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TYPHOID AND PARATYPHOID FEVER AT PAOTINGFU

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INTRODUCTION

This report proposes to give a brief review of all the cases of Typhoid Fever admitted to the Memorial Hospital at Paotingfu during a period of eleven years beginning 1918 and including 1928. Previous to 1918 we did not have regular bedside nursing and no hospital treatment records of patients were kept. Since that time with the opening of our new building we have attempted to keep medical records of all cases. Often, however, they have been imperfect and brief so that a review of any particular series of cases leaves much to be desired. Nevertheless since the literature in China contains very little of such reports, and the writer has only found two reports (1-2) on typhoid fever in his files of the China Medical Journal for the past twelve years, it has been thought worthwhile to make a brief study of our series and put it on record.

That this report may be clearly understood a few explanations are necessary. The Taylor Memorial Hospital admits only men and since we have a separate hospital for women and children on the same compound, we admit very few children under ten years of age. The Chinese are usually unwilling to have their younger children separated from their mother or nurse and therefore when they are admitted they are admitted at the other hospital. It, however, is a noteworthy fact that the women's hospital has had very few cases of typhoid. We have attempted to discard all cases in which the diagnosis seems to be in question. We have not been able to confirm our diagnosis with blood and stool cultures; furthermore in the early years Widal tests were not done on all the cases and some of those

that were done were not recorded on the charts. However, clinically, the cases reported leave little doubt about the correctness of diagnosis.

The series for the eleven years numbers 200 cases. During the same period the total admissions to the hospital were 12,819. This gives an incidence of 1.5 per cent for all admissions. Zia (3) gives the percentage of typhoid and paratyphoid to the total admissions at the Peking Union Medical College over a period of six and a half years at 1.4 percent. The medical cases average 40 per cent of the whole. The typhoid cases represent therefore 4 per cent of the medical cases. Chinese patients usually want to take a single dose or two of medicine to cure their illness and are often unwilling to enter a hospital for prolonged care such as is necessary in typhoid. It often happens therefore when told in the clinic that they need to be admitted and have bedside care that they prefer to go home or to seek someone outside who assures them of a more speedy cure. Some of course hesitate about expense. Since we have only 60 regular beds which can be increased to 72 under pressure, we are not able to admit anything like all of the patients who apply and it has often happened that the cases of typhoid fever have come in epidemics. We estimate that we have admitted between one-half to one-third of the patients who were evidently infected with typhoid. Again the patients who were admitted were usually the most serious. We do not turn down serious cases for financial reasons. Soldiers usually did not come to the clinic until the disease was far advanced and they were considered hopeless by themselves and their friends. We would therefore consider that as to selection of patients, those admitted were the most seriously ill.

PREDISPOSING CAUSES

Age.—Table 1 shows the age of the patients admitted. One hundred and fifty-six cases (70.9 per cent) we see belong to the two decades between 10-30. Jennings (4) shows that approximately 70-75 percent of cases occur between the ages of 15 and 30 years.

Occupation.—Considering the occupation of the patients (Table 2) we see that students compose 46 percent. The fact that students have been willing to seek advice earlier than others and to accept the suggestion of bedside care may account in

part for this high percentage but there have been several epidemics among the students. Without doubt this has at times been due to the occupation of the schools by the military and the contamination of their living quarters by the soldiers. This condition was especially bad in the summer of 1928, (just after the Nationalists had occupied Paotingfu and their soldiers had been quartered in several schools in the city and suburbs.) The following fall there occurred an extensive epidemic among the students. The second group of importance is that of the soldiers which show 29 percent. The surging back and forth of armies throughout the country during the past few years under the worst hygienic conditions led to wide spread infection. The term "laborers" includes unskilled day laborers of the coolie class. Their low standard of living and poverty naturally would tend to increase their percentage of infection. It is also worthy of note that there are but few farmers among the admissions. Under the merchant class are included clerks and apprentices and those connected with business. The hospital serves a very small foreign constituency so that the incidence among foreigners is insignificant. The two reported, however, were infected in the country, one of them after soldiers had occupied his home, and contaminated the wells.

Seasonal Incidence.—(Table 3) Only six cases or 3 percent of the series occurred during the first six months of the year. The curve of incidence begins to rise in July, increases in August and reaches its peak in October. More than half of the admissions, 52.5 percent, occurred during the two months of September and October. Flies probably constitute the main source of infection in North China. Spring and early summer constitute the dry season here. There is no rainfall worthy of mention until July, after which the menace from flies increases rapidly. Yao (5) and others in a study made in Peking have shown that flies attain their largest numbers in August. One might expect the peak of the incidence of typhoid to occur earlier in the year, but it might be pointed out that since the schools do not open until September and the students do not begin to eat in large groups until that time, this would tend to account for the larger portion of our cases occurring later in the season. The dining rooms of the schools are not screened and so the flies swarm in over the food which is often placed on the tables uncovered before the students arrive. The nights

get cooler in the fall and the flies tend to decrease, but they still flourish in these dining rooms. This is also true of the soldiers' barracks. The almost total absence of cases during the first half of the year would argue against there being a large number of typhoid "carriers" in Chinese society. If there were many carriers, with the general disregard for the laws of hygiene there would surely be a more general distribution of cases throughout the year. The seasonal incidence corresponds very closely to Smyly's (1) report of cases at the Peking Union Medical College in which he records the fact that the greatest number of cases were admitted in September.

SYMPTOMS AND SIGNS.

In the matter of diagnosis we have little to add that is not found in all standard textbooks. One or two items are of interest. The white blood cell counts are recorded in 130 cases and were usually done shortly after admission. Where more than one was done we have noted only the first. In 95 of the cases, that is 73 percent, of those recorded the count was below 8,000, and averaged 5,440. In 35 cases, that is 27 percent, the count was above 8,000 and averaged 11,000. The general average of all cases reported was 6,950.

The outstanding symptoms were fever, headache, and loss of appetite. Sooner or later the spleen was palpable in almost every case.

Widal's Tests.—We have usually used the macroscopic method. We have used killed cultures which we have prepared ourselves from stock culture obtained from Peking Union Medical College or the Temple of Heaven Laboratories in Peking. No Widal tests were done during the first three years of the series, and the records for the remaining 9 years show reports on 125 cases (See Table No. 4). Of these, 31 cases or 25 percent, are reported negative. Most of these patients either died or left before another examination was made, although a few of them showed negative results after 3 or 4 examinations. We did not, however, alter our diagnosis as the cases were typically typhoid. It was rarely the case that the Widal reaction was positive during the first ten days and often it was much longer before the reaction became positive. One patient was sick for 5 or 6 weeks and had intestinal hemorrhages and recovered before the Widal became positive. Another inter-

esting point in relation to the positive Widal reactions is the number of patients which are recorded as giving a positive reaction for two members of the typhoid group. Fifteen patients are reported as being positive for *Bacillus typhosus* and also for one of the paratyphoids. It was assumed at the time that these tests were made that the patient had a double infection. This was probably not the case. The dilutions in our laboratory were usually carried to 1-80 or 1-160. Had they been carried on to higher dilutions it is quite likely that one of the two types would have been ruled out, most likely the paratyphoid type. Gay (6) tells us that from eight to ten percent of the typhoid cases agglutinate one or both of the paratyphoid organisms, and that such serums more readily agglutinate paratyphoid B than they do paratyphoid A. Our figures are in harmony with this theory. Five of the 15 cases are reported to agglutinate paratyphoid A, and ten paratyphoid B, in addition to the *Bacillus typhosus*. Had the dilutions been carried higher they would quite likely have proven to be pure typhoid infections. Gay (6) also tells that agglutination of paratyphoid bacillus B in low dilutions of serum of patients suffering with paratyphoid A is common and of no significance. The two cases reported positive to paratyphoid bacillus A and B, are therefore probably cases of the former type. If we therefore correct our results according to Gay's theory we find that our positive Widal reactions show 78 percent to be typhoid fever, 16 percent paratyphoid B. Zia (3) in his Peiping series shows typhoid 80 percent, paratyphoid A 15 percent and paratyphoid B 5 percent. These figures compare closely and probably represent the approximate ratio of these three diseases in North China.

DURATION OF ILLNESS

As was stated above, the students usually came to the hospital early in the course of the disease; the soldiers and civilians, on the other hand, usually came in late. The duration of illness before entry is stated in 137 cases and averaged a little over 10 days. The cases were divided into three classes, (See Table No. 5).

First—Those who remained to be discharged as cured or greatly improved. We usually tried to get the patients to remain for a week after the temperature became normal in uncomplicated cases. This was not always possible and of course

there was always a chance of a relapse. However the Chinese patient has a pretty good constitution and it is our impression that relapses among this group were not many. There were 146 of the patients who came into this group and their average stay in the hospital was 26 days. If we add the average number of days' duration before entry we have the period of illness at about 36 days. This of course is only approximate, for many of the patients did not know just when they became ill.

Second—The group who left against our advice (D.A.A.), numbering 28. These patients went out while still running a fever and in spite of our efforts. Most of them were among those who were not seriously ill and did not see the necessity of remaining in bed and having hospital care. Many might be considered in the group of what is often called "walking typhoid." It is not likely that many of them died. However in determining our results this group will be entirely left out of consideration. It is interesting to note that the percentage of these cases has become less as the years have gone past and the Chinese have learned to take typhoid at its real value.

Third—Those who died in the hospital numbered 26 who will be considered in a later paragraph. They represent 13½ percent of all admissions and 15 percent of those who remained in the hospital for better or for worse until the termination of their disease.

TREATMENT

In the matter of treatment we have little to add. We have depended upon bedside care and proper nourishment with plenty of fluids. For food we have usually used milk, eggs, rice porridge, and "kua mien." For serious cases we have used glucose, making use of some of the corn syrups or the malt candy bought in the local markets.

Mercurochrome.—At times we have tried intravenous injections of mercurochrome, but the results have been so unreliable that we have ceased to place much confidence in it. In some cases results have seemed to be most striking. Following the injection in favorable cases the patient usually had a sharp reaction and then the temperature became normal within the next two or three days and did not rise again. It seems that the drug most certainly did shorten the course of the disease. Again in other cases, following the reaction the temperature

rose and the patient pursued the regular course of typhoid fever. Evidently the drug had no effect at all. In several cases the reaction was most disagreeable to the patient and was associated with severe abdominal cramps with marked diarrhea, with reddish stained fluid. One case, a young boy, had 10 or 12 stools the following day. Such reactions made one fear that the drug might do more harm than good. It certainly did not shorten the course of the disease in that case.

Tissue Fibrinogen.—Since the work of Mills with tissue fibrinogen we have found this preparation useful in many forms of internal hemorrhage. In our hands it has been of service in some cases with intestinal hemorrhage and I would be unwilling to be without it. Usually hemorrhages can be stopped and kept under control with it. We have obtained our supply of the preparation from the Peking Union Medical College. It is administered either by mouth or subcutaneously. It can never be injected intravenously. It is said to cause almost instant death when so given into the veins. However when given subcutaneously or orally in cold water the results are satisfactory. We have usually repeated the dose once or twice a day until the danger is past. In spite of its use, however, we lost one case from profuse hemorrhage in 1928. We were successful in saving three similar cases. Transfusion was tried whenever we could get a donor but we have found it very hard to get even the friends and relatives of the family to give blood in this part of the country. In the case of soldiers donors are practically out of the question.

