5.0%. Growth was almost normal, but no young were raised. The protein of the white kaoliang seems to be of a better quality than that of the red kaoliang. This fact agrees with the experience of the Chinese people.

**Chart 28.** Diet: white unpolished kaoliang 45.0%; casein 9.0%; dextrin 41.0%; butter 5.0%. Growth is normal. The mineral content of white kaoliang is apparently better than that of the mung bean. This, however, has not as yet been confirmed by analysis. Five of the second generation grew to normal weight on this diet.

**Chart 29.** Diet: casein 9.0%; butter 5.0%; salts 3.7%; dextrin 62.3%. Twenty per cent of the white kaoliang supply enough water-soluble B to protect from beri-beri.

**Chart 30.** Diet: white unpolished kaoliang 25.0%; casein 9.0%; butter 5.0%; salts 3.7%; dextrin 57.3%. Twenty-five per cent of the kaoliang protects from beri-beri, but does not furnish enough of the vitamin for normal reproduction. None of the second generation lived.

**Chart 31.** Diet: casein 18.0%; salts 4.0%; butter 5.0%; dextrin 23.0%; fresh undried persimmon 50.0%. These animals died from beri-beri in a few weeks.

**Chart 32.** Diet: casein 18.0%; salts 4.0%; butter 5.0%; dextrin 73.0%. In a separate dish, fresh undried persimmon was given *ad libitum*. All of the mice died from beri-beri.
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20 grams

15 grams

10 grams

5 grams

20 grams

15 grams

10 grams

5 grams

20 grams

15 grams

10 grams

5 grams
Diet: casein 10.0%; butter 5.0%; white kaoliang 45.0%; salts 3.0%; persimmon 37.0%. This diet was continued only three months on account of the fact that the persimmon season finished. During this time, however, the persimmons exerted no depression on the growth of mice, fed a diet known to be successful.

Diet: whole wheat 86.0%; yeast 2.0%; filter paper 3.0%; butter 3.0%; calcium lactate 3.0%; sodium chloride 3.0%. In addition each animal was given 30 cc. of whole milk previously boiled 45 minutes. Numbers 1-O, 1-R and 1-L were given fresh undried persimmon ad libitum in addition. Numbers 5-O and 5-L received the same diet without the persimmon. Number 5-O died of scurvy; Number 5-L was given the juice of fresh oranges and lemons, and recovered.

Diet: whole wheat 86.0%; yeast 2.0%; filter paper 3.0%; butter 3.0%; calcium lactate 3.0%; sodium chloride 3.0%. Thirty cubic centimeters of whole milk previously boiled 45 minutes. This diet was fed to mice as a control on our basal diet for guinea-pigs. The mice showed good growth, which shows that the diet is adequate in all respects except for the absence of antiscorbutic vitamine.

Neolithic Cave Deposit at Sha-Kuo-T’un.

A rich deposit of human skeletal material and a large number of associated Neolithic artifacts have recently been discovered by Dr. J. G. Andersson, Mining Advisor to the Chinese Government, in a limestone cave at Sha-Kuo-T’un in Fengtien. In the subsequent work of excavation, Dr. Andersson was assisted by Dr. Davidson Black of the Peking Union Medical College. The character of the deposit indicates that the site was not an ancient burial place. The skeletal material was largely human, there being but relatively few remains of lower mammals except in the upper stratum of the deposit. No complete skeletons nor intact skulls were found. The richest finds of human material and artifacts were made in a deeply-situated and quite sharply-defined blackened stratum, in which dissociated skeletal parts, for the most part fragmentary, and in many cases charred, were scattered in the utmost confusion. The remains of more than a score of individuals of all ages and both sexes were recovered in this stratum, which was overlaid by undisturbed cave loam to a depth of from 0.5 to 0.8 metres. A report on the topography of the cave and its locality, with a description of the artifacts, will be made by Dr. J. G. Andersson, and together with a report on the human skeletal remains by Dr. Davidson Black, will appear subsequently in "Polæontologia Sinica."
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20 grams
15 grams
10 grams
5 grams
20 grams
15 grams
10 grams
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RELATIONS BETWEEN NATIVE AND FOREIGN PHYSICIANS.

W. H. Dobson, Yeungkong.

These few ideas on medical ethics and relations would probably be more diplomatic, were the author of some more sunny race than the Anglo-Saxon.

It is to the honor of the Western medical profession that its history records few extended jealousies, bickerings, or personal spites among its members; while the fact that free discussion, consultation, assistance, and sharing of useful knowledge has ever characterized its meetings, personal relations and publications is recognized by all. Some of these happy conditions seem to exist in the relations to-day on the mission field between native Western-trained, and foreign physicians. The paucity of these relations may be criticized; we missionaries, having so much of the Spirit of Jesus, may well go more than half way in seeking to increase the welfare of our Chinese professional brethren. What constructive efforts, therefore, may be made by an already overburdened missionary? In what channels?

The community needs to recognize the value of the hard study and revolutionary endeavors of those of its number who have braved adverse criticism and ignorance, in throwing the searchlight of Western science into the darkness of native superstition. Can we not aid by more often publicly acknowledging our native brother through, say, jointly signed articles in local newspapers, personal mention of the value of his services in an accident case, or by joint public addresses on sanitary subjects? It is our object that the native Christian physician should increase, and we should decrease. We try to prefer him before ourselves, when we think of it, and recommend many patients to his care with the remark that he "is just the same, and can do as well as I." In the hospital, we receive some results of his mistakes in diagnosis and treatment, as no doubt he receives ours; we try to smooth disappointment and distrust in his native doctor by charitable remarks to the patient, showing him where he did not observe directions, use common sense, or make some other excuse: we do it to improve the opportunities of our native professional neighbor. Certainly here the old adage holds—"Those living in glass houses must not throw stones." On several occasions of serious illness in patients of the official class, I have had reason to be grateful for this friendly "team play" on the part of my native brother.
We recognize the manifest unfairness of assuming our native friend to always be on the track of the almighty dollar. A spirit of scientific research may not yet have seized him, possibly because buds of original thought cannot develop in the professional sahara in which he is lost without the cup of cold water which we may be able to give. If we invite him to our dispensary and operating room, or extend laboratory privileges he may respond, though I must confess that repeated invitations in my own community seem to bring but little result. Many graduates of our medical schools seem to be afflicted by a deadly apathy soon after returning to their homes, and gradually settle down to drugstore prescribing, waiting for patients rather than bestirring themselves in doing something for the community.

Would not a medical society be a valuable stimulus to active service? The American Medical Association has model constitutions for county and state societies, copies of which may be had for the asking. What, with the shameful famine of medical literature, can be expected of the starved native professional mind? The difficulty is that there are not enough Chinese doctors well versed in English to make translations. Who is to furnish new matter for the society? Would it not practically devolve on the foreigner? Has he the time, or the necessary Chinese scholarly attainments, to be able to present suitable translations? A medical society, to be of value, should meet at least once a month. This means at least twelve papers and discussions in Chinese per year. Teach your medical students in English, says one, and you give them an opportunity at foreign literature. What a pity these graduates, with a reading knowledge of English, were not produced years ago!

The above matter brings up that of a medical journal for consideration. Could not a committee on such a journal be appointed with responsible Chinese among its members? Could not an editorial staff be constructed with departments so divided that every active member of the local branch would be linked with one Chinese to furnish matter for the particular subdivision assigned each couple? Possibly, printing the names of the editors at the head of each sub-department, in each edition of the proposed journal, would insure constant production.

Socially, we may do a great deal to broaden the horizon, and brighten the grey day. Have you not found the native physician depressed and hopeless in his world of torpidity and darkness? Do we ever find hopelessness a stimulant? Inter-visitation, an occasional
meal or reception, where professional men of both races may meet in social equity, would seem to be an uplift which costs us little or nothing. There remain a lot of problems, the discussion of which lack of time will not permit, viz:

Shall we permit the native to have private cases in our wards? in our operating room?
Shall we seek to regulate fees in the community?
Shall we join the Chinese Red Cross?
Shall we organize a local sanitation committee?
Does the Mission dispensary compete with the local practitioner?
Can the difficulty be solved?

What is to be our attitude toward the native proprietary medicine store operated by a Western medical graduate, or by any other person?

Would not a full discussion of the above, and many similar topics be a timely one for the present session?

REPORT ON DIFFERENTIAL BLOOD COUNTS AND THEIR VALUE IN PROTOZOAL INFECTIONS.

A. F. Cole.

With reference to the Ministry of Pensions Memorandum "Enquiry into the value of a relative increase of large mononuclear (Endothelial) cells in malaria, and other infections," we beg to report that, owing to the lack of time at our disposal in which to study the mass of evidence available from some seven hundred cases of tropical disease which the West Kent Clinic has on hand, it has only been possible to deal thoroughly and exhaustively with a proportion of the statistics available. Time is money in the medical struggle for existence, and we have been able to take only the first 120 cases (unselected), in which differential counts have been made.

From the study of the cases of these 120 pensioners drawing allowances for past infections with malaria (all types), from all theatres of war, and even prior to the war, we have formed certain conclusions.

Before giving the figures, and the deductions therefrom, we beg to point out that better scientific work would be done, and less waste made of the abundant facts available in this, and other clinics, if the Ministry realized that work is done on a part time basis, and much done during and between sessions can never be detailed on weekly, or monthly return forms.
The differential counts referred to in this report were made by Drs. M. Douglas, and A. E. Wilkinson of the Ministry of Pensions Hospital, Orpington, and, in some cases, by Dr. Constant Ponder of the Kent County Laboratory.

In giving our opinions on the points raised, it should be noted that Dr. David Thompson agrees with Stitt, in holding that mononuclears of all varieties should be aggregated for the purpose of drawing conclusions as to tropical infections.

Colonel S. P. James (malaria at home and abroad, 1920) states that during apyrexial intervals (such as our cases represent), the polymorphonuclears fall from the normal 70% to about 50%, and the aggregated mononuclears of all forms rise from 25 to 45% of the leucocytes.

As regards the type of case seen, possibly a large number of them are not, strictly speaking, suffering from malaria, they are suffering from a pension of 20% or less, which they sometimes imagine may be perpetuated, if only they can magnify occasional indispositions into colourable imitations of ague attacks. The tropical consultant is often sceptical, and in this Clinic we have done our utmost to check our impressions by direct communication with the patient's doctor. These remarks have been made, because it by no means follows that differential leucocyte counts made in a tropical disease clinic, have any relation to recent attacks of malaria.

**Answers to Specific Questions in Memorandum Above Quoted.**

1. *The evidence we have obtained regarding a relative increase of large mononuclear cells, and its relation to (a) Malaria infection, any type, relapsing or latent.*

We have found that out of 120 cases of malaria, recent or remote, the percentage of large mononuclears in 53 cases was 8% or more. In 43 it was 10% or more, and in 23 it was 12% or more.

Out of 20 cases in which counts were done at intervals, the patients being presumed to be taking ten grains of quinine per diem in single doses before breakfast, no less than ten actually increased in the large mononuclear percentage, two remained stationary, and eight decreased.

Of three cases shewing B. T. malarial parasites present at first blood examination, succession of counts shewed one markedly decreased from 19% to 4%, one was stationary, and one markedly increased from 6% to 10%.

The average differential leucocyte counts from the 120 pensioners was as follows:
Polymorphonuclears ... ... ... ... 61%
Large mononuclears ... ... ... ... 8%
All other mononuclears ... ... ... ... 31%

(b) Chronic infection from other protozoa.

Of the cases with dysenteric history, studied for the purposes of this report, the average differential leucocyte count was:

Polymorphonuclears ... ... ... ... 60%
Large mononuclears ... ... ... ... 9%
All other mononuclears ... ... ... ... 31%

From this, we may deduce that, in the type of dysentery case seen at this Clinic, usually subacute or quiescent, there is no change in the large mononuclear count. In fact, there is an exact reproduction of the average differential count as seen in the malarial cases studied.

(c) The taking of drugs, e.g., quinine, and its influence on differential leucocyte count.

Unless patients are actually in hospital, no certainty exists that quinine is taken. In this connection, we wish to point out that Mayer's and Tanret's tests have been uniformly negative in the cases in which they have been carried out in this Clinic. In the general matter of differential leucocyte counts, we ought to draw attention to the fact that in the one patient, several factors may be present; e.g., he may have a malarial and dysenteric history, and be taking quinine at the same time.

We have, therefore, been unable to form any conclusion of scientific value with reference to the influence of drugs on the percentage of large mononuclear cells.

2. Expression of our views as to

(r) The value or otherwise of a relative increase of large mononuclear cells, with particular reference to malarial relapses, or latent malarial infections.

We are of opinion that the large mononuclear count is of no real value as indicating malarial relapses or latent infections.

In our experience, the percentage of large mononuclear cells is not necessarily high in undoubted cases of protozoal invasion, and has, on the other hand, been above the average in cases where there was no evidence of relapses, or latent infection.

(2) Minimum relative percentage indicating an increase of large mononuclear cells.