Perforations.—Usually these occurred in patients before they came to the hospital or in those who were admitted in extremely serious condition. The records show that we have diagnosed 9 cases of perforation. This is 5.2 percent of the cases who remained in the hospital until the completion of their disease. It is not impossible that there may have been additional perforations among the ten patients who are recorded as dying from toxemia. Post mortem examinations were not made and perforations with few or no symptoms may have been overlooked. Dieulafoy (7) states that in severely toxic patients with distention and nervous manifestations perforations may occur and be revealed only at autopsy. Jennings (4) gives the percentage of perforations in Europe and America at from 2-6 percent. We have operated on 6 cases and saved

two. Three others were considered hopeless and were not operated upon. Among patients who died from perforation the one who stayed longest in the hospital stayed 6 days.

RESULTS

Considering only those who remained in the hospital until the termination of their condition we have 172 cases (see Table No. 5). Of these 146 recovered and 26 died, which is a mortality of a little over 15 percent. Of the 26 who died, 16 were in the hospital less than a week, as follows: 2 for 1 day, 5 for 2 days, 4 for 3 days, 1 for 4 days and 2 each for 5 and 6 days. The other ten were all in hospital longer than ten days. The average duration of illness before admission of the cases in which it was stated was 15 days. As to the occupation of those who died, 10 were students, 11 were soldiers, 2 farmers, 2 teachers, and one a servant. Nineteen percent of the soldiers admitted died and 11 percent of the students. The difference is readily accounted for by the better condition of the latter on admittance. The two farmers had perforations when admitted.

CAUSE OF DEATH

The cause of death is shown in Table No 6. The percentages at the bottom of the table are the percentages of those cases which remained in the hospital until discharged.

The three main causes of death were; perforation of the intestine, intestinal hemorrhage and toxemia. Two other complications should be mentioned. One was a patient who developed acute catarrhal jaundice after he had been in for several days. There was an epidemic of typhoid fever and acute catarrhal jaundice at the same time among Paotingfu students in the fall of 1928 and this student evidently had a double infection. The other patient was a soldier who came in late in the course of the disease. His temperature fell and in some respects he seemed to improve but it was impossible to get him to take nourishment and he apparently died of starvation.

The ages given in the table are according to the Chinese reckoning; that is the ages are stated as a year older than would be the case according to the foreign reckoning. Of the 26 deaths twelve (46 percent) occurred in the 16-20 year group, ten (38.5 percent) occurred in the 21-30 year group. Eighty-five

percent of the deaths occurred between the ages of fifteen and thirty. Of the remaining four deaths one occurred at 13 years, two at 34 and one at 42.

CONCLUSIONS

Typhoid is a serious disease among the Chinese. It is often unrecognized and untreated.

It is especially frequent between the ages of 10 and 30.

If early recognized and properly treated the mortality is low.

If neglected the mortality is high.

The control of typhoid fever among the students of China is an important problem.

In closing I wish to express my appreciation to Dr. Francis R. Dieuaide for reading this manuscript and offering many helpful suggestions.

TABLES.

TABLE No. 1.—*Age Incidence of 200 Cases*

1-10	11-20	21-30	31-40	41-50	51-60	61-70	Not stated
1	74	82	22	7	4	1	9
.5%	37%	41%	11%	3.5%	2%	.5%	4.5%

TABLE No. 2.—*Occupation*

Student	Soldier	Laborer	Farmer	Merchant	Others	Foreign
92	58	19	9	6	14	2
46%	29%	9.5 %	4.5%	3%	7%	1%

TABLE No. 3.—*Seasonal Incidence according to Date of Admission*

Jan.	Feb.	Mar.	Apr.	May	June
1	—	—	2	1	2
.5%	—	—	1%	.5%	1%
July	Aug.	Sept.	Oct.	Nov.	Dec.
12	32	50	55	30	15
6%	16%	25%	27.5%	15%	7.5%

TABLE NO. 4.—*Widal Reactions*

Reaction Positive (Dilution 1—160)

Reaction Negative	Bac. Typh	B.T.& Para A	B.T.& Para B	Para A only	Para B only	Para A & B	Totals
31	58	5	10	13	6	2	125
25%	46.5%	4%	8%	10.5%	5%	2%	100%

TABLE NO. 5.—*Admissions by Year*

Year	Cured	D. A. A.	Died	Total
1918	5	1	—	6
1919	18	8	4	30
1920	5	1	2	8
1921	9	3	1	13
1922	12	1	1	14
1923	16	2	2	20
1924	6	3	3	12
1925	—	—	1	1
1926	9	4	2	15
1927	24	3	2	29
1928	42	2	8	52

TABLE NO. 6.—*Cause of Death*

Occupation	Hemorrhage	Perforation	Toxemia	Other Complications	Totals
Students	3	2	4	1	10
Soldiers	4	2	4	1	11
Farmers	—	2	—	—	2
Teachers	—	1	1	—	2
Servant	—	—	1	—	1
Totals	7	7	10	2	26
% of all cases	4%	4%	6%	1%	15%

REFERENCES

- (1) Smyly, H.J. A Study of Thirty-five Cases of Typhoid and Paratyphoid; C.M.J. Vol. 34:109 March, 1920.
- (2) Huizenga, Lee S. Forty Cases of Typhoid Fever. C.M.J. Vol. 37:320 March 1923.
- (3) Zia S. H. Typhoid Fever, A Clinical Study of 256 Cases in Peking Nat. Med. Jour. of China Vol. 14:105 April 1928.

- (4) Jennings, *Text Practice of Medicine* Vol. IV:
- (5) Yao H. Y. The Relation of Flies, Beverages and Well Water to Gastro-intestinal Diseases in Peiping, *Nat. Med. Journ. of China* Vol. 15:410 Aug. 1929.
- (6) Gay, *Text Practice of Medicine* Vol. IV: 521.
- (7) Dieulafoy, *Text Practice of Medicine* Vol. IV: 538.

**THE PROBLEM OF STATUS LYMPHATICUS IN CONNECTION
WITH OPERATION ON CHILDREN
UNDER FOURTEEN ***

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In making a report on some of the current opinions regarding status lymphaticus it is hoped that sufficient interest in this subject may be aroused so that physicians in China, having cases of sudden death simulating this condition, may report them. With the possible exception of the four noted below, there have been no cases in the Peking Union Medical College approximating this condition nor have we any reports indicating that it is at all prevalent in other parts of China. The subject is of interest not only from the diagnostic point of view but because of our desire to make as safe as possible all operative procedures in children under fourteen years of age.

It will be seen by referring to the literature that there is a great divergence of opinion as to the interpretation to be placed upon symptoms and findings in connection with these patients. Furthermore apparently there is no differentiation between the so-called chronic status lymphaticus as exemplified in the asthmatic child, presumably with enlarged thymus, and the condition which brings about sudden death in the case of older children without any premonitory symptoms but with subsequent finding at autopsy of enlarged thymus and lymphatic glands.

Perkins of Columbia, New York, makes the following conclusions:

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"1. All children before operative procedure should be studied both clinically and roentgenologically for enlarged thymus.

2. Sudden death without previous clinical symptoms may result in patients with enlarged thymus from primary anesthesia or mild shock to the system.

3. Congenital anomaly of the heart and thymic hypertrophy can be differentiated by roentgen examination, although the symptoms may simulate one another.

4. All children under three years of age present a broad base of the heart, which should not be confused with an enlarged thymus.

5. An enlarged thymic gland may be placed so low over the pericardium, that it will not cast a characteristic shadow, when examined by means of roentgen-ray.

6. Roentgen radiation presents a satisfactory method of treatment of enlarged thymus."

A study of 237 patients by Perkins showed ten with enlarged thymus with eight suspicious. A later study of 500 cases showed 25 enlargements. During a period when 600 operations were done without X-ray examination one child died with enlarged thymus of 54 grams. During the period when the 500 cases were examined roentgenologically one more case died and autopsy showed an enlarged thymus lying low over the heart weighing 39 grams.

In the Massachusetts General Hospital, Boston, Mosher reports that all cases are examined by roentgen-rays before operation; one case has died recently. X-ray following death showed enlarged thymus where previous X-ray had showed small thymus. Mosher believes the thymus may undergo sudden alteration in size.

Other observers believe some reliance may be placed on a dullness above the heart in making a diagnosis of enlarged thymus but most people feel it is likely to be unreliable.

Babbitt states that .

"The symptomatic picture of the lymphatic state, concurrent with family history, would seem of prime value in establishing caution,—history of sudden deaths in the family relation even inclusive of accidents in drowning, fatalities in surgical narcosis and under trivial surgical procedures, history of epilepsy or epileptiform attacks, infantile eclampsia, idiopathic tetany or any form of glottic spasm in patients or immediate family. Evidence of anaphylactic reaction to injections, antitoxins, serums or vaccines, lowered resistance to disease, rachitic evidence and even the constant tendency to bronchial cough is added by Ohlmacher."

Others would add asthma as a condition which should make one suspicious of enlarged thymus.

Thorpe calls attention to the increase of leukocytes in the lymphatic state. This is not always present but in those cases where there is an enormous enlargement of the thymus it is nearly always present. In one of his cases the leukocytes increased to 144,000. No autopsy was obtained in this particular case but another with leukocytosis of 106,000 had a thymus weighing 200 grams.

Edith Boyd of Minneapolis finds the average thymus to be

- 13 grams at birth
- 20 grams at 6 months
- 35 grams at 13 years

She reports Hammar's figures as follows:

- 13 grams at birth
- 35 grams at puberty
- 15 grams at 50 years

Bonilla of Madrid who favors the mechanical theory of thymic deaths believes that any gland over 15 grams should be considered pathological.

While there seems to be a great deal of difference of opinion as to just what status lymphaticus may be and just how it operates to bring about sudden death either during anaesthesia or from sudden fright or excitement, a majority of observers believe the only way of determining whether or not there is an enlarged thymus is to have a careful roentgenological study made. Mosher of Boston would include roentgen-ray study of the abdomen as well. No great reliance may be placed on other means of diagnosis. In a number of operations in the United States roentgen examination of all children under fourteen is compulsory for other than emergency operations.

Our attention was called to this matter in the first instance because of difficulties which we had been having in connection with tracheotomizing cases of foreign bodies in the trachea of children from two to four years of age with short necks. In the first place it has been difficult to bronchoscope these children and whenever tracheotomy was performed considerable difficulty was experienced in reaching the trachea and in four cases the

results were fatal. Overlying the trachea in all these cases was an upper lobe of the thymus which was pushed aside with great difficulty. In all cases the trachea was finally entered and free passage of air obtained but only after the child had shown considerable embarrassment in breathing. The remarkable thing is that even with free entrance and exit of air through artificial openings these four children did not respond. In the last case the child was breathing right up to the opening of the trachea but took only three or four inspirations following the opening. The insertion of the bronchoscope through the trachea opening subsequent to death showed no obstruction of any sort. The foreign body, in this case, a melon seed, was below the bifurcation in the left bronchus. It is difficult to understand just why it was difficult to re-establish respiration in this case, as well as in the other cases, by artificial means. While the thymus may have been instrumental in causing pressure and obstruction, one is inclined to think that possibly the manipulation of the thymus had something to do with our inability to re-establish respiration. We may have here something which points toward a systematic cause of death due to the manipulation of the thymus.

No routine X-ray of children under fourteen is being made in the hospital in Peking since first of all there does not seem to be any clear and united opinion as to the advantages of such a routine examination in all cases either normal or abnormal coming in for operation. Secondly the lymphatic state, to judge from our experience, is not a common condition in our hospitals in China.

We shall await with a great deal of interest any reports which may be forthcoming subsequent to the reading of this paper.

BIBLIOGRAPHY

- C. Winfield Perkins, M.D. Roentgen Studies and Treatment of Enlarged Thymus in Children, *Medical Journal and Record*, April 15, 1925.
- James A Babbitt, M.D., The Diagnostic Problem in Status Lymphaticus, *Archives of Otolaryngology*, Vol. 1, 1925.
- Edward S. Thorpe, M.D., An Unusual Case of Thymic Hypertrophy, *Archives of Pediatrics*, Vol. XLIV, Feb. 1927.
- E. Bonilla, Thymic Death, *Endocrinology*, September, October, 1927.
- Harris P. Mosher, See discussion under Babbitt.

**CHRONIC MAXILLARY SINUSITIS WITH SUPPURATIVE
PAROTITIS RESULT OF IMPACTION
OF THIRD MOLAR TOOTH ***

Report of Case

S. E. KAO, M.D. Peiping.

The relationship of infection of teeth to maxillary sinusitis has frequently been described in detail by both otolaryngologist and dentist. A search of the literature of the past fifteen years, reveals that the majority of cases of maxillary sinusitis on record were secondary to the infected bicuspid or second molar except in one or two cases with involvement of the third molar tooth. None of these cases, however, has had the complication of suppurative parotitis. In view of the rare parotid complication and the difficulty of successfully eradicating a fistula of the parotid gland, the following case is presented.

Report of Case

A Chinese peasant, aged 26, was first seen by a general surgeon on March 2nd, 1927, for swelling neck and discharging fistula of the left cheek.

History of present illness:—The patient had had for fifteen years a discharging fistula over the left molar bone resulting from a cheek burn. It had occasionally healed temporarily but never permanently. He had had no severe attacks of toothache nor running nose. The swelling of the neck from unknown cause had been of four years standing.

Physical Examination:—The patient was well developed and nourished; and had no fever or headache. Heart and lungs were negative. Urine and feces were normal. He had a white blood count of 7,400 and red blood count of 4,280,000. There were no parasites. The Wassermann test showed strongly positive.

Local Examination:—The ulcerated lesion of the cheek was $\frac{1}{2}$ by 3 cm. and consisted of two fistulae, one above the other. The whole cheek was firmly bound to the underlying tissue and bone, but there was no marked induration. On pressing over the margins, pus and yellowish watery discharge escaped from both fistulae. Denuded bone could be felt through the fistulae with a probe. There was, however, no definite communication into the maxillary sinus. (Fig. 1.)

Mouth:—The findings were essentially normal with the only exception of absence of the left upper third molar.

*Presented at the XIXth Biennial Conference of the China Medical Association, Shanghai, February 1929.

Nose:—The left middle turbinal was enlarged. Some purulent discharge was found in the middle meatus. The left maxillary sinus showed dark shadow on transillumination but was otherwise negative. In order to determine the relationship between the maxillary sinus and the cheek-wound, the sinus was punctured and irrigated. Turbid fluid escaped partially from the fistulae and partially from the nose.

X-ray report:—"Left antrum was slightly clouded, lateral and inferior border hazy and irregular with a small piece of sequestrum probably due to osteomyelitis" (Fig. 2)

Neck:—The swelling of the neck was examined by a surgeon as goitre.

Operative findings:—Caldwell-luc operation was done on March 16th, 1928. When the facial wall of the maxillary sinus had been removed, there was a fairly large amount of granulation present on the floor and outer wall. After removing the granulation tissue, a perforation leading into the cheek-wound was discovered on the outer wall. Free drainage was then established through the nose. Having removed the granulation as well as the diseased periosteum from the ulceration of the cheek, the underlying bone was found to be necrotic and associated with the third molar tooth which showed on the X-ray film as a small piece of sequestrum. (Fig. 3). Evacuation of the necrotic bones revealed another perforation about 2 cm. in diameter on the outer membranous wall of the maxillary sinus, through which the antral cavity could be seen clearly. To secure a flap sufficient to cover the affected area, the surrounding skin was separated from its subcutaneous tissue for a distance of 3 cm. The whole wound covered and sutured with silk. The gingival incision was also sutured in the usual way.

Post-operative observations:—As the sinus was improving steadily, no attempt was made to irrigate it. The cheek-wound was ruptured after the removal of stitches. When discharged on March 30th 1928, the patient was in good health except for the granulating wound from which a yellowish watery secretion dripped constantly, particularly during mastication. Since this persisted under local treatment the patient was readmitted to the hospital on April 20th 1928. On the next day an operation for closing the cheek-wound was performed. The technic employed was practically the same as described above. The stitches were removed on the sixth day after operation and the patient was discharged well on May 10th 1928. Since his blood was positive for Wassermann, the patient received five small doses (0.3- 0.3- 0.4- 0.3- 0.4) of arsphenamine. He went home before completing the first series of injections so that no information was obtained as to improvement of his blood.

Comment

The interesting facts in this case are as follows:

First:—Chronic maxillary sinusitis caused directly by the third molar is rare, particularly so when as in this case it is unerupted.



Fig. 1 Chronic discharging wound of left cheek before operation.



Fig. 2 Radiograph showing clouded maxillary sinus, left and third molar tooth in soft tissue.



Fig. 3 Third molar removed by operation from the cheek wound. (it has been broken into three pieces)

Second:—Complication of suppurative parotitis in chronic maxillary sinusitis is also comparatively rare. When this is present, it delays the healing.

Third:—The difficulty of successfully eradicating a fistula of suppurative parotitis has been admitted both by general practitioners and by specialists. In this case fortunately the fistula healed in a few days after the secondary operation. From this prompt result, the writer is encouraged to believe that some of these cases may not be so resistant to treatment as usually supposed, and that surgical remedies should therefore be carried out whenever necessary.

Fourth:—The question arises whether this prompt result was caused by the syphilitic treatment given. This is probably not the case because the patient received only five small doses which were insufficient to clear the blood from syphilitic virulence.

Fifth:—The case is particularly instructive in that it shows that the teeth should always be considered a possible factor of infection for the maxillary sinus even when there is no pathological change in the mouth and no history of severe toothache. Further even negative roentgenograms may not rule out this possibility as in this case, the third molar tooth was unrecognized, being shown as a small piece of sequestrum.

GAS BACILLUS INFECTION

A review of its etiology, symptomatology, and treatment

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The subject of gas bacillus infection is by no means a new one. Its historical aspect dates back as far as the time of the oldest medical authors. Hippocrates observed this disease and later Ambroise Paré. Modern studies, however, began in 1853 when Maisonneuve first described the course of the dreaded infection, which we today know as gas bacillus infection. A few years later, in 1864, Perogoff described the same condition, calling it "primary mephitic gangrene." At the same time Salleron also wrote about it and reported sixty-five cases

observed during the Crimean War. From 1871-1880, Bonttini, Pasteur, Koch, and Gaffky, all wrote extensively about the disease, identifying as the causative factor the organism to which the name *Vibron Septique* was given by Pasteur, and *Bacillus of malignant edema* by Koch and Gaffky. It was not until 1891 that Welch (1) isolated from the human blood, in an autopsy study of general emphysema, the bacillus which now bears his name. This was the first conclusive evidence that the infection was due to the organism which he called *Bacillus aerogenes capsulatus*. Frankel, two years later, substantiated these findings and described a bacillus found in fatal phlegmon, which he called *Bacillus phlegmonis emphysematosae* and which proved to be the same organism that is now known as *Bacillus Welchii* or gas bacillus. Ever since, medical literature has contained a constantly increasing number of reports on the lesions and symptoms produced by this organism and on their occurrence in both civil and military practice.

Although *Bacillus Welchii* has been isolated in most cases of this infection there is still doubt in the minds of some writers whether this organism is the exclusive causative agent. From the standpoint of the clinician, eager to learn the best means of arriving at an early diagnosis, it seems safest to consider gas bacillus infection as a clinical entity of multiple etiology. In the majority of cases, however, *B. Welchii* is the potent factor; such other organisms as *Vibron Septique*, *B. oedematiens* and *B. fallax*, if present, being secondary and tending to increase the virulence of *B. Welchii*.

Simonds (2) found spores of *B. Welchii* in 100 per cent of the uniforms of the Belgian soldiers who came directly from the trenches. Taylor in analysing 216 cases of wounds, found that 130 cases, or 61 per cent, showed the presence of *B. Welchii*. Of these 130 cases, clinical symptoms of gas infection were present in 45 or 35 per cent. Vincent (4) recovered *B. Welchii* in 82 per cent of cases of gas gangrene during the war. Fleming (5) and Stoddard (6) made a very careful study of the subject and their results follow:

(1) Occurrence of *B. Welchii* in untreated wounds (Fleming).

TABLE I

No. of cases examined	Duration of wound (days)	B. Welchii Present	
		No. of cases	Percent
127	1-9	103	81 %
56	8-20	19	34 %
27	20	5	18.5%

(2) Incidence of gas infection in wounds after casualty clearing station treatment (Stoddard). Definite gas infection occurred in 2.9 per cent of all cases. Of the cases showing *B. Welchii* on culture it occurred in 13 per cent. Including slightly doubtful cases, the figure became 22.5 per cent.

These figures show that *B. Welchii* is the important organism concerned in the majority, at least, of cases of gas gangrene. Of the 17 cases which we report below from the Peking Union Medical College Hospital, *B. Welchii* was recovered in culture from every wound.

Realizing the importance and significance of the presence of *B. Welchii* in certain wounds, it may be well to review briefly the bacteriology of this organism so that it may be distinguished from other bacteria when occasion arises. *B. Welchii* is known by various names in different countries; in England, *aerogenes capsulatus*; in Germany, *Frankel Bacillus*; in France, *Bacillus perfringens*. It is a member of the saccharolytic group of the anaerobes, and is a short square-ended gram-positive bacillus, occurring singly or in pairs. It is non-motile and has a capsule. It grows best under strictly anaerobic conditions. Spore formation is inconstant and occurs only in alkaline media, never in pure culture in media containing a fermentable sugar or free acid. It ferments all the common sugars with the production of a large amount of gas and butyric acid. It is the most active fermenter in the saccharolytic group. The stormy fermentation of lactose in milk gives a characteristic reaction which identifies *B. Welchii* within 12-18 hours. It produces an exotoxin which is thermolabile and is composed of a hemolysin which destroys the red blood corpuscles and a myotoxin which apparently acts on the muscles. Bull (7), working with laboratory animals in 1917, succeeded in producing an active immunity and in obtaining an effective antitoxin serum. It was chiefly his work that opened the field of sero-therapy in this infection.