We consider that a minimum relative percentage of ten indicates an increase of the large mononuclear cells.
CASE REPORT LIVER ABSCESS FOLLOWING AMOEbic DYSENTERY.

F. R. McDonald, Chia Yu Hei.

**History:** Chinese woman, age 29, admitted to Changli Hospital, March 18, '21. Patient was treated in same hospital, July 1920, for dysentery, when amoebae were present in stools in large numbers. Patient was treated here in August 1919 for amoebic dysentery. Patient gives no history of malaria, and does not live in malarial district.

**Symptoms:** Upon admission to hospital the tenth day of her disease, patient complained of marked pain and sense of heavy weight in hepatic region, inability to take deep inspiration, fever and chilly sensations at night. Patient lay always on right side, as sense of pressure was greatly aggravated if attempt was made to lie on left side. Palpation caused pain and discomfort below costal margin in right mammary line. Percussion showed area of hepatic dullness most pronounced upward and to right (5th rib). Pain referred to right shoulder was a very marked symptom of which patient complained rather continuously the first three days. Right rectus muscle showed rigidity. Chills accompanied the evening rise in temperature.

**Diagnosis:** History of recent amoebic dysentery, hectic temperature, pain tenderness and enlargement in hepatic region with referred pain to right shoulder, sense of weight much more pronounced when lying on back or left side, shallow inspirations, cough, lack of splenic enlargement, make probable diagnosis of liver abscess.

**Treatment:** Patient was urged to have operation and refused. Emetine by drochloride gr. ½ was given night of admission, and twice daily for eight days, then none was given for two days because patient had no pain, and refused the injection. The following day patient was given one injection gr. ½ and refused further treatment as she had no further pain. The first two days patient was in hospital all the above symptoms were more pronounced than upon arrived, but from third day on all symptoms rapidly cleared up.
ADENOIDS AND TONSILS, WITH SPECIAL RELATION TO PHARYNGITIS AND OTITIS MEDIA, TREATMENT AND OPERATION.

CHARLES A. HAYES, M.D., Canton Hospital.

The subject of this paper covers such a wide field that the writer is not attempting to discuss many phases of the question, and some only in part. An attempt is made, however, to give some thoughts based on personal experience and observation during the past years, with special reference to the year 1919 at the Canton Hospital.

In regard to the anatomy of the oropharynx, Ballenger and Wippern's work on Diseases of the Eye, Ear, Nose and Throat gives the following brief description:

"The oropharynx opens into the oral cavity at the anterior pillar of the fauces. The soft palate consists of muscle fibres supported by fibrous tissue and an outer mucus membrane. A medium ridge or raphe divides it into two halves. The conical-shaped projection is known as the uvula. The lateral margins of the palate, on each side, divide into the anterior and posterior pillars of the fauces. The anterior pillar contains the palatoglossus muscle. The posterior pillar contains the palatopharyngeus muscle. Between the two pillars is the recess in which the faucial tonsil is lodged. The tonsils, one on each side of the oropharynx, are almond-shaped masses of lymphoid tissue imbedded in a fibrous capsule. The inner or free surface is covered by a closely adherent epithelial membrane. This epithelium extends into the blind pouches or crypts which have their openings into the surface of the tonsil. These crypts may be very shallow, or they may extend the entire depth of the tonsil. The supratonsillar fossa is a recess of variable size situated above the tonsil and between the anterior and posterior pillars."

The plica triangularis is described by some authors as a triangular fold of mucus membrane stretching backward from the anterior pillar of the fauces, blending with the surface of the tonsils as it passes downward, but with a free crescentic margin directed inwards and backwards.

This, in brief, will serve as a general description of the anatomy of the faucial tonsils and the surrounding parts.

It is claimed by many laryngologists that lymphoid glands are always present between the pillars of the fauces in children, being
present from infancy until puberty when they tend to atrophy. They are rare in adults, as a rule, but sometimes persist throughout life. They are not necessarily pathological, however, even if they do project somewhat from between the pillars. It is very difficult at times to determine definitely whether the tonsils are in a mild pathological state or not. This is especially true if the tonsils are "buried" beneath the folds of the anterior and posterior pillars of the fauces.

Practically all laryngologists are agreed that if the tonsils are in a state of chronic inflammation they are a source of danger to the patient and should be removed, but a difference of opinion exists as to the advisability of operation in cases of non-inflamed tonsils, even if there has been a previous attack of tonsillitis. The writer does not wish to argue either pro or con in regard to the latter condition, except as it involves the pharynx and middle ear. Dr. Kenelm H. Digby, Professor of Clinical Surgery and Anatomy at the Hongkong University, has written a most excellent book entitled "Immunity in Health." In it he has shown a very clear picture of the part the subepithelial lymphatic glands, including the tonsils, are supposed to play in the bodily economy. He has produced a remarkable collection of evidence in support of the theory that these glands act, in health, as immunizing agents of the body and therefore should not be removed except when diseased.

Sir St. Clair Thomson, M.D. (F.R.C.P., Lond.; F.R.C.S., Eng.), in his work on the Diseases of the Nose and Throat, says: "the marked development of the tonsils in the latter months of intra-uterine existence, and their tendency to disappear after the first few years of life, speak in favor of their rudimentary character. The fact that their development varies so much in different individuals at different periods of life, shows that the role they fulfill as lymphatic glands is not a large one, especially when compared with the large number of similar glands in the body. It would appear reasonable to regard the various tonsils of Waldeyer's ring as organs for the defence of the respiratory and digestive tracts during the early years of childhood. The ages in which they are most in evidence, their situation, their structure, the recognized emigration of lymphocytes through their epithelium, their frequent enlargement with infectious process, the frequency with which, when their resistance is overcome, they appear to be the starting points of infection, their lasting hypertrophy after prolonged or repeated infections, experimental observations which show that they serve as ports of entry for infection, and their normal involution at puberty, appear to confirm this view."
Basing an opinion upon personal experience, and upon the results of investigation and experience of different writers on the subject, it would appear reasonable to compare the function of the tonsils to that of the vermiform appendix. The body of the former and the inner portion of the latter is made up of subepithelial lymphatic tissue (Digby). The appendix had a distinct function to fulfill in early fetal life, but before birth it has finished its original mission. It may still have some function that medical science has not yet been able, definitely, to discover, but it has ceased to serve the body in its original capacity and apparently lies dormant in the abdominal cavity, a harmless organ if uninflamed. If, however, an inflammatory process once sets up, the continuance of this same appendix in the body constitutes a constant menace to the patient’s life. The vermiform appendix ceases its original function sometime before birth, while there is at the same time a marked development of the tonsils during the latter months of intra-uterine existence. These in turn show a tendency to atrophy after a few years, usually not later than puberty. These facts would strongly suggest the rudimentary character of the tonsils as well as the appendix. It would also suggest that, after the period of atrophy has commenced in the tonsils they are dormant, harmless glands unless they become inflamed. If inflammatory process once begins the tonsils may go back again to their original condition, but a partial hypertrophy with deep crypts is apt to remain and leave the gland more subject to subsequent inflammation. We often hear of cases reporting that they never had tonsillitis until a certain date, after which time they had recurrent attacks.

It would seem to the writer that, either before or after puberty, slightly enlarged tonsils that have never been inflamed may usually be considered harmless, and in small children, perhaps, they have some function to fulfill. If, however, they become inflamed they are no longer harmless, but may become a positive danger to the patient and be subject to recurrent attacks at any time. After a patient has had one or more attacks he may not be conscious of the fact that he is carrying large unhealthy tonsils in his oropharynx and it may be discovered only upon examination. In many cases, the large tonsils may change the character of the voice, while a smaller number complain of difficulty in swallowing.

It is claimed by some that removal of tonsils and adenoids is followed later in some cases by acute otitis media, bronchitis-pneumonia, endocarditis, chorea, diphtheria, joint symptoms, etc. I would point out the necessity in all these cases of complete enucleation.
of the tonsil. It would seem that if you do only a partial removal you not only run a greater risk of haemorrhage and other complications following, but you also leave diseased crypts exposed and after cicatricial tissue has formed over same there is absorption from these diseased glands into the system. It has been the writer's experience that with complete enucleation there seems not only to be a less tendency to contract other diseases, but concurrent chronic pharyngitis will many times entirely clear up. Out of forty cases of tonsil enucleation during 1919 at the Canton Hospital not one case of acute otitis media was observed later.

There are two general varieties of tonsil enlargements seen in children, namely: Simple hyperplastic, or temporary hypertrophy and inflammatory hypertrophy. In the first variety, there would seem to be little or no danger to the patient and they may possibly possess some immunizing function, but this cannot at present be proven. In the inflammatory variety, however, there is the presence of violent organisms in the tonsil. The gland probably never returns again to exactly its previous condition and the large crypts remaining harbor foci of infection that cause the tonsil to be in a state of semi-chronic inflammation, or make it subject to recurrent attacks. In this connection I would like to point out the continued presence of the supratonsillar fossa which remains patent, and presents an excellent hiding place for virulent foci to lodge and cause trouble from time to time. Probably many of the peri-tonsillar abscesses have their origin in this fossa.

With this condition of the tonsils present there is usually a concurrent chronic pharyngitis to be found and many times chronic purulent otitis media as well.

On June 22, 1920, a foreigner who was formerly in the British army at Salonica during 1916-1917, presented himself for examination and treatment for pain in both ears. He had had two attacks of what he termed "sore throat" during the time he was at Salonica, the second attack being nine months after the first. On both occasions he was treated by the army surgeons. He reported that since that time he had had no sore throat or difficulty in swallowing. When he presented himself to me for examination he said that his throat was not sore and he experienced no difficulty in swallowing, also saying that he had never had tonsillitis, diphtheria, pain in his ears, or discharge from same before the onset of the present attack. Two days previous he began to have pain in front of both ears which gradually became worse, but not acute unless pressure was made over that region. There
was no pain back of the ear or over the tip of the mastoid. Early on the morning of the examination, when he awoke, he found a thin yellowish fluid coming from his left ear and the pain on that side gone. At about 9 o'clock a.m. a discharge began to flow from the right ear, and the pain was much less after that and he felt quite comfortable. Upon examination I found a large ragged laceration in the drum membrane of each ear and a thin yellowish discharge coming from same.

Upon examining the throat I found large, chronically inflamed, unhealthy tonsils present; also a chronic pharyngitis and rhinitis—all of which the patient was not conscious. Had his tonsils been sufficiently treated at an earlier date and then completely enucleated, his pharyngitis, and possibly his rhinitis also, would have cleared up and he probably never would have had an attack of acute purulent otitis media. In this case, there was unquestionable evidence of infection from unhealthy tonsils. One would naturally say that in tonsils of this type they certainly should have been removed long before, after preliminary treatment. On the other hand, it is not always easy to determine definitely that no inflammation is present, or to anticipate the onset of another attack. Several weeks ago two children were presented for examination, whose tonsils showed evidence of previous attacks of tonsillitis and were at that time quite enlarged, but not inflamed. On account of the delicate health of one child, the mother was advised to wait until the cooler months before having an operation, but an appointment was made for operation on the second child one week hence. Four or five days later, however, one of these children was taken very sick with a recurrent acute attack of tonsillitis which made it necessary to temporarily delay all plans for operation.

If the tonsils alone were involved in a case of acute tonsillitis, chronic tonsillitis or hypertrophied tonsils, one need not necessarily worry about the consequences or outcome, although we sometimes hear of deaths from an acute attack, but we have to think of how it involves the possibility of causing chronic pharyngitis with all its attending discomforts and dangers.

We have to also think of the possibility of this hypertrophied and possibly semi-chronically inflamed tonsils harboring foci of some virulent organisms in its crypts that may be in process of constant absorption into the system; and still more important, we have to consider the danger of mastoiditis, eustachian tube, and middle ear disturbances following in the wake of untreated and unoperated tonsils and adenoids. Not infrequently the latter cause partial deafness by their
growth over the mouth of the eustachian tube, and many times they seem to be a direct cause of middle ear disturbances. It is claimed by many that they are a greater cause of acute catarrhal otitis media than the tonsils. They are the same type of glandular tissue, however, and would appear to be an extension upward of that gland.

In the report of the Canton Hospital for the year 1919, we reported a total of 2,869 eye, ear, nose and throat patients treated in the dispensary, or out-patient department. Of this number approximately one-third were treated for ear and throat diseases. There were 1,191 diseased conditions of the throat treated. Of this number 419 were hypertrophied or diseased tonsils, 317 adenoids, and 402 acute and chronic forms of pharyngitis.

There were also 595 diseased conditions of the ear treated. Of this number 162 were for chronic purulent otitis media, nine for acute purulent otitis media, ten for mastoiditis, and a much larger number for chronic catarrh of the eustachian tube.