B. Welchii is widely distributed in nature. Its spores are very numerous in most soils. They have been found in garden earth, in dirt from the street, from the coal mines, and from laboratory floors. In cultivated and polluted soils, their number sometimes reaches 10,000 per gm. of soil. The organism has been isolated from sewage, from water, from fish, milk, cheese, and other miscellaneous food stuffs. It is a normal inhabitant of the gastro-intestinal tract of man although usually limited in its distribution to the cecum and colon.

The type of wound in which gas bacillus infection usually develops is a question of interest and importance from an etiological point of view. The accompanying table gives a brief summary of 314 cases collected from various sources—175 cases collected by Simond (8), 61 cases collected by Stewart (9), 36 cases reported by Koltz and Holman (10), 25 cases reported in the Bellevue series, and 17 cases from the Peking Union Medical College Hospital.

TABLE II

Type of wound	P.U.M.C. (17)	Stewart (61)	Bellevue (25)	Koltz & Holman (36)	Simond (175)	Total cases (314)	Per cent
Compound fractures	7	23	10	24	61	125	40 %
Extensive lacerated and crushed wounds	—	2	10	10	49	71	22.6%
Post-operative cases	2	14	2	—	11	29	9.2%
Gun-shot-wounds	4	7	2	—	10	23	7.3%
Following hypodermic injection	—	2	—	—	9	11	
Simple fracture	2	—	—	1	6	9	
Multiple injuries	1	—	—	1	3	5	
Following infusion	—	3	—	—	—	3	
No previous injury	—	6	—	—	4	10	
Unexplained	—	3	—	—	—	3	
Miscellaneous cases	1	1	1	—	22	25	
Total	17	61	25	36	175	314	

It is striking to note that in this series, 40 per cent of the cases of gas bacillus infection occurred in wounds complicated by compound fractures, 22.6 per cent in extensive lacerated and crushed wounds, and 9.2 per cent in post operative cases. It may be briefly stated that it is most commonly found in wounds in which great trauma has taken place, as in compound fractures, extensive lacerated wounds, or grinding accidents. In

such wounds, there is usually an injury of the muscle and a circulatory disturbance in the form of blood vessel injury, thrombosis or inflammatory swelling which interferes with nutrition. The circulatory disturbance leads to necrosis, the injured muscle provides a culture medium rich in fermentable carbohydrate, and the presence of dirt, bits of soiled clothing, fragments of bullet or shell provides the organism. These three conditions form a favorable environment for the immediate germination and rapid multiplication of the organism and the development of the disease. The infection is also more common in injuries of the fleshy part of the extremities and muscular parts of the body such as the buttocks. The scalp and the hands and feet are seldom involved.

TABLE III

	Simond J.P.	Stewart J.C.	Koltz and Holman	Belle- vue	P.U. M.C.	Total
No. of cases	175	61	36	25	17	314
Extremities involved in	105	49	35	24	11	224
					Percent	72%

As has been stated above, *Bacillus Welchii* grows best in devitalized muscle. The pathology is, therefore, limited chiefly to muscle destruction with production of acid and gas. The retention of gas causes sustained pressure with a resultant complete anemia of the muscle fibers, and gangrene is established by ischemia. Macroscopically, the affected muscle is black on the surface, firm and non-contractile. The fibers are widely separated from each other by air spaces. The muscle substance frequently crepitates and on section cuts like partly consolidated lung. There is usually no bleeding on cutting, though occasionally a small amount of thin hemorrhagic pus is seen along the muscle sheaths. In the skin one usually notices subcutaneous edema and crepitation, discoloration due to hemorrhage, and occasionally blebs containing thick hemorrhagic fluid. One should not fail to mention the peculiar and characteristic odor produced by this organism. Some describe it as heavy and sweet, others call it fishy. It is difficult to describe and difficult to forget. Of the eight cases that the writer has seen, in at least four of them the odor was the first thing that led to the suspicion of gas bacillus infection. Once the organ of smell

is impressed with this odor it never fails to help in making the diagnosis.

Microscopically, the bacteria are found most numerous distributed in the muscles and along the muscle sheaths. They are occasionally present in the muscular layer of the walls of the arteries in the neighbourhood of the infection. Less frequently they are found in the skin. McNee and Dunn (12) have shown that in the early stages there is a separation of the muscle fibers from the surrounding interstitial tissue with clear spaces between the fibers. The fibers stain irregularly and there is marked swelling of the nuclei. Later, individual fibers separate widely, the sarcolemma disappears, and finally the entire muscle fiber disintegrates and becomes gelatinous. The bacteria spread up and down the muscle in the interstitial tissue and later invade the fiber itself. Infiltration with leucocytes is a late phenomenon. In the blood vessels, as shown by Taylor, there is usually erosion or sloughing of the intima and loosening of the supporting tissue elements, which permits the escape of cells from the blood into the perivascular tissues. The skin shows subcutaneous edema, swelling of the connective tissue fibers, and vacuolar degeneration of the basal cells. Occasionally, there are deposits of blood pigment.

Clinically, the disease may be briefly divided into three stages. During the first stage three fundamental changes take place, namely: injury, infection and localized necrosis. This occurs within 10 to 30 hours after injury. The symptoms are slight rise of temperature, increase in pulse rate, slight headache, thirst, and as a rule swelling and pain in the wound. On examining the wound, one may notice some brownish discoloration and the skin is found under tension. There may or may not be crepitation. The characteristic odor may be present within 24 hours. If not properly checked the condition passes on into the second stage with progressive gas production, more circulatory disturbance, and increased toxicity. This takes place usually within two days after injury with pronounced increase of pulse rate, marked discoloration of the skin, much swelling and induration, marked crepitation and the characteristic odor. The infection by this time becomes generalized, and the patient looks toxic. When gas bacillus infection is once well established, its progress is rapid and destructive, and in a certain per-

centage of cases, even with proper and vigorous treatment, it proceeds to the third or final stage of profound toxemia and, frequently, septicemia and death.

Sometimes the progress of the infection may be arrested and eventually cured by early and proper surgical measures, or the open character of the wound may be originally such as to render the essential anaerobic growth of the organism a difficult matter. Thus one may see various stages of gas bacillus infection, depending upon the location and character of the wound, the time and nature of surgical interference, the efficiency of the after treatment, and the virulence of the invading organism.

With regard to symptoms, two interesting phenomena have been observed by most writers on gas bacillus infection: first, the temperature may be comparatively low and out of proportion to the rise of pulse; second, the degree of pain is apparently out of proportion to the appearance of the lesion. These manifestations, when present, should always make one suspect gas bacillus infection.

The diagnosis of this infection in the late stage is by no means a difficult matter, but we shall here discuss the factors by which an early diagnosis may be made. The length of time elapsed after injury is of first importance. All wounds are to be suspected and should be carefully watched for a period of one week. The complaint of pain in the region of the wound should always call for careful inspection, and a smear should be made and examined for gas bacilli. The type of wound is of importance. As has been mentioned, gas bacillus infection is essentially a disease of traumatized muscle. The most important single sign is SWELLING. Discoloration of the skin is a reliable sign in a fairly early stage. This, together with the presence of dead muscles and gangrene should always lead one to suspect gas bacillus infection very strongly. The presence of gas in the tissues can often be detected very early by auscultation with the bell of the stethoscope pressed against the suspected area while it is gently palpated with the fingers. The tense sensation of the swelling, the crepitation, and the escape of gas bubbles on pressure establish the diagnosis. At this stage the characteristic odor is present and roentgenologically gas bubbles may be seen in the tissues. When these cardinal signs—SWELLING, GANGRENE, CREPITATION, and ODOR are present one should never

wait for a positive culture report but should start appropriate treatment immediately.

A table is here presented to show the relative frequency of these various signs and symptoms in a series of 92 collected cases.

TABLE IV

Symptoms & signs	No. of cases positive	Percentage positive
Swelling	61	66%
Crepitation	60	65%
Gangrene	57	62%
Gas from wound	54	59%
Odor	50	54%
Discoloration of skin	50	54%
Pain in wound	32	35%

Discharge from the wound is rarely seen in a pure gas bacillus infection. If present, it is usually of a sero-sanguineous type unless the wound is secondarily infected with pyogenic organisms, a not uncommon occurrence. In our series, eleven cases were secondarily infected, due chiefly to the fact that the patients came in very late after injury.

The prognosis of this infection depends upon a number of factors; the character of the wound, its location, the presence or absence of injury of blood vessels and nerves, the time elapsed between the injury and treatment, and the kind of care at operation and afterwards. Early diagnosis is by far the most important factor in the prognosis, but the virulence of the invading organism, of course, should not be forgotten.

Statistics differ in regard to the morbidity of this infection. Vincent pointed out the frequency of the infection during the war, and recorded 1,851 cases among the wounded evacuated to the hospitals of France alone. Unfortunately he did not give the total number of injuries so that a more accurate estimate of the incidence can not be obtained. Gross (13), however, in 1916 observed 2,796 wounded soldiers of whom 101 or 3 per cent developed gas bacillus infection. During the same year he observed another series of 1,676 wounded men of whom only 1.9 per cent developed the infection. In 1918, Sieur and Mercier (13) reported that less than 0.5 per cent of the wounded developed the infection. Our figures correspond very closely

to this last figure. In 3,000 injuries we have had 17 cases of gas bacillus infection giving an incidence of 0.5 per cent. The condition is a rare one when compared to the number of injuries that actually occur. In the Bellevue Hospital from 1909-1911 there were 5,802 cases of trauma but only nine cases of gas bacillus infection, averaging one in 644, or 0.15 per cent.

Rare as the condition is, it carries a high mortality whenever it has opportunity to manifest itself. The following table gives the gross mortality of this infection, collected from various clinics.

TABLE V

	Irens Vincent	Koltz & Holman	Belle-vue Series	I. S. Simond	J. C. Stewart	Gross	Total
No. of cases	107	1851	36	25	175	61	2356
No. of deaths	28	615	15	11	79	34	839
Mortality	26.4%	33%	42%	44%	45%	55%	34%

We have had 17 cases of gas bacillus infection in the Peking Union Medical College Hospital of which 7 were fatal, giving a mortality of 41 per cent. From the above table we can easily see that the mortality varies a great deal in different clinics; from 26.4 per cent to 56.5 per cent. This marked variation is due to several factors, the most important of which are early diagnosis and the type of treatment used. Thus Lardennois, (13) in 1926, reported 500 cases with a mortality of only 15 per cent.

In cases where extremities are involved, amputation does not seem to reduce the mortality to any marked extent. The writer has collected and analyzed 92 cases—15 from the Peking Union Medical Hospital, 20 from the Bellevue series, and 57 from other scattered sources with this question in mind, (Table VI). Of these 92 cases there were 33 deaths giving a gross mortality of 35.9 per cent. These 92 cases were then divided into two groups, those treated radically by amputation, and those treated conservatively by incision and drainage. In the group treated by amputation there were 38 cases with 16 deaths, a mortality of 42.1 per cent. In the second group treated by incision and drainage, there were 54 cases with 17 deaths, a mortality of 31.5 per cent. It may be stated that the cases

treated with incision and drainage were just as severe as those treated by amputation. This finding agrees with the report of most writers on this subject. For instance, Gross, in 1916, reported 72 amputations among his 101 cases of gas bacillus infection with a mortality of 52.7 per cent.

TABLE VI
Analysis of 92 cases

Treatment	Number	Deaths	Mortality
Incision and drainage	54	17	31.5%
Amputation	38	16	42.1%
Total	92	33	35.9%
Bacillus Welchii isolated in 70 cases=76%			

As in the treatment of other diseases, prophylaxis is of the greatest importance. All wounds contaminated by soil or dirt-covered objects should be treated as if infected with gas bacillus. An attempt should be made to remove or destroy the bacteria present in the wound and deprive them of their necessary soil, the dead muscle. Precautionary measures against gaseous distension may be accomplished by keeping the wound open, avoiding if possible heavy dressings or casts and keeping the leg or arm in extension when fracture is present. These steps combined with thorough cleansing of the wound, removal of all foreign bodies, and repeated irrigation of the wound with an antiseptic solution active against gas bacillus, complete the prophylactic treatment.

When gas bacillus infection is diagnosed, treatment should be started immediately. In early cases the entire area of devitalized tissue should be resected and the wound left wide open. In late cases where massive gangrene has occurred and when the patient is in a profoundly toxic condition, immediate liberation of all the areas involved should be done by multiple incisions and resection of the affected muscles. The resection should be continued until normal muscle, having normal color, good contraction, and adequate blood supply is reached. When extremities are involved there is always a debate in the mind of the surgeon whether to use conservative operative treatment as outlined above, or to amputate the extremity in an effort to save the patient's life. Formerly, the rule was to amputate high above the involved tissues as soon as the diagnosis was made.

The experience of Frankau and most other workers, substantiated by reliable statistical data, has shown that conservative treatment, if carried out properly, gives as low a mortality with less mutilation. As amputation does not seem to be a factor in reducing the mortality, conservative treatment should always be resorted to when possible, thus giving the patient the chance of having a useful limb for the rest of his life.

The kind of anesthesia to be used is worthy of consideration. Without any doubt local or block anesthesia should be used whenever possible. For the lower extremities spinal anesthesia was satisfactory in every case of our series, and for the upper extremities we have found the use of brachial block very desirable. If these cannot be utilised, gas and oxygen anesthesia should be the choice.

The post-operative treatment should be directed toward two main objects: first, care of the local injury; and second, the building up of the general condition. The dressings should be reduced to an absolute minimum; that is, only one or two layers of gauze placed over the wound so as to allow free access of air, and, if possible, sunshine to the wounded region. The wound should be repeatedly irrigated with an antiseptic solution which tends to relieve rapidly the tense, engorged tissues, while at the same time acting as a bactericide.

Following the idea of using a hypertonic salt solution and a solution of quinine and acetic acid to promote analgesia as well as for its germicidal properties, Pilcher (15) has used a quinoformol solution with good results.*

*Pilcher's quino-formol solution has the following composition:

Quinine sulphate	1.00 gm.
Hydrochloric acid	0.50 c. c.
Glacial acetic acid (90%)	5.00 c. c.
Sodium chloride	17.50 gm.
Formol (40%)	1.00 c. c.
Thymol	0.25 gm.
Alcohol (90%)	15.00 c. c.
Aqua q.s. ad.	1000.00 c. c.

Formol is used for its bactericidal properties, synergised by the alcohol necessary to get the thymol into solution. The solution is prepared by: (1) dissolving the quinine in the hydrochloric acid and acetic acid, (2) dissolving the sodium chloride in water, and (3) dissolving the thymol in alcohol. Solution 1 is added to solution 2, then the formol is added and finally the thymol.

This solution is actively inhibitive and destructive to both anaerobic and aerobic bacteria, is non-irritating, perfectly stable, easy to prepare, and mildly deodorant. It gives little danger of secondary hemorrhage as it has no proteolytic property. With the use of this solution a definite flow of fluids from the tissues into the dressing takes place, and a rapid reduction of the edema and cessation of pain result. Its use is limited, however, to the first two or three weeks. By this time, the infection is usually under control, and the wound well covered with granulation tissue. The use of a surgical solution of chlorinated soda (Dakin's solution) is then indicated. We have recently made use of this solution of Pilcher's with very satisfactory results. In cases with extensive wounds of the extremities the use of Pilcher's solution is advantageous as it does not call for protection of the skin and the patient seems to have less pain than with Dakin's solution.

Great care should be taken to prevent the wound from becoming secondarily infected, as mixed infection tends to delay healing and convalescence. When the infection clears up, the wound edges can be approximated by secondary closure or skin-grafted by the Reverdin method.

The general post-operative care of the patient does not go beyond the usual measures of rest, fluids and food. During the first two weeks patients should be given sufficient morphia to keep them comfortable and give them rest. They should be given an abundance of fluids by mouth, per rectum, subcutaneously, and intravenously when indicated. Blood transfusions are very helpful when proper donors are available. Patients should be given liquid food in the beginning, shifting gradually to soft, light, and then full diet. The bowels should be kept open by cathartics or enemas. Sodium bicarbonate may be given for alkalization of the tissues since the organism thrives in an acid medium.

We shall not discuss the use of serotherapy in this paper, as we have had no specific serum available, and have consequently had no experience with its use. Many writers claim that it is a very valuable aid both in the prevention and treatment of this disease.

While the above principles underlying the treatment of this infection are simple, the method and the extent of their applica-

tion in any individual case should always be weighed in the judgment of the surgeon.

REPORT OF 17 CASES

Treated in the Peking Union Medical College Hospital.*

Case 1. K. J. C., a man aged 35, was admitted to the hospital on May 2, 1922. The history could not be obtained, as the patient was admitted in a stuporous condition. The left orbit was badly wounded with complete disorganisation of the eyeball. There was a large open skin wound in the adjacent temporal region, exposing brain substance. Roentgenologic examination showed a foreign body in the floor of the frontal fossa.

Under general anesthesia, the left eyeball was removed and the orbit packed with vaseline gauze. The wound in the left temporal region was sutured with catgut. Foul odor was noticed at the time of the operation. The day following operation, pus with a foul odor was noticed escaping from the scalp wound. The patient was somewhat irrational. Two days later, culture from the discharge showed a growth of *Bacillus Welchii*. Irrigation of the wound with a surgical solution of chlorinated soda (Dakin's Solution) was started but the patient died the next day, apparently from gas bacillus infection.

Discussion: From the description of the local wounds and from the general reaction of the patient the infection was well established at the time of admission, but was not recognised until the cultures were reported two days later.

Case 2. S. C. Y., a boy aged 15, was admitted to the hospital on March 19, 1923. The boy had sprained his ankle 23 days before admission. The ankle became swollen and in six days became very red. After the local application of some drug the condition grew worse and blisters formed. Two days later the skin beneath the blisters became black and sloughed away at the edges. General swelling of the whole leg followed. On the outer side of the left ankle there were two large ulcerated areas separated by a bridge of skin. The skin on the dorsum of the foot was discolored and there was marked redness and swelling of the whole leg up to the knee.

Amputation through the ankle was done under ether anesthesia. A culture taken at the time of operation gave growths both of gas bacillus and of hemolytic streptococcus. Two days after operation a foul odor was noticed and there was black sloughing on the surface and in the muscles. The patient gradually became very toxic, with a temperature over 39°C. Finally, five days after the first operation, the leg was amputated through the thigh under gas and oxygen anesthesia, but the patient died two hours after operation.

*Cases 10 to 17 inclusive came under the personal observation of the writer.

Discussion: The clinical picture in this case was undoubtedly complicated by the presence of a hemolytic streptococcus. This mixed infection may have had a great deal to do with the early death of the patient as there were no frank signs of an advanced gas bacillus infection. As a matter of fact Meleney (16) included this patient in his series of cases of hemolytic streptococcus gangrene.

Case 3. C. Y. S., a man aged 21, was admitted to the hospital on March 27, 1924, because of congenital club feet. One foot was operated on and the wound healed in a week. He was readmitted to the hospital on September 24, 1924, for operation on the other foot, which was done on September 27, 1924, and a cast applied.

The first day following operation the patient complained of numbness of the toes which on inspection were found to be swollen and purplish in color, with loss of skin sensation. Subcutaneous hemorrhage and blisters appeared in the skin and the temperature was high. The cast was removed and the wound was laid wide open. Culture was positive for gas bacillus. Amputation through the middle of the leg was done under gas and oxygen anesthesia. The stump was left open and treated with a surgical solution of chlorinated soda. The patient gradually recovered and the stump was covered with skin grafts a month later.

Discussion: The changes in the foot in this case were thought to be due to injury of the posterior tibial artery at the time of operation, as the region supplied by the dorsalis pedis remained fairly well nourished. This disturbance of the circulation served as a predisposing factor and provided the organism with an ideal culture medium.

Case 4. J. H. O., a man aged 49, was admitted to the hospital on April 14, 1924 for thrombo-angiitis-obliterans of the left leg with gangrene of the toes. Amputation through the middle of the leg was done and the stump was closed. The day after operation the stump was swollen and red, and there was gangrene of the skin flaps. Definite crepitation and foul odor were noticed. Gas bacillus infection was strongly suspected and culture was positive for the organism. By the afternoon of the same day, the swelling, redness and crepitation had extended up to the knee. The stump was laid wide open and treated with a surgical solution of chlorinated soda. The infection gradually cleared up and the patient was discharged two months after the first operation with a useful stump.

Discussion: This was another case of gas bacillus infection occurring in devitalized tissues. Fortunately the condition was recognized at the very beginning and early conservative treatment effected a cure.

Case 5. F. Y., a man aged 35, was admitted to the hospital on December 15, 1924. He had been run over by a motor car seven days before admission, sustaining a fracture of both legs. Both fractures were compound and there was gangrene of both lower extremities. The muscles looked edematous and black, and exuded gas on pressure.

Under ether anesthesia, amputation through both thighs was done, and the stumps were left wide open. Cultures were positive for gas bacillus. The patient ran a septic temperature for three weeks, during which time he developed a staphylococcus aureus bacteremia and had two blood transfusions and one intravenous injection of 30 c.c. of 1 per cent solution of gentian violet. These together with vigorous irrigation of the wound controlled the infection.

Discussion: The amputation in this case did not get rid of the infection which required two other radical incisions before it was cleared up. It is rather remarkable that this patient, with a bacteremia and a far advanced gas bacillus infection, survived.

Case 6. C. C. W., a man aged 28, was admitted to the hospital on December 13, 1925. He had been injured by an exploding shell three days before admission, sustaining a compound fracture of the tibia and fibula, lacerated wounds of the crural region, and there were pieces of foreign body in the soft tissues of the leg. The wounds were badly infected and the patient looked toxic.

Under spinal anesthesia, incision and drainage of abscesses of the leg was performed. Two days after operation foul discharge from the wound was noticed and black sloughing was also present. Amputation was done through the lower third of the leg and the stump closed. Two days later pus was noticed in the stump, escaping between the stitches. A day later there was swelling and redness. All the stitches were then removed and the wound was irrigated with a surgical solution of chlorinated soda. Later, crepitation was present and multiple incisions were made. The patient died the next day. Gas bacillus was reported to have grown from the culture of the discharge and from the muscle excised at the time of operation. The patient's blood culture was positive for hemolytic streptococcus.