Out of a total of 368 in-patients in the eye, ear nose and throat department of the hospital, 1,064 diseased conditions were treated. Of this number 78 were for middle ear disturbances, and two for mastoiditis. There were also 193 diseased conditions of the throat treated, 71 of which were for acute or chronic tonsillitis, or hypertrophied tonsils, and 104 cases of acute or chronic pharyngitis. It will be noted by comparison that the total number of middle ear diseased conditions and that of inflamed or hypertrophied tonsils is practically the same among the in-patients. In the out-patient department the comparison is about one to three, but in this department the figures may not be quite as reliable.

It seems fair to presume from the foregoing that not only are tonsils that are in a state of acute or chronic inflammation to be considered "dangerous," but after tonsils, either in children or adults, have been subject to one or more attacks of inflammation, they should no longer be regarded as harmless. This is especially true of the latter class if they are insufficiently or improperly treated following the attack. We frequently meet with patients that report a number of attacks of tonsillitis during their lifetime with no ill-effects that they observe, yet how often it is that patients come to us for treatment of impaired hearing due to chronic tubal catarrh or other condition of the eustachian tube, secondary to throat conditions.

A "smoker's throat" is many times the cause of a chronic pharyngitis that extends high up into the post-nasal space and is probably responsible for a certain per cent of cases of chronic catarrhal otitis media. Many times the tonsils are not involved, but in others
there seems to be an associated slight chronic inflammation or hypertrophy of same. This may possibly be largely an accidental coincidence, but in some cases irritation of the tonsils seems unquestionably due to the above cause. In a word, it would appear that any continued irritation or repeated attacks of inflammation of the pharynx, tonsils, or post-nasal space would subject the patient to the danger of eustachian tube or middle ear disturbances. The cause should be sought for and properly treated. In some cases, habits of life should be regulated.

When, then, is operation for removal of tonsils and adenoids indicated? In the case of adenoids it is quite generally agreed that when a fairly large adenoid is found to be present it should be removed at as early a date as possible. It may recur later, however, but if it does, remove it again.

With the tonsils the question cannot be so easily disposed of. In children, if the tonsils show a small degree of hypertrophy, with no associated inflammatory process, there would seem to be no justification for subjecting the patient to the dangers involved in an operation, as the gland may possibly be serving some good purpose. If, on the other hand, there have been one or more attacks of tonsillitis which have left the tonsils large, with crypts of varying depths remaining, the tonsil probably can no longer be of any service to the body any more than unhealthy tissue in other parts of the body would be. My experience has been that in tonsils of this class the patients are much safer with the tonsils out, whether they be children or adults.

Tonsils probably can have little or no function as immunizing agents after puberty. There is no special reason, however, why, in adults, a gland that shows a small amount of simple hypertrophy should be removed, unless there is evidence of occasional inflammatory process, or there is reason to believe that the condition of the tonsils is responsible for an associated pharyngitis, laryngitis, etc.

**Treatment of Acute Tonsillitis:**

The treatment of acute tonsillitis is necessarily somewhat different from that for chronic tonsillitis, but certain lines of treatment give good results in both types of the disease. It is not easy to determine the cause of acute tonsillitis, but it is well to regard it as a general infection. When the disease has once started the foci of infection is acting throughout the body of the tonsil and it is a diseased organ; it should be regarded as such and the patient isolated, if possible.

As preliminary treatment it is well to give broken doses of calomel with soda, followed by a brisk cathartic eight to twelve hours later.
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When the disease is established the attack probably cannot be aborted, but a proper line of local treatment may assist in the involution of the disease. Many use a weak solution of iodine and glycerine, but the writer has found that a solution of silver nitrate of about 3% or 5% strength is a dependable standby in these cases, applied once or twice a day to the tonsils. If there seems to be some irritation from the use of this solution, then use it once a day only. Solutions of argyrol and protargol are useful agents, but their action is not reliable. Too strong solutions should not be applied to the tonsil at this stage, but an effort should be made to lessen the inflammation. Sometimes copious alkaline sprays are of service and seem to give comfort to the patient and lessen the congestion. Weak, warm solutions of listerine, potassium permanganate or potassium chlorate may be used in the same manner. If a peritonsillar abscess should appear as a complication it should be opened freely. Scarifying the tonsil is a questionable procedure and probably does little or no good.

For internal treatment sodium salicylate and aspirin are two reliable drugs in most cases. Cardiac or joint symptoms should be watched for as complications, but it is well to give good-sized doses of sodium salicylate in the beginning of the attack if the patient's stomach is not too much disturbed by it. This may be continued in small doses for a few days. For the fever or headache repeated doses of aspirin may be given, either with or without salol or phenacetin. If complications in the ear or other parts of the body arise during the disease, treatment suitable to each condition should be given.

Sir St. Clair Thomson recommends that in small or fractious children, the following should be given undiluted:

R

Tinct. ferri chloridi ......................2 drachms,
Glycerini .................................q. s. ad., 2 ounces
M. et. Sig. Take one-half drachm every hour.

This preparation acts locally and also systemic.

The food given should be liquid, semi-liquid, or light diet.

Treatment of Chronic Tonsillitis:

The local treatment prescribed for acute tonsillitis can be used with success in the chronic form, but the solutions applied locally to the tonsils can usually be used in greater strength. A 5% to 10% solution of silver nitrate is of great service in lacunar tonsillitis and is of marked benefit in hypertrophied tonsils. If argyrol is used at all it should be made fresh and of 25 or 30% strength. Painting with a 1 or 2% solution of iodine and glycerine (or stronger), tincture iodine, a 5 to 12%
solution of resorcin and glycerine, or similar other preparations are of service in these cases.

Tonics and change of air are claimed by many to hasten the process of restoring the tonsils to their normal size and condition. Some claim to have had good results in hypertrophied tonsils with the use of galvano-cautery puncture. Many other methods of treatment are being used by laryngologists; the principle involved in all methods, however, is:

First: If the tonsils are inflamed, use methods to combat the inflammation and kill the exciting foci of infection, if possible.

Second: If the tonsils are hypertrophied, use methods to reduce, if possible, the hypertrophy. It is not best, as a rule, to remove tonsils while they are inflamed. Reduce the inflammation first by internal and local treatment, and if hypertrophied tonsils persist after adequate treatment, then one should consider seriously the advisability of operation.

Operation.

If operation is indicated it should be complete, i.e., the tonsils should be enucleated. It is questionable if partial removal is ever a justifiable procedure, except in very exceptionable cases. In children and adults where the adhesions are not marked and the tonsils not bound down by a past inflammatory process, the simplest and easiest method of removal is with the Beck-Mueller tonsil snare under a general anaesthetic. This instrument has a ring for the tonsil to pass through, with a hollow groove on its inner aspect, into which the wire snare is placed and held in position by a bar or lock. The instrument is held by the right hand in removing the right tonsil, and in the left hand for the left tonsil. The operator may stand at the side of the patient that he is operating on, i.e., on the right side for the right tonsil and the left side for the left tonsil. The writer prefers, however, to stand at the patient's right side during the whole operation, holding the instrument alternately in the right or left hand, depending on whether he is removing the right or left tonsil. After the tongue is held down by a tongue depressor, the ring or loop of the instrument is placed rather low down just at the anterior edge of the posterior pillar of the fauces and pressed well between this and the tonsils, the handle of the instrument being held as low down as the other side of the patient's mouth will permit. While still pressing against the parts, the tonsil and anterior pillar are lifted forward and slightly upward. The tongue depressor is now removed, and with the index finger of the free hand the tonsil and
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Anterior pillar are forced through the ring until the finger is well past it, there being no danger of cutting the anterior pillar. The wire is now pulled up at this stage until it grips down firmly back of the tonsil. The finger is gradually removed as the tension of the wire increases and a small depression will be found at that point in the anterior pillar, indicating that the whole tonsil and its capsule are being detached by the snare. The instrument is now locked and after a good vulsellum forceps is firmly gripped into the tonsils the wire loop is slowly pulled through the instrument until the tonsil is entirely free. If done in this manner you cannot fail to completely enucleate the tonsil. Plenty of time, say about five minutes, should be taken for the wire to pass entirely through. If this precaution is observed there is very little danger, ordinarily, of hæmorrhage.

A sluder with a dull blade and lock can be used for the same class of tonsils. It can be applied in the same manner, but the anterior pillar must not be forced through the ring. With the Beck-Mueller instrument you must force it well through or you will not get all the tonsil, but with the sluder, if you force it through you will cut the anterior pillar. After the dull blade of the sluder is pressed down firmly back of the tonsil it is locked, care being taken that it does not include any part of the anterior pillar. The tonsil is now firmly grasped with a vulsellum forceps and with a sharp submucus or periosteal elevator moved back and forth in the groove of the inner side of the sluder, the entire tonsil and capsule will be dissected loose. After completing the operation leave the instrument attached for a few minutes to prevent bleeding and then unlock and remove the blade. This instrument is of special advantage in cases where the tonsils are partially adherent, pedunculated, or friable.

If the tonsils are thoroughly bound down by adhesions as a result of long or periodical attacks of inflammation, probably the easiest method of removal is by dissection and snare. If done under a general anaesthesia there may be considerable hæmorrhage in some cases. This should be controlled by pressure or with the use of hæmostats. The use of adrenalin is not free from danger to the patient. In adults, probably the easiest way of dissection in most cases is under local anaesthesia. The following mixture makes the operation practically painless and free from hæmorrhage:

\[ R \]

Solution cocaine \( 1\% \) .......... 30 mils
Sol. adrenalin chloride .......................... 2.
Inject a few mils through the edges of the anterior and posterior pillars of the fauces with a tonsillar or laryngeal syringe. Some inject through the center of the tonsil as well, making sure that the solution reaches the plica on the external surface of the tonsil. Before injecting the solution it is advisable to paint the tonsils with a 10% solution of cocaine on their inner surface. A solution of novocain of ½% or 1% strength, with sol. adrenalin chloride added in proportion of 30 minims to the ounce, makes a very excellent local anesthesia in these cases. Some recommend the use of quinine and urea hydrochlorid of 1% strength.

Removal of Adenoids:

This is a very simple operation, but occasionally one hears of unfortunate accidents connected with same. The uvula may be clipped off with your instrument, or you may wound the openings to the eustachian tubes. It is very essential in this operation that you should have a good light and see what you are doing. With a good light so you can see clearly your field of operation, the cutting off of the uvula would seem unexcusable. After passing the uvula the instrument should be kept in a straight line and not allowed to bend to the right or the left. If this precaution is observed there is practically no danger of wounding the mouth of the eustachian tube. The old style of adenoid curette may be used to good advantage, but there is danger of particles of adenoid tissue being drawn into the larynx and trachea by inspiration. The La Force adenoid curette with a sliding blade makes this complication an impossibility and is highly to be recommended. After inserting the curette once or twice, pass the index finger of your right or left hand up into the post-nasal space and further curette away any particles of adenoid tissue that still remain. If this is done thoroughly the haemorrhage following this operation is usually of small amount and entirely ceases soon afterwards. After completing the operation turn the patient on his side to prevent further swallowing of blood.

Complications:

One of the first complications and the one that often gives the operator anxiety is haemorrhage. There may be haemorrhage at the time of the operation, or it may be reactionary, coming on from 6 to 24 hours later.

In the first class you have to deal with it at the time of the operation. In these cases you also must have a good light. The writer prefers an electric headlight. As soon as the tonsil is out,
pressure should be made into the tonsillar space with small pledgets of gauze held by forceps. At the same time, counter-pressure can be made over the anterior pillar with the index finger, as many cases of haemorrhage are from this point. If this method does not control the bleeding, it is well in some cases to immerse the pledgets of gauze in hot water, and after expressing most of the water with your fingers, apply hot to the parts, with pressure. If, after a reasonable time, the bleeding continues, the bleeding arteries should be found and caught up with artery forceps. (If bleeding is profuse in the beginning, this measure should be used at once.) With the ordinary artery forceps this is sometimes a little difficult, but the writer has found that if you pick up the bleeding points with skin forceps first, and then apply the artery forceps in their place, there is very little trouble. After a few minutes they can usually be removed without any recurrence of the haemorrhage, but sometimes a catgut suture is necessary.

It is rarely ever necessary to use any more radical means than this to control the haemorrhage. The putting of a suture through the anterior and posterior pillars of the fauces, with a pledget of gauze in the tonsillar space, is a questionable procedure except in rare cases, but it may be necessary in so-called ‘‘bleeders.’’