Discussion: Looking back on this case there are several questions to be discussed from the standpoint of treatment alone. When the case came in three days after injury, with a compound fracture of both bones of the leg, and with wounds very badly infected, should not the leg have been amputated immediately? The writer is not in a position to answer this question as one can never decide without personally seeing the patient. However, if conservative treatment was the method

of choice, the leg certainly should have been kept in traction, not only on general principles but also for the important purpose of preventing gas distension if the wounds were contaminated with gas bacillus. There should further have been no hesitation, at the time of amputation, three days later when definite evidence of gas bacillus infection was present, in leaving the stump wide open. It was not until three days after the operation, when the infection was already generalized, that the stitches closing the stump were removed. Error in judgment played some part at least in the fatal outcome of this case.

Case 7. W. T. C., a man aged 21, was admitted to the hospital on December 29, 1925 with multiple bullet wounds of the left leg received seven days previously. There were retained foreign bodies, fracture of the patella and tibia, and the entire leg was greatly swollen and tender.

A debridement was done under ether anesthesia on the day of admission. Tissue removed at the time of operation gave a growth of *B. Welchii*. The condition did not improve after the operation and amputation was advised. This was refused and the patient was discharged against advice.

Case 8. C. Y. S., a man aged 28, was admitted to the hospital on March 8, 1926 with a gun shot wound of the right inguinal region sustained three days previously. There was an infected entrance wound over the right lower quadrant of the abdomen from which came a thin, bloody discharge. The right thigh was swollen and red. Some crepitation beneath the skin could be felt around the wound. The foreign body was retained. There was a fracture of the ilium.

On March 9, 1926, under ether anesthesia, a debridement of the gun shot wound was done with removal of the foreign body. Culture taken at the time of operation was positive for *B. Welchii* and for streptococcus hemolyticus. Blood culture was also positive for the latter organism.

Under vigorous irrigation of the wound with a surgical solution of chlorinated soda the infection cleared up and cultures became negative by March 17, 1926. Unfortunately the patient developed a chronic suppurative osteomyelitis for which he stayed in the hospital for five months before he was discharged in good condition.

Case 9. C. T. C., a man aged 24, was admitted to the hospital on March 18, 1926, for a gunshot wound received two hours before admission. There was a penetrating wound on the posterior aspect of the region of the left shoulder. The foreign body was retained, and there was swelling and a hematoma under the skin.

On March 19, 1926 with the patient under gas and oxygen anesthesia, a debridement of the gun shot wound was done and the wound was closed without drainage. A piece of muscle and the foreign body were sent for

culture, and *B. Welchii* was reported. One day after operation the wound was found to be infected and crepitation was present. The wound was opened and irrigation with a surgical solution of chlorinated soda was started. The condition gradually improved and the patient was discharged well three months after admission.

Case 10. S. T. C., a man aged 60, was admitted to the hospital on February 12, 1928. He had been shot by a bandit sixteen hours before admission, the bullet going through the right arm near the wrist. There was profuse bleeding which had been stopped, to some extent, by packing the wound with cloth. The patient was very pale. There was a compound fracture of the bones of the right forearm with the distal portions held in place by a few tendons.

On admission, amputation was done through the middle third of the forearm under brachial block anesthesia. The muscles were found to be slightly edematous. In spite of this, however, the stump was closed. On the next day the temperature was 40.6°C. and the pulse 153. Inspection of the wound showed that the skin was black, there was air bubbling from the suture line on pressure, and there was definite crepitation around the stump. The patient looked very toxic. A smear from the wound showed great numbers of gas bacilli. Roentgenologic examination showed that the stump was extensively infiltrated with gas up to the elbow joint. Under brachial block anesthesia the stump was reamputated through the upper arm and the wound was left wide open. Both temperature and pulse came down on the next day and the patient had a smooth convalescence.

Discussion: When this patient came in sixteen hours after injury the infection had already gained a foothold as shown by the edematous condition of the muscles at the time of the first operation. If the stump had been left open at that time the patient would probably have had a different post-operative course.

Case 11. S. C. K., a man aged 28, was admitted to the hospital on July 6, 1928, for a gun shot wound of two days duration. There were multiple small punctured wounds on the chest wall, arm, forearm, and hand, with numerous foreign bodies retained. There was marked swelling of the hand and pain was present. Culture was positive for *B. Welchii*.

The hand was chiefly concerned in this case. Realizing the mild nature of the infection in this region, conservative treatment was instituted, including hot soaking, constant dressing of the wounds with a surgical solution of chlorinated soda, and removal of foreign bodies. The patient had a smooth convalescence.

Discussion: This case illustrates the fact that when the infection occurs in the hand it usually assumes a mild form due to the compact structure of the hand and to the lack of depth

and of muscle tissue, two factors so essential for the growth of this organism.

Case 12. L. H. C., a man aged 25, was admitted to the hospital on September 30, 1928 with a gun shot wound of seven days duration. There was a through-and-through gun shot wound of the chest wall. The wounds were badly infected and a foul odor was present. There was gangrene of the skin. The entire abdominal wall and part of the chest wall were edematous and redness and crepitation were present all over this area. The patient was delirious and looked as if he might die at any minute.

Because of the extensive involvement of the abdominal wall and the grave general condition of the patient no operation was performed. He died two days after admission. *B. Welchii* was isolated from the discharge.

Discussion: The patient was undoubtedly in a late terminal stage of gas bacillus infection at the time of admission. Could he have been cured by multiple incisions? The opinion at the time was that he would not survive the necessary operative procedures.

Case 13. C. F. S., a man aged 21, was admitted to the hospital on September 30, 1928 with a gun shot wound of the pubic region sustained six days before admission. There was a badly infected lacerated wound of the scrotum and penis with a compound fracture of the pubis.

Two days after admission gangrene was present and a typical odor was noticed. Culture was positive for gas bacillus. The wound was treated accordingly and the gas bacillus infection was easily controlled. Unfortunately the wound was secondarily infected with hemolytic streptococcus which finally invaded the blood stream, causing the death of the patient six and a half weeks after the original injury.

Discussion: The infection caused by the gas bacillus was completely brought under control by the combined use of multiple incisions and irrigation with Pilcher's solution, followed, after two weeks, by the use of a surgical solution of chlorinated soda. The secondary infection complicated the condition and finally caused the death of the patient. His blood taken on the day before death gave a growth of 2,800 colonies of hemolytic streptococcus per cc. of blood. Fatal cases of gas bacillus infection rarely last longer than two weeks.

Case 14. C. T. H., a man aged 29, was admitted to the hospital on October 27, 1928 with multiple shell wounds of the buttock received two hours before admission. There were multiple punctured wounds over the back and the buttocks and many foreign bodies and much dirt in the wound.

Under gas and oxygen anesthesia a debridement of the large wound was done and the wound closed. Inspection the next morning showed a small amount of pus and gas bubbles escaping on pressure from each of the small punctured wounds. The typical odor was present. Examination of smears of the discharge showed the presence of gas bacilli. Crepitation was also present. The stitches were removed and all the wounds were irrigated with Pilcher's solution. Death occurred six days after injury. The small punctured wounds were scattered over the entire back, and were all deep and infected.

Discussion: This case shows that, when conditions are favorable, the development of gas bacillus infection is rapid and that all the cardinal signs may be present within twenty four hours.

Case 15. L. H. H., a man aged 22, was admitted to the hospital on September 29, 1928, with a gun shot wound received six days previously. There was a badly infected wound over the right lumbar region and gangrene of the skin.

With the patient under gas and oxygen anesthesia the dead tissue was excised. The infection had spread both anteriorly toward the abdominal wall and posteriorly to the back of the chest. An extensive degree of gangrene and a strong odor were noticed at the time of the operation. Culture was positive for gas bacillus. The wound was irrigated with Pilcher's solution and became clean in a few days.

Discussion: The open character of the wound and the early treatment were the two important factors determining the outcome of this case. The use of Pilcher's solution for post-operative treatment worked with great satisfaction.

Case 16. K. C. S., a man aged 37, was admitted to the hospital on September 30, 1928 with a wound received ten days before admission. There was a through-and-through gun shot wound in the gluteal region infested with maggots. There was redness and swelling.

Cultures were positive for gas bacillus. The wound was treated by incision and the patient had a smooth convalescence.

Case 17. C. H. C., a man aged 24, was admitted to the hospital on June 1, 1928 with a gun shot wound of the abdominal wall of seven days duration. The wound had been left open for about fourteen hours and then bandaged up without any treatment. For three days there had been no dressing done. Maggots were present on the fourth day. Physical examination showed a large wound over the left lower quadrant of the abdomen with much gangrene of the tissues. There was edema and redness of the surrounding skin. The abdomen was distended. No crepitation was present.

With the use of compresses of hypertonic (20%) salt solution the maggots disappeared within twenty four hours. The gas bacillus infection

was not recognized until five days after admission when it was already far advanced. The patient died three days later in spite of radical operative treatment. *B. Welchii* was isolated from the discharge.

Discussion: Could this case have been saved by early operation? The writer, having had direct charge of this case, has asked himself this question many times.

In addition to these seventeen cases of gas bacillus infection in the Peking Union Medical College Hospital, another case is of interest in this connection. A boy of nineteen was admitted to the emergency ward on December 7, 1928 for multiple incised wounds of the scalp, face, shoulder region, and forearm received three days previously. The right hand was almost completely amputated at a level just above the wrist joint. The muscles looked black and dead. It was surprising to note that although the injury was of three days duration and no antiseptic treatment had been instituted, there was no sign of pyogenic infection and no discharge from the wound. Under gas and oxygen anesthesia the amputation was completed at the site of injury, a debridement was done including a total excision of all dead muscle and skin, and free incisions were made until normal looking muscle was reached. The wound was left open and was dressed loosely. A swab was sent for culture from which no organisms were grown. A piece of muscle was also sent from which *B. Welchii* was isolated. The patient's temperature gradually came down, and examination of the stump five days after operation showed that the wound was very clean and healthy. There was no swelling, no discoloration of the skin, and no tenderness around the wound.

The writer feels sure that had the stump been closed at the time of operation this patient would certainly have developed a gas bacillus infection which might have endangered his life. This dreadful infection was therefore avoided by excising all the dead tissue and laying the wound wide open, thus breaking the vicious circle.

SUMMARY AND CONCLUSIONS

During the eight months between February and October, 1928, the writer had the opportunity of observing and treating eight cases of gas bacillus infection in the Peking Union Medical College Hospital. With this comparatively frequent occurrence of an infection which usually carries a high

Table VII Summary of Cases Treated in the P. U. M. C. Hospital

Case	Initial injury and region involved	Fracture C - Comp. S - Simple	P. S.	B.W. light present	Discoloration of skin	Gangrene	Crepitation	One	Other	Swelling	Pain	Discharge from wound	Operation A - Amp. I - Inc. & drain.	Outcome D - Death R - Recovery
1	G.S.W. orbit and forehead	C	+	+	-	-	-	-	+	-	-	+	I	D
2	Sprain of ankle	-	-	+	+	+	-	-	+	+	+	+	A	D
3	Post-op. wound leg	-	-	+	+	+	-	-	-	+	-	+	A	R
4	Post-op. wound leg	-	-	+	-	+	+	+	+	+	-	-	I	R
5	Cut and wound leg	C	-	+	+	+	+	+	-	+	-	+	A	R
6	G.S.W. leg	C	+	+	-	+	+	-	+	+	-	+	A	D
7	G.S.W. leg	C	+	+	-	-	-	-	-	+	+	+	-	I
8	G.S.W. groin	S	+	+	-	-	+	-	+	-	-	+	I	R
9	G.S.W. shoulder	S	+	+	-	-	+	-	-	+	-	-	I	R
10	G.S.W. arm	C	-	+	+	+	+	+	+	+	-	-	A	R
11	G.S.W. arm and hand	C	+	+	+	+	-	-	+	+	-	-	A	R
12	G.S.W. abdomen	-	-	+	+	+	+	-	+	+	+	+	-	D
13	G.S.W. pubic region	C	+	+	+	+	-	-	+	+	+	+	I	D
14	Multiple G.S.W. buttock	-	+	+	+	+	+	+	+	+	-	-	I	R
15	G.S.W. abdominal wall	-	+	+	+	+	-	+	+	+	-	+	I	R
16	G.S.W. thigh and buttock	-	+	+	-	-	-	-	+	+	+	+	I	R
17	G.S.W. abdominal wall	-	+	+	+	+	-	-	+	+	+	+	I	D

mortality, the importance of a thorough understanding of the condition became apparent. The foregoing study was therefore made, including:

(1) A review and analysis of ninety two cases of gas bacillus infection from the standpoint of etiology, symptomatology, and treatment.