Reactionary haemorrhage is often due to causes unknown and at other times to the formation of a clot, caused by the gradual oozing of blood. If it is due to the latter cause, then one should curette out this clot and the bleeding will probably stop. If due to a bleeding vessel, then this should, if possible, be located and caught up with forceps. Hydrogen peroxide applied on cotton will often stop an oozing of the blood, but if it continues, however, pressure should be applied, and it might be well to apply a sponge moistened with solution of adrenalin chloride. A dose of from 20 to 30 grains of calcium lactate may be given. In many cases of oozing of blood, a hypodermic of morphia $\frac{1}{12}$ to $\frac{1}{6}$ grain in children and $\frac{1}{6}$ to $\frac{1}{4}$ grain in adults will control same. If the patient is restless or excited, it is well to add atropine. After the operation, it is essential that the patient should be kept quiet and not allowed to be excited by friends or relatives. Immediately upon arrival from the operating room he should be placed on the bed with face downward, so that if there is any bleeding the blood will run out of his mouth and not be swallowed. This is imperative in very small children. If this precaution is not taken, the first warning the surgeon may have of a very serious haemorrhage is the vomiting of a copious amount of bright red blood. There is usually considerable bleeding for a few minutes following the removal of the adenoids, but this
practically never need give serious concern, although isolated cases of profuse haemorrhage have been reported. If haemorrhage of unusual amount continues, however, it can be controlled by pressure with gauze in the post-nasal space.

The writer has used ice to good advantage, just as the operation is finished, applied externally over the region of the tonsils and small pieces wrapped in gauze applied to each side of the nose.

A brisk purgative previous to the operation is thought by some to reduce the danger of haemorrhage.

The foregoing constitute the principal complications met with at the time of the operation and immediately or soon after. In small children and adults where there is entire freedom from inflammatory conditions, very little reaction follows in the tonsillar space and the surrounding parts. In cases where a marked reaction occurs and a membrane forms over the parts in from 12 to 48 hours after the operation, it will need applications of some antiseptic solution. The solutions used should not be too strong, so as to avoid too much irritation. In cases of this type, the application of a 3% or 5% solution of silver nitrate to the parts once a day has proven very useful. A gargle of a solution of potassium permanganate 1 to 5,000 three or four times a day is very helpful in these cases.

Conclusion:

In conclusion the writer would urge the necessity of routine examination of the throat, if possible, in all dispensary and hospital patients. If this is not done you will many times overlook the real cause of the patient's fever and leave large, unhealthy tonsils unobserved and untreated and a source of danger to the patient's middle ear, as well as to his general health.

I would not advise too hasty a decision to operate, but if a tonsil is pathological it should usually be removed at as early a date as possible after the subsidence of the inflammation.

In my opinion surgeons err more on the side of conservatism rather than the contrary.

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THE USE OF FINE SILK IN SURGERY.

ADRIAN S. TAYLOR.

I have been requested by a prominent member of the C. M. M. A. to publish in the China Medical Journal an account of the use made of silk in the surgical clinic of the Peking Union Medical College. Because of my belief in the excellence of this suture material, and because of the infrequency of its use in other clinics, I am glad to comply with this request.

The whole matter is fully discussed by Professor W. S. Halsted in a report published in the Journal of the American Medical Association, April 12, 1913. In this paper Dr. Halsted gives convincing reasons for his use of silk, almost to the exclusion of catgut, in his clinic. The introduction of rubber gloves, gutta-percha tissue and silver foil is also interestingly described. The article is illustrated by the superb drawings of Max Brödel, and is written in Dr. Halsted's own inimitable style. What I have learned of the use of silk in surgery I owe to Dr. Halsted's teachings, and to my observation of the work of many of his students both in the John Hopkins Hospital and in other clinics.

Garrison in his "History of Medicine" says, "Quietly and unobtrusively, Halsted has taught the delicate art of the perfect healing of wounds, which has been nowhere more beautifully demonstrated than at his clinic." During the past four years, I have had opportunity to observe closely this kindly wound healing, and I am convinced that the use of very fine silk contributes largely to this fortunate result.

During six years recently spent in America, many clinics were visited, and the work of many surgeons critically watched, and one found one's self unconsciously classifying surgeons in two large groups. In the first group, insistence upon rigid asepsis was noted. The work of the surgeon was gentle and dextrous and hemostasis was well-nigh perfect. Speed was not the goal most striven for by these surgeons. Dissection was done with the sharp scalpel, and due care was taken of important anatomical structures. Tissues were gently handled, and massive, crushing ligatures were never used. Practically all aseptic wounds were closed without drainage, and post-operative distension with blood or serum was almost unknown. Blood was carefully conserved during the operation, hemorrhage being largely controlled by transfusion sutures of fine silk. Surgical shock was seldom seen.
In the second group, the same care was not exercised in attaining a rigid technic, dissection was rapid, blunt and often brutal; tissues were unnecessarily traumatised; little attention was paid to hemorrage; coarse catgut ligatures and sutures were used, and, being tightly tied, often crushed the tissues en masse. Little confidence was felt in the hemostasis attained, and drains were commonly seen in clean wounds, and surgical shock was common.

A surgeon can by no means be classified by his choice of suture material, but those found using very fine silk all fell in the first group; this delicate thread does not lend itself to rough and careless use.

Dr. Halsted describes in detail the silk and the fine straight needles used by him. He has found ordinary black sewing silk to be well suited for use. Brainerd & Armstrong Nos. A, C, EE give the necessary choice in size. The needles used are the ordinary milliner’s needle of commerce, size No. 9. The usual straight cambric needle is inconveniently short for general use, while the milliner’s needle is of an ideal length. Glass reels easily distinguished in shape are used, on which various sized silk is wound for use at the table as ties or in easily threaded, split-eyed needles.

CHINESE SOURCE OF SUPPLY.

On my arrival in Peking, I found that the supplies of silk ordered from America had not come. This made necessary a careful study of the Chinese silk available. A very fine white silk found in the shops proved almost ideal in that it had great tensile strength for its calibre. A larger medium white silk was satisfactorily used where greater strength was needed as in hernia repair, for instance. The black silk bought in the Chinese shops was not entirely satisfactory, as the dye undoubtedly weakened the fibre, and the strength after boiling was so slight that its use was very trying because of the ease with which the silk would break in tying. One objection to all white silk is the difficulty in seeing the blood-stained thread in the wound; the black dye has no deleterious effect upon the tissues, but undoubtedly weakens the fibre even in the best imported varieties. The black foreign machine-made silk, however, is more uniform and very much stronger than hand-twisted silk made and dyed in China. One further objection to native made silk is the lack of a standard in size and the lack of uniformity in any one strand itself, but, in spite of this, the native product is very satisfactory indeed. For delicate blood vessel surgery, nothing better can be obtained anywhere than selected strands of the very fine hand-twisted white silk to be bought in any silk shop in China.
ADVANTAGES OF SILK OVER CATGUT.

Cost is a great item of all medical work in China. The amount expended for all the silk used in a busy clinic in a year is an infinitesimal part of the budget, while the cost of a similar supply of catgut makes a formidable item. One strand of catgut 60 inches in length, sterilized in sealed glass, costs delivered in Peking about Mex. $0.50. This sum will buy silk for a month's use.

Silk is easily sterilized by boiling. The sterilization of catgut is troublesome, expensive, and unreliable, unless in expert hands. Years ago in Yangchow, I investigated all the published methods for the sterilization of catgut, and found it exceedingly difficult to preserve the tensile strength of the strand and still feel absolutely sure of the sterility. The raw catgut is far from cheap, and in view of the difficulty of sterilization, authorities on hospital management do not advise its being done by the hospital. The commercial firms are far better equipped for it, waste is eliminated, and a product is secured where the sterility should be beyond question. Even so, investigation of many thousand samples so sterilized, and furnished to the Government during the War, showed that an alarming number were not sterile. In an article by Butterfield and Ely, examination of 15,000 tubes of catgut is described. These were selected at random from lots totalling 5,000,000 tubes. 1,518, or 11%, were contaminated. In view of this astounding result, experiments were carried out to determine the temperature and the time necessary to attain absolute sterility. It was found necessary to heat the sealed catgut three hours in an autoclave under 28-30 lbs. pressure. Chromic catgut was even more resistant than the plain. On account of the danger of infection with tetanus, any attempt to lessen the cost of the raw material by purchasing from unreliable sources is unjustifiable.

There is almost universal fear of silk causing permanent sinuses, and for this reason it is not well to bury silk in infected wounds, although fine silk sutures are repeatedly seen to be quietly covered over even in infected wounds. Emphasis should be laid upon the word "fine." Far heavier strands than necessary are frequently used. It is not claimed that these will lie quiet in the presence of infection. In clean wounds I think that it is certain that a strand of fine silk used as ligature or suture causes less reaction than a strand of catgut of a size strong enough to accomplish the same purpose. In a recent review in the British Journal of Surgery of the First Report of the Committee of the Privy Council upon Injuries of the Nervous System.
the following is found concerning suture material to be used in nerve injuries: "For sutures, linen thread and silk are preferred to catgut, as the latter causes more cellular reaction and it is doubtful whether this disadvantage is compensated for by its greater absorbability." I have often heard Dr. Halsted tell of experiments where he would, for instance, close one-half of a transverse wound in the neck made for thyroidectomy with buried catgut and the other half with buried fine silk. The side closed with silk would heal without visible reaction, while the other side would be red and puffy and almost always a few drops of serum could be pressed from the lips of the wound. There is nothing more satisfactory in surgery than to watch the beautiful healing of a goitre wound closed without drainage after careful hemostasis with fine silk transfixion ligatures, and with the deep layers of the wound brought together with interrupted sutures of the same very fine silk, gently tied. The tensile strength of silk is great, and the finest strand suffices to approximate tissues or to stop hemorrhage, while to do the same with catgut requires a considerable amount of foreign material being left in the wound.

The use of silk presupposes rigid asepsis, and requires gentleness in the handling of the tissues, and these are valuable by-products of its use in any surgical clinic.

TECHNIC.

In the Peking clinic, four sizes of silk fill all possible requirements. The finest is a very fine grade of white Chinese handmade silk. This is used for the most delicate work possible. It is ideal for nerve and blood vessel suture, and for experimental surgery where the finest possible suture material is needed. For the great bulk of the ordinary work of the clinic, the Brainerd & Armstrong No. A is used and is called "fine silk." It is used for stopping hemorrhage, ligating all except large vessels, intestinal anastomosis, in the dura, in the capsule and parenchyma of the thyroid and in approximating tissue planes where there is no tension. The No. C is our "medium silk" and is used where greater strength is required, as in ligating the thyroid vessels, occasionally in intestinal anastomosis, and frequently in hernia repair. Doubled, it often replaces the next grade, which is the EE, or our "heavy." This is really seldom used, as the medium grade doubled is thought to cause less reaction than the heavier single strand.

Nearly forty years ago, Dr. Halsted had made in Germany glass reels of two distinctive shapes for winding the silk for sterilization and for use at operation. These are unobtainable in China and are fairly
expensive in America, and the breakage is very great. Here we have eliminated glass as material for the reels because of the difficulty in making smooth, uniform samples, and because of the poor annealing with the high breakage resulting. Very satisfactory reels were turned for us of hard wood (see illustration) at a few coppers each. These have been in constant use for six months and are just now beginning to crack. Real ivory is easily turned, stands boiling well, but costs as much as pure silver. A common substitute for ivory (see illustration), the bone of the walrus tusk, called by the Chinese 角 is much cheaper, and lasts with daily boiling about six months. The reels made from this cost about fifty cents silver. Recently, beautiful reels have been made for us by the local silver-smiths from pure silver at a cost of Mex. $1.00 each. These are ideal in use, and as they are absolutely permanent, they will prove the cheap ones in the end. The two shapes pictured are used for different grades of silk. The fine silk is wound on the short round reel, while the medium silk is wound on the longer reel. The heavy silk is easily distinguished at the table by its size, and is therefore wound on the same reel as the fine silk. (See illustration.)

Straight needles threaded beforehand are prepared and kept in the operating room in pieces of gauze in packages of six each. (See illustration.) These may be sterilized by boiling on a moment's notice, and a supply of ready sterilized packages are always ready for emergency use. The silk deteriorates after sterilization and the needles rust, so, as a rule, the supply for an operation is sterilized by boiling for three minutes in pure water at the time. Silk in three meter lengths is wound on the reels and sterilized in the same way. A small supply sterilized in the autoclave is also kept on hand. Soda in the water causes great loss of tensile strength and is not used. In this clinic a separate sterilizer filled with pure water is kept for gloves and silk.

The long, very keen milliner's needles are almost universally applicable. They are used in transfixing and ligating bleeding points, as described by Dr. Halsted, in intestinal anastomosis, and in all types of skin suture. They lend themselves admirably to the method of skin suture described by Cushing in Keen's Surgery. In this method all the needles are introduced before any are tied and inversion of the skin edges is effectually prevented. Fine curved intestinal needles are likewise kept threaded ready for instant use. Small fine round curved needles easily threaded at the table because of a split eye are freely used here. These are known in the Baltimore clinic as "French needles" and are used in three sizes. (See illustration.)
Often need arises for a short straight needle to be used on a clamp or needle holder in the depths of the wound. Dr. Halsted has had these made to order in England. In Peking they have been easily extemporized by cutting off and sharpening the embroidery needles obtainable in all of the shops. (See illustration.) These are also kept threaded ready for use. They are ideal for transfixion of the upper pole vessels in a thyroid resection, and often for ligation of the intracapsular vessels seen along the lateral aspect of the gland. In cleft palate repair, they have also proved invaluable.

SUMMARY.

Silk is used in the surgical clinic in the Peking Union Medical College because of its cheapness and availability and physical qualities which make it ideal for suture material; because of the ease and certainty to its sterilization; because of the kindly way it is tolerated by all of the tissues of the body; and finally because of the necessity of the development of gentle technic and perfect asepsis in those who would use it successfully. These are much to be desired in the work of a teaching clinic.

REFERENCES:

ANAESTHETICS IN CHINA.

By Dr. K. C. Wong (王)) Chief Medical Officer, Railway, Hangchow.

The earliest record of the use of anaesthetics in China was in the third century B.C. In the work of Lietsz the following story is related. King Wu of Lu and Tsi Ying of Chao were sick and both asked Pien Chiao, the famous physician, to treat them. Pien Chiao gave them a narcotic wine to drink which made them unconscious for three days. He opened their chests, removed their hearts, exchanged them, and put them in again under the administration of some effective drugs. When they awoke, they felt as before, took leave and returned home.

It is usual, however, to associate anaesthetics with the name of Hua To, the most celebrated surgeon of China who lived in the second century A.D. In his biography as recorded in the Annals of the Posterior Han Dynasty, it is stated that he caused the patient to take
An effervescing powder in wine which produced numbness and insensibility. He opened the abdomen or back, as the case may be, washed, cut or removed the diseased portion. He sutured the parts together and then apply a salve to the wound which healed up in four or five days.

The *Yu Tang Han Hua* (玉堂聞話) says that in the time of Kao Ping of the Tang Dynasty (860 A.D.) there was a magician who was very successful in curing leprosy. He put the patient in a small room and gave the latter several pints of olibanum spirit which produced complete unconsciousness. Opening the suture of the cranium he extracted a handful of worms each measuring about two inches in length. The wound was then covered with plaster. The patient was given some medicine to take, and put under a low diet. Exertion was prohibited. The wound healed completely within two weeks. About a month the eyebrows and hair grew again and the patient looked plump and healthy.

In the *Secrets of the Stone Chamber*, written by Chen Shih-toh, there appears the following prescription: First administer a dose of 'tincture forget-oneself' until the patient is drunk. He will gradually lose consciousness and be insensible to pain. Open and extract the thing desired. Anoint with some wonderful ointment, suture the wound and then put a piece of plaster over it for twenty-four hours. After the operation give some stimulating decoction to the patient who will wake up as if from a dream with all the former symptoms of sickness disappeared.

The above are four records found in current literature referring to the use of anaesthetics in China. It is not known what is the exact composition of the narcotic wine of Pien Chiao, the effervescing powder of Hua To, the olibanum spirit of the magician, or the 'tincture forget-oneself' of Chen Shih-toh. Later physicians, however, employed datura alba, rhododendron sinense, jasminum sambac, and various species of aconite for this purpose. The *Pentsao* (本草) states that one inch of the root of jasminum sambac extracted with spirit will produce unconsciousness for one day, two inches for two days, and three inches for three days. According to Chi Hsia-feng, the girls of Fokien feigned death by drinking jasmin wine so as to elope with their sweethearts. The *Yu Hang Chi* (虞衡志) says that the flowers of the datura alba have similar actions, robbers frequently resort to it for drugging their victims. In Mei Yuan-shih's Materia Medica the following formula for inducing local anaesthesia is given: datura alba, Szechwan aconite, and another species of aconite. Another receipt
from the *Tsí Mong Yi Chíng* (貴 柒 醫 經) consists of rhododendron sinense, aconite, copper ore, clam shell, olibanum, myrrh, bear's gall, cinnabar and musk. It should be administered in hot wine. Anaesthetics are practically unknown in China at the present time.

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**TREATMENT OF TRACHOMA, A TRANSLATION FROM THERAPEUTIQUE OCULAIRE (DR. ROBERT, 1920).**

W. S. Thacker-Neville, M.D., F.R.C.S. (Ed.), Moukden Medical College.

Below I append a translation on the treatment of trachoma taken from Therapeutique Oculaire by Dr. Robert, 1920 (Masson and Cie.). This is a most excellent small book of 166 pages on ocular therapeutics.

**General treatment,** use tonics such as Cod Liver Oil—Vinum Iodi and sulphur or salt baths.

**Local treatment,** if there are no complications, apply the following to the everted eyelids, glycerine 10.00, sulphate of copper 0.75. Stop this treatment when a greyish tinge is produced. As the treatment is painful use cocaine and wash copiously with cold water after the cauterization. Repeat this treatment every day or every second day, but wait for the inflammation to disappear. If the eye is irritable smear the conjunctiva in the same way with crude petroleum (rock oil). When the irritation has disappeared, again use the above solution or replace it by glycerine 10.00, Tannin 1.00 or water 10.00, Hydrarg Perchlor 0.05 or touch the granulations with cotton soaked in Hydrarg Perchlor 1% or massage the conjunctiva with Boric acid for some minutes. It is good to change the treatment now and then.

**Between the above treatments,** wash the eye with Lotio Borici or Cyanide of Mercury 1:2,000, and apply cold compresses twice a day for quarter of an hour, or wash twice a day with cold water. If there are only a few isolated granulations, use copper sulphate pencil or Argent Nitrat Mitigatus or alum. There ought to be a separate pencil for each person. If there are many granulations use the galvanic cauter or the thermo-cauter or chromic acid or scissors, then use copper sulphate 1.00, glycerine 10.00 or 20.00. If the granulations are dry, scarify them. When there is purulent secretion cauterize with Argent Nit. 1% or 2%. To shorten the treatment, you may use expression or crushing of the granulations by Knapp's or Kahnt's method.
If the patient cannot attend you, then, instead of the above treatment, prescribe the following:

Argent Nit. 0.02, vaseline 5.00 or oil of Cade 0.50, vaseline 5.00 or copper sulphate 0.06, vaseline 5.00. When the lids are better cauterize them less frequently, but never stop the cauterizations suddenly. After the cauterizations are complete one may use copper sulphate 0.20, water 10.00 for months and even for years. For pannus one may use Ung Hydrarg oxidi flava or do a peritomy (not advisable, W. S. T. N.) or cauterize with galvano-cautery (not advisable, W. S. T. N.). If ulcers are present on the conjunctiva use cold compresses of Hydrarg Perchlor 1/10,000 and cauterization with galvano-cautery. If these are irritable scars use Ung Borici 1%. If the copper is too irritating, replace it temporarily by an alum stick which one may use unlike copper even if there is ulceration of the cornea.

Instead of the copper sulphate prescriptions mentioned above, one may use sulphate of copper 0.20-0.75, novocaine 0.15, glycerine 10.00, or one may massage the conjunctiva once a week after cocainization with sulphate of copper 1.00, Boric acid 50.00. One ought to use massage till blood oozes out and then wash with sterile water. Instead of copper sulphate one may use Hydrarg Perchlor 0.20, Sod. chloride 0.50, distilled water 10.00. If the inflammation is too intense, do not use irritating substances but replace them by an ointment as follows:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Iodoform dissolved in ether</td>
<td>0.30</td>
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<tr>
<td>Cocaine hydrochlor</td>
<td>0.10</td>
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<tr>
<td>Vaseline</td>
<td>10.00</td>
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When the trachoma dates back for several months it is necessary to modify the treatment and to brush the conjunctiva with a tooth brush with hand bristles, soaked in a solution of Hydrarg Perchlor 1/500. Preceding this scarification of the mucous membrane, roll or pull the conjunctiva into view with a forceps. One can also have recourse to electrolysis on several occasions.

In the case of old trachoma when the conjunctival granulations are almost cured and there is no more secretion, one may use jequirity in powder or in solution. Apply the powder with a forceps on the everted eyelids and lay it on rather thickly, or use a solution of one gramme of the powdered jequirity in 100 grammes of water with several drops of chloroform, and apply it with the help of a tampon of cotton after cocainization.

Some treat trachoma by injecting sulphate of copper. After anaesthesia of the conjunctiva with cocaine 2% and injection of cocaine ¼% or of acoun in physiological solution, then inject 0.33 mils of copper sulphate ¼%-½% into the upper fornix.
The stronger solution is used if one injects one fornix at a time, the weaker if one injects both at the same time.

A new injection is made at the end of several days when the reaction of the preceding injection has disappeared. The complete treatment, even when long and distributed over several months only needs 0.05 centigrammes or at the most 0.10 centigrammes of copper sulphate. This quantity will always be sufficient to stop the formation of follicles without other treatment. This treatment will not upset the general health of the individual nor have a toxic effect on any of the organs of the body.

A number of cures have been made by oxidized naphthol. Below is the technique. The important point is to protect the cornea; for that, one uses a piece of old fine linen cloth, doubled in two, the fold of the cloth is pushed into the upper fornix after the lids are everted. The anterior part of the cloth is then lifted up and held against the everted lid and is used to dry the conjunctiva on the tarsus.

When this piece of linen is thus placed the naphthol camphor is spread on the mucous membrane.

The naphthol camphor is only used after it has been oxygenated for several days by exposure to the air and light.

It is prepared by gently heating two parts of camphor and one of naphthol. It is then filtered. While filtering it do not expose it to the air (on filtre a l'abri de l'air) and one allows the naphthol and camphor to combine in a flask of white glass, until it has the consistence of syrup and is of a mahogany colour.

Once the liquid is applied to the conjunctiva, the patient is told to look upwards. This causes the cornea-scleral junction (the limbus) to be covered by the eyelid, which itself is covered by the piece of linen. The patient immobilizes, i.e., fixes the upper eyelid by using pressure on it with his handkerchief. The patient's tears dilutes the excess of the medicine rapidly and in about three minutes you may remove the linen without endangering the cornea. The pain is severe but bearable, whilst later the application has a sedative effect. These applications (i.e., cauterization) ought to be done two or three times a week.

Besides these cauterizations use at the same time warm compresses of Iodine solution (Tc. Iodi 1.00-2.00 to distilled water 100.00). Apply these warm compresses three to six times a day to the half-open eyelids.

A lotion of chloride of zinc (chloride of zinc 0.001, water 10.00) can also be used. Of this lotion three drops are dropped into the eye every evening. The strength of this lotion is gradually increased till 0.015 is being used and at the end of the month even up to 0.02 of
chloride of zinc to water 10.00 may be used. Of this strong lotion one applies one or two drops every evening.

The chloride of zinc reinforces the action of the naphthol. Finally, to overcome eczema, due to epiphora, hot compresses of a strong solution of zinc sulphate (0.50 to water 100.00) may be used.

Using this naphthol camphor treatment will yield an improvement in less than a month and the cured cases will be many, nor does this treatment produce actual scars, as with other methods of cauterization. Above all, in the acute cases does this method prove successful. In the chronic cases silver nitrate must be used as well as the naphthol camphor and both must be used for a long time.

Note. A Chinese translation of this combined with a translation of MacCallan’s treatment of trachoma in Egypt and Kirkpatrick’s Magnesium Sulphate treatment and a prescription sheet with the various prescriptions classified according to MacCallan’s classification of trachoma can be obtained from Dr. Thacker-Neville, Moukden, Manchuria.

NOTES FROM THE PHILIPPINES.

RAFAEL C. THOMAS, Union Mission Hospital, Iloilo, Philippines.

The data for this case may be summed up as follows. Both children were males, and born dead. Mother had a history of twins once before. The birth took place about two months ago. The case is of interest, of course, only as a freak of nature, but it is the more striking when we recall the Samar twins of whom you may have heard. Their fame is world-wide.

While writing you of this “freak” case, I might mention also as of some interest the notable increase of typhoid fever in our district during the last two or three years. A few years ago typhoid was something of a rarity with us and appendicitis was very rare indeed. Now we are rarely without typhoid cases in the Hospital, and appendicitis is exceedingly common. We are wondering as to the reason for this and whether, like everything else, we must attribute it to “American occupation.”

If you have room for a personal observation, I should like to make a plea (as a result of my own practice), for smaller incisions in interval appendix cases. For some time now I have been using an incision from three quarters of an inch to an inch, and find it sufficient in the vast majority of cases, and for many reasons far better than the con-
ventional two and a half inches or even two. Of course, if there is any question at all of appendix abscess, or if adhesions make the small incision difficult, it may be easily enlarged. Though I may say I have almost never had to do this. I have not counted up the cases, but should judge that in eighty per cent or more of them the small incision was adequate.

The technique worked out is of some importance, and I may mention a few details that are the fruit of experience.