(2) A report of seventeen cases from the Peking Union Medical College Hospital.

From this brief study the following points may be emphasized:

(1) Gas bacillus infection is chiefly an infection of traumatized muscle, occurring most frequently in compound fractures and in extensive and deeply lacerated wounds.

(2) As the type and location of the wound varies, different grades of gas bacillus infection are seen. The virulence of the invading organism also plays a part.

(3) The cardinal symptoms and signs of this infection are: swelling, pain, discoloration of the skin, crepitation, gangrene, escape of gas from the wound, and foul or peculiar odor. These may be present in a given case within twenty four hours after injury if conditions are favorable.

(4) The proper treatment of this infection requires: (a) an early diagnosis, (b) an immediate operation, and, (c) a continuous irrigation of the wound with some antiseptic solution following operation.

(5) The question of amputation should be considered only from an anatomical and functional point of view; the degree of the infection and the general condition of the patient are not factors to be considered in the choice of the type of operative treatment to be instituted. Adequate debridement and wide incisions generally give better results than does amputation.

(6) For continuous irrigation of the wound, the use of Pilcher's solution supplemented later by a surgical solution of chlorinated soda (Dakin's solution) is recommended highly.

REFERENCES

1. Welch and Nuttall: A Gas Producing Bacillus Capable of Rapid Development in the Blood-Vessels after Death, *Bull. Johns Hopkins Hosp.* No. 3, 81, 1892.

2. Simond, J. P.: Studies on *Bacillus Welchii* with Special Reference in Gas Gangrene, *J. Exp. Med.* 25: 819, 1917.
3. Taylor, K.: Observations on the Pathology and Bacteriology of Gas Gangrene, *J. Path. and Bacteriol.* 20: 384, 1916.
4. Vincent: Quoted by Joseph, M. in: *The Prophylaxis of Gas Gangrene in Civil Surgery*, *Ann. Surg.* 87: 772, 1928.
5. Fleming, A.: *The Bacteriology of Septic Wounds*, *Lancet*, 2: 638, 1915.
6. Stoddard, J. L.: The Occurrence and Significance of *Bacillus Welchii* in Certain Wounds, *J.A.M.A.* 71: 1400, 1918.
7. Bull, C. G.: Toxin and Antitoxin of and Protective Inoculation against *Bacillus Welchii*, *J. Exp. Med.* 26: 119, 1917.
8. Simond, J. P.: Studies in *Bacillus Welchii*, *Rockefeller Monograph*, No. 5, 1915.
9. Stewart, J. C.: *Anerobic Cellulitis*, *J.A.M.A.* 45: 528, 1905.
10. Koltz and Holman: Infection by the Gas *Bacillus* in Coal Mines, *J. Infect. Dis.* 9: 251, 1911.
11. Cramp, W. C.: A Consideration of Gas *Bacillus* Infection with Special Reference to Treatment, *Ann. Surg.* 56: 544, 1912.
12. McNee and Dunn: The Method of Spread of Gas Gangrene into Living Muscle, *B. M. Jour.* 727, 1917.
13. Gross, Sieur and Mercier, and Lardennois: Quoted by Van Beuran, F. J. in: *Treatment of Gas Bacillus Infection*, *J. A. M. A.* 73: 239, 1919.
14. Frankau, Drummond and Neligan: The Successful Conservative Treatment of Early Gas Gangrene in Limbs by the Resection of Infected Muscles, *B. M. J.* 1: 729, 1917.
15. Pilcher, J. T.: Gas Gangrene, with Special Reference to its Treatment, *Ann. Surg.* 81: 198, 1925.
16. Meleney, F. L.: Hemolytic *Streptococcus* Gangrene, *Arch. of Surg.* 9: 317, 1924.

SYPHILITIC OCULAR DISEASES AMONG THE CHINESE

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In taking up this most comprehensive subject of syphilitic ocular disease among the Chinese, the writer, however, does not attempt in any way to cover the various aspects of the entire field, but simply wishes to discuss the types of this disease that are frequently found in China, and to report some interesting

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cases, among the Chinese, with the hope that it may stimulate future workers to secure more definite data on the subject, and to show more clearly the relationship of the disease between the Chinese and other peoples. Literature on this subject is of such immense quantity that reference in the following pages will be very limited.

Syphilis has been known in China for several centuries, and became very prevalent in the Ming dynasty, when accurate description of the disease was given by all medical workers, *Wong* (39). In recent years *Sia* (27), *Snell* (28), *Tsen* (33), *Korns* (18), and *Lennox* (19) have made extensive studies and are of the opinion that syphilis is very prevalent at present as well. The reports of the routine Wassermann tests made on Chinese inpatients by *Sia* and *Snell* give the percentages as high as 24% and 39% respectively. The comparison of the incidence of syphilis of both in and out patients in China with that in America as made by *Lennox* shows 8.4 against 2.5 for inpatients and 6.1 against 3.1 for outpatients. In view of these striking figures a thorough study of this disease would be of special interest to the ophthalmologist now working in China. A search of the P.U.M.C. eye records, numbering 23,713 of last seven years, was recently made on both in and out patients, and a number of 380 cases diagnosed as most probably of syphilitic origin was found to have a strongly positive reaction of Wassermann test. This should furnish sufficient material to facilitate our study.

It must be borne in mind that the positive finding of a Wassermann test on outpatients who are suspected of having a disease of syphilitic origin, such as iritis, should never be accepted without reservation. In the first place, tuberculosis or other focus of infection may play a great role in those cases at the same time, and in the second place, owing to lack of sufficient visits of the patient to the clinic no antisyphilitic treatment could be given to prove its syphilitic origin. The inpatients are naturally more accurately studied than the outpatients and a therapeutic test can always be tried. A certain number of cases of the present material give a positive reaction to tuberculin test as well as the positive test of Wassermann, the former, as we know, being very frequently the factor of the disease which gives almost the same clinical picture as syphilis. Therefore, it is by no means a complete proof of syphilis although

a positive reaction of Wassermann test is found. Nevertheless it may give some general information indicating the most probable frequency of syphilitic lesions incurred in our daily hospital practice. It is to be noted that the records of foreign patients are purposely omitted.

TABLE I.

Lids and Conjunctiva

	<i>Number of Hospital Cases</i>	<i>Number of O.P.D. Cases</i>	<i>Total</i>
Chancre of Lid	1	1	2
Gumma of Lid (one with Keratitis c Lagophthalmos and Atrophy Bulbi)	2	1	3
Secondary Syphilitic Ulcer of Lid, o.s.	1	2	3
Gumma of Conjunctiva	1	—	1
			9=2.3%

Lacrimal Organ

Gumma of the Lacrimal Sac Region	1	—	1=0.3%
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Cornea and Sclera(a) *Typical syphilitic lesions:—*

Deep Punctate Keratitis	—	3	3
Deep Scleritis	—	1	1
Interstitial Keratitis, Acquired	12	17	29
Interstitial Keratitis, Congenital	15	10	25
Keratitis Profunda	—	6	6
Keratitis Profunda Pustuliformis	1	—	1
Sclerosing Keratitis	1	1	2

(b) *Corneal lesions found in patients with positive Wassermann:—*

Atypical Catarrhal Ulcer	3	—	3
Episcleritis	—	2	2
Intercalary Staphyloma	—	1	1
Herpes Zoster	5	—	5
Neuroparalytic Keratitis	1	1	2
Staphyloma Sclerae with Central Retinitis	1	—	1
Superficial Marginal Keratitis	—	2	2
			83=21.8%

Iris and Ciliary Body

Cyclitis	1	—	1
Hypopyon Iridocyclitis	5	3	8
Iridocyclitis	19	30	49
Iritis	34	42	76

134=35.3%

Retina, Choroid, and Vitreous

Sclerosis of retinal vessels	8	—	8
Central Retinitis	1	—	1
Chorioretinitis	2	2	4
Choroiditis	2	2	4
Exudative Retinitis	1	—	1
Exudative Choroiditis \bar{c} Detachment of Retina	1	—	1
Haemorrhagic Retinitis	4	—	4
Retinitis Proliferans	—	1	1
Retinitis Syphilitica (typical)	2	2	4
Vitreous Opacities	1	5	6

34=8.6%

Optic Nerve

Choked Disc	5	—	5
Neuroretinitis	6	—	6
Optic Neuritis	1	4	5
Papillitis	2	1	3
Primary Optic Atrophy	12	27	39
Retrobulbar Neuritis	2	1	3
Secondary Optic Atrophy	6	17	23
Secondary Optic Atrophy, Hemianopsia, o.d.	1	—	1

85=22.4%

Ocular Muscles

Argyll Robertson Pupil	5	4	9
Paresis of Convergence	1	—	1
Paralysis of 6th	—	3	3
Paralysis of 3rd, Ptosis	1	—	1
Paralysis of 3rd, 4th, 6th	3	—	3
Paresis of Internal Rectus	1	1	2
Paralysis of 3rd, 4th	5	1	6
Paralysis of 4th, 6th	—	1	1
Paralysis of 3rd, 6th, Ptosis	2	—	2
Paralysis of 3rd, Paresis of 4th, Ptosis, o.d.	—	1	1
Paresis Orbicularis and 3rd	1	—	1
Ophthalmoplegia Totalis	—	1	1

32=8.7%

<i>Orbit</i>			
Retrolubar Syphiloma, Optic Atrophy o.d. Exophthalmus, Ophthalmoplegia Totalis	1	—	1
Syphiloma of Orbit	1	—	1
			2=0.5%

TABLE II.
The incidence of syphilitic ocular diseases

<i>Occupation</i>	<i>Inpatient</i>	<i>Outpatient</i>	<i>Total</i>	<i>%</i>
Scholar	27	31	58	15.2%
Farmer	12	4	16	4.2%
Labourer	30	35	65	17.1%
Merchant	33	25	57	15%
Soldier	48	42	90	23.7%
Females	26	24	50	13.1%
Nil	19	24	43	11.3%
Total	195	185	380	

Table 1 shows the distribution of lesions of both in and out patients under the following headings: Lids and conjunctivae, Lacrimal organ, Cornea and sclera, Iris and ciliary body, Choroid and retina, Muscles, Optic Nerve, and Orbit.