A nick with scalpel, followed by scissors, is the method used. Incision slightly farther out than the conventional junction of middle and outer third of line from anterior superior spine to umbilicus. Small fenestrated bladed retractor introduced in exact line from umbilicus to anterior spine, and held firmly that subsequent incisions may be exactly in same line. As aponeurosis and muscle layers are cut the retractors are slipped deeper, until the peritoneum appears. In doing this, the scissors may be opened with blades in the fenestrations of the retractors. Peritoneum is grasped carefully with smooth forceps and nicked. When peritoneum is opened for full length of incision, it is held by forceps, and abdomen explored. Usually I have found that an incision large enough to admit index finger to middle joint is sufficient. If appendix is made out it is frequently possible to draw it out of the wound by intestinal forceps (rubber tipped). If omentum interferes, there is room to pack it off and still admit the finger. If the appendix can not be made out, the cæcum may be seized and drawn into the wound and the appendix located by the band. Even very marked adhesions may gently be broken up, if appendix adheres without danger. If appendix appears friable, however, packing may wall off the whole area, or better, the incision may be enlarged. (But, as I say, this rarely happens.) Just enough cæcum is exposed to bury the stump, or even less if stump is unburied. Fine silk for the peritoneum, and one deep stitch of silkworm is sufficient to hold the wound safely, with two superficial skin sutures, if desired to approximate the edges of the wound more accurately.

The after results have been almost perfect. As the intestines are not handled or exposed (as the operation is extra abdominal), no stasis occurs, and pain is naturally much less. Of course, subsequent hernia is out of the question, as it is really but a "stab wound." Also, I consider that the danger of adhesions is diminished, as so little intestine or mesentery is seen or handled.

I hope you will excuse me if I have gone too much into detail in this description. At first I experienced some difficulty, and this detail
MALE TWINS BORN DEAD, 1920, ILOILO, PHILIPPINES.

TWINS BORN 1920, ILOILO, PHILIPPINES.
ECTOPIC GESTATION.
Ectopic Gestation.

W. Edgar Robertson and Sir Shihwei, Presbyterian Hospital, Hengchow, Hunan.

The patient is a farmer's wife from Yungchow. She presented herself at our clinic on May 16th last, was advised to enter the hospital for operation and consented.

HISTORY.—Had been vaccinated by Chinese method in childhood. When ten years old she had a large abscess on her head. After it was cured she suffered from headache for two years—had malaria when 13 years of age. There is no history of venereal disease. She was married at the age of ten and has had three normal pregnancies; the first at 19, the second at 21 and the third at 23 years of age. One year after the last birth she menstruated once, then not again until a full year when she menstruated once again. Two months after this last time, she noticed a tumor about as big as a hen's egg in the right iliac region and noticed that it grew larger day by day. In the 4th month there were movements in the tumor and these continued through the

is the result of it. I might also mention that, only a small amount of gut should be observed at a time, if the cæcum is not found at once, as the wound may strangulate it very quickly, and make return difficult, and even require enlarging incision. Also, if the gut has any tendency to become hemorrhagic, incision should be enlarged. In other words, if the small incision operation is regarded as a cosmetic one, and abandoned at the least hint of danger, it will be useful.

I do not know that you will have room for any of this, but if you do not, you are at liberty to print any part of it, if you care to do so, or to publish the photograph. But, even, if you can not put in the detail (which is a good deal to ask, I know), I should be greatly obliged if you would in some way indicate that this small incision is meeting with success here in appendix cases, for I feel that it would be a step toward bettering present surgical practice. I remember that in Berlin I used to be aghast, sometimes, at the huge incisions made in the abdomen, and I am doubtful if it is at all necessary.

P. S.—Note also that by this method no chromicized gut is used in sewing up. Wounds have been solid, whereas formerly when I used chromicized in muscle and aponeurosis I frequently had stitch abscesses.—R. C. T.
The tumor grew rapidly in size up till the end of the 7th month. She suffered no unpleasant symptoms such as are commonly associated with pregnancy. About the end of the 7th month there was swelling of the abdomen and legs which became very severe during the 8th month. In the 9th month she took Chinese medicine and the swelling disappeared, but there was severe pain in the legs and abdomen so that she had to lie down from the 9th month till the end of the 14th month. After this the pain became gradually less until at the end of 24 months when she entered the hospital there was practically no pain.

**Examination.**—Patient is 27 years of age, medium height, emaciated and somewhat anaemic. Pulse 90, temperature 35.5 and respiration 20 per minute. Head and neck negative. Lungs normal, heart sounds good but somewhat weak. Abdomen shewed a tumor hard to the touch, dull on percussion and reaching from the symphysis pubis to one and one-half inches above the umbilicus. The liver, spleen, kidneys and bowels seemed normal. The urine had a trace of albumen.

**Operation.**—The incision was made in the middle line from the symphysis to one and a half inches above the umbilicus. The tumor had many adhesions, the right ovary and broad ligament being very firmly adherent. The pedicle was very stout and broad with large vessels. The pedicle merged into the upper right corner of the uterus which was cut off as well as the uterine appendages on the right side. Bleeding points were looked after, raw places covered with peritoneum and the abdominal wound closed without drainage.

Post Operative history.—Patient stayed in the hospital 38 days. The first two days shewed a temperature of 37.6 and pulse 110. By the end of 7 days the temperature and pulse were normal. After 12 days she could sit up in bed and after 18 days she could walk about the ward.

Examination of the tumor—very hard on palpation, round and of firm consistency. On opening it the foetus was found very tightly compressed and covered with a thick brown fluid. The foetus was full term and looked like an ordinary baby. The whole mass after being washed free from the sticky thick fluid weighed 5 lbs.; the foetus weighing 3 lbs. and the sac 2 lbs. The sac, as you will see from the picture, is in places very thick, being over \( \frac{1}{2} \) inch in some places and nowhere less than \( \frac{1}{4} \) inch.
ANATOMICAL AND ANTHROPOLOGICAL ASSOCIATION.

At a meeting of the Council of the Anatomical and Anthropological Association on Friday, February 26th, 1921, the following resolution was unanimously passed:

Whereas. The Wistar Institute of Anatomy and Biology has been of special assistance to the Anatomical and Anthropological Association in its critical period of organization by the free distribution of valuable publications to the members of the Association.

Resolved. That the Association indicate its appreciation by electing Dr. Milton J. Greenman, the Director of the Wistar Institute, first Patron of the Anatomical and Anthropological Association of China.

At the regular meeting of the Anatomical and Anthropological Association held on Monday, November 29th, 1920, Dr. S. R. Detwiler presented a paper on "The Transplantation of Limbs in Amphibia." The following abstract is presented by the author:

The ability of the Amphibian limb to undergo differentiation independent of its normal surrounding was first demonstrated by Braus (1903). Since that time considerable evidence has accumulated in the work of Harrison and the present author to show that the immediate organic environment has no specific influence in determining that a limb shall or shall not develop, and that its rudiment may be transplanted to any part of the body and there develop into a normal appendage.

Limb grafting as an experimental method has been applied to the solution of a number of fundamental questions concerning the development of the peripheral nervous system. Its most important applications were made in connection with the question of the genesis of the nerve fiber, particularly in the work of Harrison. In these experiments evidence was brought to bear against the Hensen Theory of nerve development and the Outgrowth Theory of His was given valuable experimental support. With the establishment of this latter theory and the modern neurone concept, far-reaching results have been attained in the fields of nerve regeneration and transplantation, and our knowledge of reflex pathways has been greatly enhanced.

When an extra limb is transplanted to an abnormal position on the body, it will acquire a system of nerves derived from that part of the central nervous system of the host which corresponds in position to that occupied by the transplanted limb. If a limb rudiment is excised
and re-implanted near the limb vicinity on the same embryo, the bulk of its innervation is derived from the original limb level of the spinal cord. The functional behavior of the transplanted appendage plays no role in determining whether or not it shall receive a complete supply of nerves, thus supporting the concept that initial outgrowth of the nerve fiber from its center is an intrinsic factor of the nerve cell body.

Transplanted appendages which are devoid of function may be as completely supplied with peripheral nerves as are those which function normally, and a study of the nerve supply to the limbs show that neither the completeness of the peripheral nerve supply nor the source from which the nerves are derived determine the extent to which the limb may function.

The normal anterior limb of Amblystoma centers opposite the fourth myotomic segment and is supplied by a brachial plexus composed of the third, fourth and fifth spinal nerves. When the limb is excised and re-implanted to the same embryo from one to seven body segments caudal to the normal position, its degree of function decreases as the distance from the normal limb site is increased. There is a marked tendency on the part of the original limb nerves to supply the transplanted appendage. When this is accomplished the transplanted limb, even though situated four or five segments posterior to its normal position, will function co-ordinately with the opposite intact limb. Transplanted limbs which are supplied by nerves coming from segments of the cord caudal to the limb level, function imperfectly in spite of complete peripheral connections.

An analysis of the factors governing the behavior of transplanted limbs indicate that the decreased ability of limbs to function as they become further and further removed from the original site is not due to structural deficiencies nor to a corresponding decrease in effective peripheral innervation, but rather to defective central connections. The normal function of transplanted limbs which receive the normal limb nerves, regardless of their position is due to the fact that they are connected with a central reflex pathway adequate for co-ordinated movements.

The results of these experiments yield no evidence of individual muscle-neurone specificity. They further show a marked adaptiveness on the part of the peripheral nerves to take on new functions, which, however, can only be adaptively performed when they are given proper support by the central reflex pathways.

A New Step in the Right Direction.

Dr. Vaughan, Medical Secretary for the Board of Foreign Missions of the Methodist Episcopal Church, has recently organized a Medical Brotherhood for Missions in his Church. The President of the new Brotherhood is Dr. Irving S. Haynes, and the Secretary Dr. Daniel S. Dougherty, both of New York City.

Dr. Vaughan promises to write on the subject later, after the organization has had more time to prove itself.

The reasons for this movement, as set forth in the Preamble, are well worth while and are here appended.

Whereas, there has been a feeling for some years on the part of our doctors in mission lands that they were working in isolation with inefficient connection with their medical brethren in the homeland, which feeling has at numerous times been expressed in formal action, and was especially well stated in the Peking Quadrennial Conference in January 1920:

And whereas, many of the medical brethren in the United States have been desirous of co-operating more directly and more effectively with their professional associates who have gone into missionary service;

And whereas, in the extension of our church's program the time now seems ripe for a direct attempt to arouse the interest and
intelligent support of the Methodist physicians in this country in behalf of medical missions;

And whereas, numerous church societies in the British Isles have most successfully organized medical auxiliaries for their foreign work;

Therefore, a group of Methodist physicians of New York City and vicinity, upon invitation of the Executive Committee of the Board of Foreign Missions of the Methodist Episcopal Church, after having carefully considered the situation, has drawn up the following proposals for the organization of the Methodist Medical Brotherhood.

The Committee on Arrangements has now definitely decided to hold the National Christian Conference at Shanghai on May 5-14, 1922. It is expected that approximately one thousand delegates, half Chinese and half foreign, will be elected by the different missions, churches, and Christian organizations in China. Rt. Rev. F. R. Graves, D. D., is Chairman of the Committee on Arrangements.

The general subject proposed for consideration by the Conference is "The Chinese Church." This will be presented under five general heads, and commissions composed of Chinese and foreign members resident in different parts of China are being chosen to prepare the reports which are to come before the Conference. The Committee after much consideration as to the best method of selecting the members of these commissions, has chosen the following chairmen and is with them studying in detail the method of selecting the members of each separate commission.


The National Medical Association of China will hold its next Conference in Shanghai from January 30th to February 1922. A cordial invitation to attend is extended to all members of the C. M. M. A.

The National Association has issued a Directory of Chinese Medical graduates comprising 1,160 names, with year of graduation, qualifications, present position held and present address. The price is $1.00 but members of the C. M. M. A. will be furnished copies on the same terms as members of the National Association, that is, at fifty cents a copy. This Directory has involved a lot of work and reflects great credit upon the National Association for its enterprise.

The Peking Union Medical College was officially opened with elaborate and impressive ceremonies on September 19th by Mr. John D. Rockefeller, Jr., on behalf of his father, and in the presence of Dr. George E. Vincent, President of the Rockefeller Foundation and many distinguished guests both medical and lay.

We are not reprinting any of the newspaper notices of the occasion in the hope that in the November Journal we may be able to print a more official account.

The College starts with every human prospect of success in being of the greatest service to suffering humanity in this country, and a stimulus to the advancement of medical and surgical research.

All that is necessary now is for the College to be given the chance to work out its destiny to the best of its ability. The Staff is a strong one and may be relied upon to do the right thing at the right time.

It is the earnest hope of every medical man in China that in the years to come the Peking Union Medical College may send out many men lovers of humanity, strong and well-equipped to battle for the physical and moral regeneration of their race and country.
THE CONFERENCE AND DEDICATION AT PEKING.

W. W. Peter, M.D.

In point of numbers our Association was well represented at the formal opening of Peking Union Medical College. The combination of the dedication of this, the finest medical school in the Orient in whose reconstruction and reorganization a great deal of interest has centered during the past five years, and a medical conference the first of its kind with so many distinguished visitors from abroad on the program, presented a dual attraction which led many of our members to attend. The sacrifice such attendance involved in time and money was more than worth while. All of us who were privileged to be present now have a first-hand knowledge of the facilities Peking Union Medical College will be able to offer its students in equipment and training. What is more important still is the fact that we had an opportunity to come into personal contact with the men who have had the responsibility of determining what should be its equipment and policy, as well as with those whose task it will be to make the school a success. All of us were impressed by the fine spirit of the founders, Board of Trustees and faculty alike. They are entering into this task with a real desire to serve. Our response should be a willingness to co-operate with them wherever possible in making this school a great factor in human progress in China.

The Medical Conference opened on September 15 and continued till September 22. According to the action of our Executive Committee following a vote by mail, it was accepted as a substitute for our regular biennial conference. The daily program was as follows:

**Morning**

9.30-11.00 Clinic sections covering general medicine, general surgery, obstetrics and gynaecology, ophthalmology, neurology and otolaryngology.

11.30-12.15 Papers.

**Afternoon**

2.00-5.00 Inspection of the plant, sight-seeing, President's Reception, Dedication exercises and special conferences.
Looking toward the main court from the rear, one sees this covered passage way which viewing the whole group takes the sharp edges off the hyphenated buildings by an artistic combination of the circle and the square.
Viewed from the opposite side, the same effect is produced. An open, raised walk leads from the Chemistry building (left) to the hospital wards and other buildings.
STUDENTS AT WORK IN ONE OF THE PHYSIOLOGY LABORATORIES.
SEVEN OF THE MANY DISTINGUISHED VISITORS PRESENT FOR THE OPENING.

Reading from right to left, in the order of march: 1. Dr. Victor C. Heiser, Director for the Far East, International Health Board, Rockefeller Foundation. 2. Dr. T. Tufier, Formerly Inspector-General, Medical Corps, French Army, Paris. 3. Dr. A. B. Macallum, Professor of Pharmacology, Physiology and Physiological Chemistry, McGill University Medical School, Montreal. 4. Dr. Thomas Cochrane, one of the founders of Union Medical College, London. 5. Sir William Smyly, Ulster, Ireland, father of Dr. H. Joscelyn Smyly of the Department of Medicine, P. U. M. C. 6. Dr. Francis W. Peabody, Boston, Mass., Exchange Professor in Medicine for 1921. P. U. M. C. 7. Mr. Edwin H. Dodge, Secretary of the Rockefeller Foundation.
The first scientific paper was presented by Dr. George de Schweinitz, Professor of Ophthalmology, University of Pennsylvania Medical School and President-Elect of the American Medical Association. Other visitors from abroad who took part in the program were Dr. Francis W. Peabody, Associate Professor of Medicine, Harvard Medical School; Dr. R. T. Leiper of the London School of Tropical Medicine; Dr. Florence R. Sabin, Professor of Histology in the Johns Hopkins Medical School; Dr. T. Tuffier, Surgeon, Paris, France; Dr. S. Hata, of Japan; Mr. George E. Vincent, President of the Rockefeller Foundation; Dr. A. B. Macallum of McGill University, Montreal, Canada; Dr. S. S. Goldwater, New York City; Dr. Victor G. Heiser, International Health Board; Dr. William H. Welch, Johns Hopkins University School of Hygiene and Public Health. Those from China participating in the general meetings were Dr. E. H. Hume, "Survey of Medical Education in China"; Dr. Wu Lien-teh, "Plague in the Orient with Special Reference to the Manchurian Outbreak"; and Dr. W. W. Peter, "Health Education in China." The success of the clinic sections is due to the excellent preparation by the heads and members of the various departments of the college.

Abstracts of the papers presented at the conference are being prepared by a committee of the faculty and will appear in coming issues of the Journal. It was the intention of the editorial board of the Journal to issue a special P.U.M.C. number. But with so many papers of scientific interest as well as general addresses, it would have been difficult to include them all. It is now the intention of the school to prepare a special commemoration volume in which will be included the important addresses given by Dr. W. W. Yen, Minister of Foreign Affairs, Mr. Roger S. Greene, Resident Director of the China Medical Board, the Ministers of Education and of the Interior, and Mr. John D. Rockefeller, Jr. We present in this issue, however, eight pictures which will give Journal readers an idea of the school and hospital buildings, and two of the Dedicatory procession. Some may be so fortunate in the months to come as to be able to see the moving pictures taken during the week and especially those taken on Dedication Day.
"Will Peking Union Medical College help us in our missionary work?" The answer to this question which has often been asked must be found in the spirit of the men in control. How do they look upon their task? No better statement could be given in reply than the words spoken by Mr. John D. Rockefeller, Jr., on Dedication Day, September 19:

"... We have realized, too, that although we might give to the Chinese medical students who pass through the College training as good as is to be had anywhere, that alone would fall far short of equipping them for their life work as the highest type of medical practitioner should be equipped. For only as their professional skill goes hand in hand with high character, only as they are inspired with the spirit of service and of sacrifice referred to in the message from my father, will our graduates be of most value to their fellowmen and to their country. And it is because we believe that the highest character is built upon the deepest spiritual foundations alone that we have sought to bring together a medical faculty not only with the best scientific equipment but possessed at the same time of the finest idealism. In other words, it is the desire of the Peking Union Medical College to offer to the people of China the best that is known to Western civilization not only in medical science but in mental development and spiritual culture. While, therefore, we shall willingly minister to the bodily needs of those who come within our doors seeking physical aid only; while we shall gladly afford training for the minds of those who come for that purpose, and while it is our profound conviction that the best in any man can only be realized as his nature becomes receptive to the highest spiritual influences, at the same time it is not our purpose to force upon any one that which he does not wish; nor shall we refrain from serving those who come to us for aid along any one of these three lines of human betterment because he does not wish help along all three.

"With the Medical Missionary Boards which have been most zealous in the development of medical missions, and with the work which they have undertaken, the Peking Union Medical College wishes at all times to be in most cordial co-operation. We are here to supplement, not to supplant, what they are doing, to aid, not impede them in their efforts. In fullest sympathy with the missionary spirit and purpose, we are desirous of furthering it as completely as may be consistent with the maintenance of the highest scientific standards in the medical school and the best service in the hospital. We would ever show respect to the genuine aspiration and sacrifice of those who come within our doors, whatever their views—for, after all, is it not a fact that the final test of true religion is the translation of that religion into the highest type of life?"
The most distinguished visitor of all, MR. JOHN D. ROCKEFELLER, JR.

Hundreds of people who could not be accommodated in the chapel took advantage of the open spaces to watch the Dedication Procession. This is the end of the procession and a part of the crowd. In the lead are Dr. W. W. Yen, Minister of Foreign Affairs; Mr. Roger S. Greene, Resident Director of the China Medical Board; Dr. Henry S. Houghton, Dean of Peking Union Medical College; and Mr. John D. Rockefeller, Jr.
THE CHAPEL.

The choicest spot in the whole property was set aside for the chapel which is called "A" Building. In this chapel, on Dedication Day, September 24, Dr. Houghton was installed as Dean by Dr. George B. Vincent, President of the Rockefeller Foundation.
And this is the message from his father Mr. Rockefeller referred to, a cablegram read on the day of the dedication:

“'My highest hopes are centered on the Peking Union Medical College which is about to open its doors. May all who enter, whether faculty or students, be fired with the spirit of service and of sacrifice and may the institution become an ever-widening influence for the promotion of the physical, mental and spiritual well-being of the Chinese nation.'

The founders of the new Peking Union Medical College have provided a physical plant which leaves little to be desired. They have set aside funds and delegated the responsibility for maintaining the school to a Director and a Board of Trustees in whom every one can repose the fullest confidence. They have gathered together a faculty from Europe, America and China well qualified for their work. And their three-fold motive is to promote the physical, mental and spiritual well-being of the Chinese nation. Surely theirs is a most auspicious beginning, or a consummation, far surpassing the dreams of the founders of the original school. Peking Union Medical College is to be congratulated on thus emerging from youth to manhood.

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Editorial Foreword.

It is the hope that this Department of the Journal can be made of practical use to the readers. For that reason, brief contributions and comments relating to new species of animal parasites, geographical distribution and methods of technic, as well as reviews of important articles appearing in other journals, will be heartily welcomed.

I had an opportunity to meet many members of the C. M. M. A. during the summer, and was especially fortunate to become acquainted professionally with twenty-two who took the course in Practical Parasitology offered in Kuling during August. As an outgrowth of this and of the stimulus which Parasitology is receiving in China, many new forms and others from new localities are likely to be brought to light. Material needing identification may be sent to me at the Union Medical College, Peking.—E. C. Faust.
Among many items of importance to human and comparative parasitology are those of particular interest to workers in China.

Cort calls attention to a species of Heterophyes (H. nocens) described from man by Onji and Nishiio in 1915, but previously mentioned only in Japanese literature. It is endemic in two villages in which it occurs in 22 to 30 per cent of the inhabitants. It is contracted through eating a fish, Mugil japonicus, in which the final larval stage occurs. The primary larval host is apparently not known.

Bartsch suggests that the successful introduction of Japanese snails into the United States for aquarium purposes might lead to the establishment of life cycles of Japanese flukes in America.

Stiles makes the following contribution on temperature reaches of hookworm eggs and larvæ.

8 to 10° C. (46.4 to 50° F.) : This is the lowest demonstrated temperature at which hookworm eggs, placed under favorable conditions, will segment and will hatch out larvæ that reach the infecting stage.

8 to 15° C. (46.4 to 64.4° F.) : In this range of temperature, hookworm larvæ are sluggish to motionless.

20 to 30° C. (68 to 95° F.) : Favorable to hookworm development and motility.

25 to 30° C. (77 to 86° F.) : Optimum for development of hookworm eggs and larvæ and for motility of larvæ.

35 to 40° C. (95 to 104° F.) : Less favorable hookworm development and motility.

40 to 50° C. (104 to 122° F.) : Eggs have been observed to hatch at 40° C., but in general constant temperatures above 37 C. are reported as unfavorable to fatal for eggs and larvæ. However, both eggs and larvæ can stand 40 to 50° C. for a few minutes and survive.

50 to 60° C. (122 to 140° F.) : Fatal to eggs and larvæ in 1 to 5 minutes.

Above 60° C. (above 140° F.) : Fatal to eggs and larvæ almost instantly.

Cort announces that Tanabe had reported Echinostoma perfoliatum var. japonicum from man, the final intermediate host being fresh-water fish.

Tubangui reports the occurrence of an Echinochasmus and a new Prohelmintum (Dist. mes) from the dog in China.— F. C. F.

Recent Progress in Medical Zoology.


In this admirable review the writer makes a concise résumé of the progress in Medical Entomology and related lines during the last seven or eight years.— E. C. F.

The Correlation Between the Chemical Composition of Anthelmintics and Their Therapeutic Values in Connection with the Hookworm Inquiry in the Madras Presidency.


Betanaphthol is a drug of constant chemical composition which acts as a powerful vermicide, especially efficacious in hookworm infections. 1p to 40 grains a single treatment is advised. For 50 to 60 grains two or three portions are advised. In large doses this drug is an effective ascaricide.— E. C. F.
The Incidence of Intestinal Parasites, Especially with Regard to the Protozoa, Amongst Symptomless Carriers in Jamaica.


The concentration method of Cropper and Row was found to be particularly efficacious for cysts of Entamoeba coli because of the irregular distribution of these cysts throughout the stool. A rather high per cent of protozoan cysts was found, considering the fact that the hosts were symptomless carriers.

In two succeeding articles of this same series published in the same journal, the writer presents data on size relationships of cysts of Entamoeba histolytica and of E. coli. He finds several strains of the former, with modes at 7.7 \( \mu \), 10-15.5 \( \mu \), 11-11.5 \( \mu \), 12 \( \mu \), and 13-13.5 \( \mu \), and two distinct strains of the latter, with modes at 17-18 \( \mu \) and 19-20 \( \mu \).—E. C. F.

Notes on Filariasis, Elephantiasis and Allied Conditions.


This paper is a review of the important points in nosogeography, structure, life history and pathogenicity of Filaria bancrofti, likewise the theories of causation of elephantiasis. The writer takes the view that the elephantoid condition is produced either by repeated infestations of filaria or a primary infection of filaria followed by secondary invasion of micro-organism.—E. C. F.

Five cases of Fasciolopsis Infection. Coly, A. F.


The writer holds to the view that material collected at Ningpo from the Shao Hsing endemic area of fasciolopsiasis belong to the single species Fasciolopsis buski, and that described variations in size and lack of integumentary spines are referable to post-mortem changes. Since no other causative agents are present in the great majority of cases, the accompanying symptoms must be due to these worms. The ill effects are not in the direction of blood destruction, but are produced by toxic absorption, which leads to secondary anemia, dyspnoea, general oedema, ascites, and skin changes. Fasciolopsicides and purge are followed by rapid recovery.

The writer states that the distribution of the parasite is rather restricted.—E. C. F.

The Classification and Differential Diagnosis of the Æstivo-autumnal Malaria Plasmodia. Craig, C. F.


The Æstivo-autumnal plasmodia are capable of differentiation into two forms, Plasmodium falciparum and Plasmodium falciparum quotidianum. Morphologically they are as different as P. vivax and P. malariae. Clinically they are distinguished by differences in the time of the paroxysm. The quotidian form is relatively rare, having occurred in only 189 out of 1,662 total cases of Æstivo-autumnal malaria that have come under the author’s observation. This fact accounts for its late recognition.
<table>
<thead>
<tr>
<th>Period of Development</th>
<th>Plasmodium Falciparum</th>
<th>Plasmodium Falciparum Quotidianum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Length of cycle in man</td>
<td>Forty-eight hours</td>
<td>Twenty-four hours</td>
</tr>
<tr>
<td>2. Earliest intracorpuscular stage</td>
<td>Ring-form. Average diameter, 1.5 microns</td>
<td>Minute oval body. Average diameter 0.5 micron</td>
</tr>
<tr>
<td>3. Morphology of ring-form</td>
<td>1.5 to 3.5 microns in diameter</td>
<td>0.5 to 1 micron in diameter</td>
</tr>
<tr>
<td>a. Size</td>
<td>Well defined. Relatively large in amount</td>
<td>Poorly defined. Relatively very small in amount</td>
</tr>
<tr>
<td>b. Cytoplasm</td>
<td>Relatively small in amount, composed of one or two spherical dots</td>
<td>Relatively large in amount, composed of irregular or semi-lunar masses, forming a large part of the ring-form</td>
</tr>
<tr>
<td>c. Chromatin</td>
<td>Present. Fine grains in expanded portion of ring</td>
<td>Never present in the ring-form</td>
</tr>
</tbody>
</table>
| d. Pigment            | Slightly reduced in size     | Reduced in size, Distorted in shape frequently. |\
| e. Effect on erythrocyte |                            | Peculiar holelike appearance in portion enclosed by ring-form |
| 4. Morphology of pigmented and presporulating forms | 1.5 to 6 microns in diameter | 1 to 3 microns in diameter |
| a. Size               | Large in amount. Well defined | Small in amount and poorly defined |
| b. Cytoplasm          | Relatively small in amount   | Relatively large in amount        |
| c. Chromatin          | Small granules and irregular clumps | Smaller in amount. One or two solid blocks |
| d. Pigment            | Reduced in size              | Reduced in size and distorted in shape |
| e. Effect on erythrocyte |                            |                                 |
| 5. Morphology of sporulating forms | 5 to 6.5 microns in diameter | 3 to 3.5 microns in diameter      |
| a. Size               | Well defined. Large in amount | Poorly defined owing to small amount |
| b. Cytoplasm          | Each merozoite has a small spherical dot | Each merozoite is composed almost entirely of chromatin |
| c. Chromatin          | Irregular mass               | Solid minute block                |
| d. Pigment            | Reduced in size              | Distorted in shape. Slightly reduced in size. |\
| e. Effect on erythrocyte |                            | Sporulating plasmodium fills only about one-half or slightly more of the erythrocyte |
| f. Number of merozoites | 10 to 30                    | 6 to 18                           |

— E. C. F.
The Course of Migration of Ascaris Larvae.


Upon hatching the larvae of Ascaris burrow into the walls of the small intestine and enter the lymphatics and venules. They may then pass into the hepatic portal and be carried through the liver into the vena cava, thence through the right heart to the lungs. Others pass through the lymphatics through the receptaculum chyli, thence through the right heart into the lungs. A minority possibly burrow through into the abdominal cavity and thence into the lungs. Larvae may be found in the peripheral lymph nodes 24 hours after infection, presumably having migrated (passively) through the systemic circulation.- E. C. F.

DOCTOR WOO BACK AGAIN.

Dr. S. M. Woo went to Canton in January on a leave of absence of six months to organize the Canton Municipal Health Department. It is good news to announce that he has returned to resume his work with the Council on Health Education. Herewith a letter from him to you about one phase of our work.

W. W. Peter.

A few Facts about Health Bulletins:

WE PRODUCE HEALTH BULLETINS BECAUSE THERE IS A DEMAND.

In 1917 before we issued any, we sent out 150 circular letters to missionary doctors to find out how many would pledge to subscribe and pay in advance. We had no capital. Fifty-one doctors responded enthusiastically by subscribing for 121,650 copies. Since May 1920 to September 30, 1921, we sold at printer’s cost 551,345 copies totalling 6,328,243 pages. 749 missionaries are using them.

Bulletins are the only means by which we can reach the distant corners of China, and Chinese colonies abroad.

They are your most economical method of health education. There is little waste because Chinese people are more apt to read such bulletins than the Westerners, due to the general lack of reading material.

Although the proportion of illiterate people is very big, still we can safely estimate that 5% of the Chinese can read. Potentially this means that there are twenty million people who can read the bulletins.

Through conversation between friends and relatives even the illiterate can be reached by the bulletins.
The bulletins stand ever ready to repeat the instructions to those who forget. They are always ready even on New Year days and at midnight, in the tea-house, school or home.

WE HAVE THE RIGHT KINDS.

There are, on twenty different subjects, twenty-two prepared in Mandarin and fifteen in Wenli—thirty-seven in all.

Northerners demand Mandarin whereas Southerners prefer Wenli. This is why we prepare both kinds. They are all practical.

THE BULLETINS ARE IN SIMPLE STYLE.

They were originally written and are constantly being revised to suit the average Chinese readers. In order to make them interesting and clear, a great many analogies are used. Whenever possible, brief anecdotes are introduced to illustrate the points. Only a few fundamental and practical points are set out in each bulletin. Completeness is sacrificed in order to make the points very clear and easily remembered. For example: In the bulletin of Infant Hygiene we discuss three principal causes for infant mortality, inherited weakness, improper feeding, improper care. Then we give some practical suggestions on the care of infants. In the bulletin on Home Sanitation five points are discussed: the dwelling house; food and drink; work, recreation, rest, activity; home nursing; first aid.

WHO CAN RECEIVE MOST BENEFITS FROM THESE BULLETINS?

Patients. A patient suffering from tuberculosis will naturally read the bulletin on tuberculosis with real interest. Furthermore, he has plenty of time to read, and what he reads is just what he needs.

Students. Students can derive benefit from the bulletins because their minds are plastic and their habits are not yet firmly formed.

Scholars. A great many Chinese scholars have nothing to do except to read, and some are mentally very alert so they can read the bulletins with keen interest and real understanding.

Mothers. Every intelligent mother will read the bulletin on Infant Hygiene and Home Sanitation with conscientious care and apply the knowledge thus acquired.

WHAT THE BULLETINS CAN BE EXPECTED TO ACCOMPLISH.

If circulated extensively, the bulletins will help to drive away the superstitious ideas about disease and death, and will tend to throw new light on previously fatalistic beliefs.
They will help create a health conscience.
They will create a popular demand for public health administration.
They will give practical suggestions to those who need them.

THIS SHOULD BE OUR AIM AND YOURS.

To distribute one million copies of health bulletins in this coming year. They cost only $6.00 per thousand. In view of the facts that there are so many mission schools, missionary hospitals, churches, Y. M. and Y. W. Christian Associations in China, each has only to do its part to more than realize this objective. The cause of public health is certainly worthy of sacrifice and support on your part. Will you do your share?

Send for samples.

Sincerely yours for prevention,

S. M. Woo, M.D., C. P. H.,
Secretary, Council on Health Education.

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**Book Notices.**


Keen's Surgery: Supplementary Volumes 7 and 8 with the Complete Index to Keen's Surgery. Per set, Cloth £6.6/-; Half Morocco £7.15/-.

Vol. 7 covers General Military and Naval Technics; Fractures—Spine and Peripheral Nerves; Orthopedic Vascular System.


Intensely interesting with much new material and discussion of the latest developments in diagnosis and treatment.


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Correspondence.

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To the Editor, C. M. J.

Dear Sir:—These are the days of great suspicion. Every one who tries to say something is suspected of having an ulterior motive of some sort. Surely he must have an axe to grind. Perhaps there will even be those who may suspect that the enclosed is for a reason. It is, but not for that kind of a reason. I happen to have more money in the bank for my work than I know how to spend wisely. That is one reason I do not wish my name to be used. Some of the brethren in our Association might suggest communism. Another reason is that I do not want any of the readers to suspect that this attempted tribute may be for future reference. They did not give us a chance to say 'Thank you' in Peking, so I say it through our Journal.

Sincerely yours,

With my C.M.M.A. dues paid up,

P.S. —I also paid my own travel both ways and board bill in Peking. Have I disarmed everybody?

The biggest impression made upon me while in Peking attending the formal opening of Peking Union Medical College was not made by the physical plant. When I came to China I was sent into the back country and have never become familiar with the stringent requirements for a modern medical school and large hospital. Those who know more about these things and about art and architecture than I do, probably had a hard time to restrain their enthusiasm. Ignorance saved me. But I noted that there was ample ground for every building, and inside these buildings everybody seemed to have plenty of room in which to work. The buildings are so clean and well lighted and substantial. Just to be in and out of them day after day put new spring into my legs and ginger into the day's program. But the physical plant, magnificent as it is, made an impression of secondary importance upon me.
This is what constantly impressed me. The spirit of the men I met there. Like many others, I have known Mr. Greene and Dr. Houghton for years. I found them just the same splendid, clear thinking men we all know them to be. They gave me no new surprises and I centered my attention upon the newcomers—members of the faculty just out from home, members of the Board of Trustees of the China Medical Board, and particularly Mr. John D. Rockefeller, Jr., himself. Without intruding, I made it my business to meet them. This was easy because they are democratic citizens. I also attended every meeting they just the same splendid, clear feller, Jr., himself. Without intruding, I made it my business to meet them. It was a revelation to me to learn of thinking men we all know them to be. They gave me no new surprises and I centered my attention upon the new-comers—members of the faculty just out from home, members of the Board of Trustees of the China Medical Board, and particularly Mr. John D. Rockefeller, Jr., himself. Without intruding, I made it my business to meet them. This was easy because they are democratic citizens. I also attended every meeting I could to hear what they had to say. The end of every day found me dead tired, but happy.

I say happy because I believe these men are trying to serve China just as truly as I am. Before I reached Peking I had heard occasional disquieting words about the school and how it might exert an influence not fully in line with the present needs in medical education in China. I can only wish that those whose minds are ill at ease still will make it a point to read the addresses delivered by Mr. Rockefeller, Dr. Vincent, Mr. Greene, Dr. Houghton and others during the dedicatory week. My feelings are pretty well case hardened, but I was stirred to the depths of my heart by the fine spirit each one of them manifested. This new advance in medical education is in good hands.

It was a revelation to me to learn of the difficulties they encountered in delay and cost of construction because of the contrasts is too great to put it this way, but we on both sides of the Pacific sacrificed together to make possible and then enjoy this wonderful dedication week. It was not easy for those of us in China to drop our work for so long a time as this with travel required. But those coming from abroad, Mr. Rockefeller, the President Elect of the American Medical Association, and the many distinguished persons from other countries certainly found it no easier. Having been at Peking, I shall never be so easily satisfied in the future with low standards and careless work.

May the highest expectations of the founders of this institution be realized through the years to come. And in this realization, each one of us may have a small but vital share through our sympathy and support.

To the Editor, C. M. J.

Dear Sir:—In looking over some old China Medical Journals preparatory to having them bound, I find that I have two copies of March 1916. If any of your readers would care to have this extra copy to complete their set, it can be obtained by communicating with the undersigned.

Yours, etc.,
E. C. Wilford.
West China Union University
Medical Faculty.
NOTES.

DOCTOR WANTED. British or American. Preferably a physician rather than a surgeon as assistant in an established practice in out-port and adjoining summer resort. Particulars may be had by addressing "Practitioner"

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ENQUIRY INTO MISSIONARY PROBLEMS.

Dear Sir,

The International Review of Missions completes its tenth volume in October 1921 and we desire the counsel and help of your missionary readers in laying our plans for the next decade.

The aim of the Review is to place at the disposal of missionaries the best thought of the missionary body in all fields and all branches of the Christian Church. In order to fulfil this aim we wish to relate the articles in the Review to the most real and living questions with which missionary workers are confronted.

It will help us towards the attainment of our aim if your missionary readers will send to our office, Edinburgh House, 2, Eaton Gate, Sloane Square, London, S. W. 1., a brief statement of the three problems on which they most feel the need of help. We mention the number three because we do not desire a mere catalogue but a note of those matters which have most pressed themselves upon the attention of missionaries, causing them genuine perplexity during the past year of two. Those who see four or five questions of equal urgency will of course not limit themselves to three.

We ask for is merely the naming of the problems which are most pressing, but if any who have time to do so will send us a little elucidation of the precise nature of the problems they have in mind, the circumstances in which they have arisen, and any clue as to lines on which a solution might be sought, it will be of the greatest assistance.

To facilitate filing for reference in our editorial work, it will be a convenience if where notes are sent a separate sheet of paper is used for each problem. The name, station, society and length of service of each missionary should be written at the top.

Faithfully yours,

J. H. Oldham,
G. A. Gollock.