It is unquestionable that occupation plays a great part in syphilitic infection. *Table II* shows the incidence of ocular syphilitic disease with reference to *occupation* which is roughly classified as follows: Scholars, farmers, labourers, merchants, and military men. Women are under one classification by themselves, and persons with no definite occupations at the time of examination are also classified by themselves. The highest percentage of eye cases suffering from syphilis is found in the military class, especially during and after war time, a fact which has been pointed out by many authors, indicating naturally the low moral character of this class of people.

It is generally known that the incidence of syphilis is usually higher in males than in females, but the lower percentage

Note:—The Tables in this paper are published as received. There are one or two small discrepancies in them which hardly affect the percentages given.—*Editor*.

of females shown in our table here has no bearing on this matter, as the percentages are for all patients combined and not for males and females separately and respectively. Since the female patients who were admitted in the Eye Clinic are so small in number, the figure shown in *Table II* naturally does not give the real percentage at all of the syphilitic ocular diseases of the female patients of the Chinese population.

The following is a short account of the lesions under different headings:

I. LID AND CONJUNCTIVAE

Men with large practice as *Hamburger* (12) never saw a single case of eye chancre in 16,616 cases. *Wilbrand* and *Staelin* (37) observed 200 syphilitic eye cases, but no primary sore of the eye was ever found. *Hahn* (11) stated that he had not seen one eye case out of 307 extragenital primary affections. However, *Terson* (32) of France observed 8 lid chancres in 15 years, *Wolfrum* and *Stimmel* (38) of Germany 2 in 5 years, and *Igersheimer* (16) 3 in 5 years. The largest number ever recorded by *Munchheimer* (24) was 463 chancres of the eye found in 10,265 cases of extragenital chancres (4.15%), and *Posey-Korschitz* (26) described 130 eye chancres out of 888 extragenital primary affections in Russia.

In P.U.M.C. there were only three cases recorded during the last 7 years, one of which happened to be a foreigner, primary chancre of palpebral conjunctiva, reported by Dr. *Ling*. This case was omitted in the table. Another was a woman who appeared in the clinic only once. The third case was proved by dark field examination for spirochetes, Wassermann test and therapeutic effect, besides the clinical characteristics and the definite history of exposure, a brief report of which is described below:

Case 1: Liu Lien Shan, hospital No. 20771, age 24, was admitted in the hospital on June 27, 1928, with the complaint of ulcerative growth of the left lower lid for 2 months. Patient stated that about 3 weeks after the exposure he noticed a swelling of the left lower lid, soon afterwards followed by ulceration which was treated by local application of Chinese medicine, without any success. Physical examination showed that the left preauricular glands, and glands in the parotid region were enlarged and indurated, with generalized maculopapular eruptions, which appeared, 7 weeks after the onset of the eye lesion, chiefly on the trunk, characteristic of secondary syphilis. No penile sore was found. Local examination

showed indurated and ulcerated growth involving the whole lower lid and the external canthus with a small contact ulcer (Elschnig) (5) at the middle of the upper lid margin, and sector-shaped superficial infiltration at the lower temporal quadrant of the cornea (fig. 1). After confirmation of the diagnosis by dark field examination and Wassermann test, nearsphenamine injection and Mercury inunction were administered, besides local application of Hydrargyrum cum creta. The lesion was almost completely healed after 6 injections of nearsphenamine and local treatment, i.e., 4 weeks after admission (fig. 2).

The *secondary stage* of syphilis may happen on the eyelids as on other parts of the skin in the form of ulceration, though it is very difficult to differentiate from gummatous process when it takes the form of ulcer. It is of great interest to note the following two cases:

Case 2: Liu Tien Ch'en, 38 years of age, O.P.D. no. 49871. Duration 1½ months, commencing with a small pimple, opened the next day himself with a needle and becoming worse gradually. Patient admitted exposure of venereal infection 1½ months before the onset of the present eye disease; at the onset he had also sore throat and some red patches appearing over the body.

Examination of the eye showed a large longitudinal ulcer just above the left lid margin, extending from the internal canthus to almost the outer canthus, slightly indurated.

Physical examination showed indurated papular lesions, varying from 3 to 8 mm. on the scalp, neck, trunk, back and extremities, and a longitudinal scar, about 3 by 1 cm. lying about 2 cm. above the right Poupart's ligament, which was apparently the scar of primary sore.

About three weeks after antisymphilitic treatment was given, the papular lesion of the body totally disappeared, but the ulcer of the eyelid, however, took 5 weeks before being completely healed.

Case 3: Yang Jui Chih, hospital no. 141451, age 57, was admitted to the eye clinic on November 10, 1928, with the complaint of swelling and ulceration of the left upper lid for less than two months.

Patient admitted early venereal exposures when he was young, but denied penis sore and secondary manifestation, and another exposure shortly before the onset of the present illness, followed by sore throat and generalized eruptions, and stated that he had lost much weight. The ulcer of the eyelid started shortly after the sore throat, and became worse gradually.

Physical Examination: A few irregular copper red papular lesions were found on the dorsum of the hand and right shoulder. Both inguinal glands were palpable. There was no glandular enlargement of preauricular regions or the neck. Throat examination showed superficial ulcerations on the left tonsil and anterior pillar. The tonsil was of medium size and soft in consistency. Irregular deep ulcerations were found over the base of the tongue.

Chancre of the Lid O. S.



*Fig. 1 Taken on admission,
June 27, 1928*



*Fig. 2 Taken on discharge,
after 6 injections of neoarsphenamine
and local treatment.*



Fig. 3 Gummatous destruction of the lids



*Fig. 5 Retrobulbar Syphiloma O.D.
Side view, taken on admission, July 16, 1928*



Fig. 4 Gumma of lacrimal sac region O.S.

Eye Examination: O.D. negative except the presence of a small atrophic pterygium on the nasal side and arcus senilis.

O.S. there was an ulcer about 2×7 mm. in size at the inner aspect of the upper lid. It was slightly indurated and swollen, and the conjunctival surface seemed to be slightly wider than the skin surface. But upper and lower lid conjunctiva were congested, especially around the ulcerated area. The pterygium on the nasal side was also slightly swollen with a superficial ulcer about $1\frac{1}{2}$ —2 mm. in size at its middle. Cornea negative except the presence of arcus senilis.

Antisyphilitic treatment was immediately administered and 20 mgm. hours radium was applied to the left eye. A week after the injections of arsphenamine the ulcer of eyelid was practically healed. The generalized lesions disappeared and the soreness of the throat was much improved, but the voice was still hoarse.

The tertiary stage of syphilis may also happen on the eyelids. The following case shows how the upper and lower lids were totally destroyed by a gummatous process:

Case 4: Chao Jung Chen, age 41, hospital no. 22298, was admitted in P.U.M.C. hospital on November 16, 1928, with the complaint of blindness of the left eye for one year, and of the right eye for 8 months.

Present Illness: Right Eye: Patient at first had some redness of the eyeball, and blurring of vision. He was treated by a Chinese doctor with some internal medicine. The condition, however, became gradually worse and the vision was completely lost one month after the onset.

Left Eye: The trouble began two years ago with a small papule on the inner angle of the upper lid and very soon another one appeared on the nose. The latter was healed after application of some Chinese medicine, but the former became worse and extended slowly along the upper lid outward to the outer angle, from where it travelled downward involving the entire lower lid. Five months later he was treated under a native doctor by means of baking with hot iron, which was done for about 5 months. The lesion was finally healed but the lids became closed.

Past History: Nothing remarkable except that he had venereal exposure and penile sore 20 years ago. Had ulceration of nose lasting for one year 7 years ago.

Physical Examination: Essentially negative except the condition of the eyes and the nose (see fig. 3). Wassermann very strongly positive.

Eye Examination: Right Eye: A typical picture of *iris bombé* following iridocyclitis and the iris was atrophic with many new formed blood vessels. The pupil was covered with organized exudate. *Left Eye:* Closed by an irregular scar, extending from middle of nasal bridge to about 3 or 4 cms. beyond the temporal end of the eyebrow. The scar was freely movable, and through it a round-shaped mass (eyeball) was palpable. Tension: O.D. 5 mm. hg. Schiötz. Vision O.D. light perception at 2 meters, with only poor central projection. O. S. amaurosis.

LACRIMAL ORGANS.

Igersheimer (16) states that secondary syphilis of the lacrimal passage is undoubtedly more seldom in acquired than in congenital syphilis, and primary lesion of the lacrimal sac is very rare. He explained that such a lesion may occur in the skin above the lacrimal sac then affect the lacrimal sac secondarily. The case observed by *Stock* (31) however, is very much like a primary lesion of the lacrimal sac. We have not seen a case even similar to it in our material. *Galezowski* (8) pointed out, that dacryocystitis usually occurs in the newborn, possibly of either tuberculous or syphilitic origin. It frequently starts first with rhinitis or periostitis of the nose, then leading to dacryocystitis. *Igersheimer* (16) doubts very much if syphilitic dacryocystitis could exist without any nostril diseases, because there is no clinical evidence of the nose being diseased in these cases and besides that all of them were adults. The gummatous process, however, may occur in the lacrimal sac region as it does in the other parts of the body. A case of this kind is briefly reported as follows:

Case 6: Yen Liu Shih, age 24, hospital No. 9840, a married woman, admitted on January 10, 1928.

Present Illness: 4 months before admission patient noticed slight swelling of the left lacrimal region, without any pain, inside of which there was a small and hard nodule. It gradually increased to the size of a chicken egg in 2 months' time, and was then opened by a physician but no pus was found. Another mass developed at the same time on the left lower jaw.

Patient was married 4 years ago. Husband had venereal exposure 2 years ago, followed by secondary manifestation. Had 4 pregnancies, 1 miscarriage, and 3 abortions.

Physical Examination showed a semifluctuant tumor mass of the left lower jaw extending into the submaxillary region. Cervical and inguinal glands were enlarged. X-ray showed no involvement of bone. Subcutaneous tuberculin test slightly positive. Wassermann moderately positive. A dose of arsphenamine .40 gram was given intravenously with a fever reaction of 38.2.

Eye Examination: An indurated and red area about 1½ inch in diameter was found at the lacrimal sac region of the left eye with two ulcers in the center covered with sloughing tissue, the swelling of the indurated area extended to the bridge of the nose and left eye brow. The condition of the lacrimal sac was not tested owing to the heavy induration of the infected area (fig. 4).

Moderately positive Wassermann reaction, the clinical picture, and the family and personal history indicated strongly that it was a gummatous lesion of both lacrimal sac region and the left lower jaw, in spite of the weakly positive reaction of tuberculin test. It is, however, unfortunate that the therapeutic proof could not be obtained in this case, owing to short observation. The patient was discharged against advice, and disappeared entirely from the clinic for further study.

CORNEA AND SCLERA

Interstitial Keratitis

According to the early records of Hutchinson (15), interstitial keratitis is a disease caused by congenital syphilis in children. V. Hippel (14), at a much later date, found out that tuberculosis is another cause of the disease and gives the same clinical picture. Still later, many other observers stated that acquired syphilis produces the same disease, though in a much smaller degree.

The classification of acquired and congenital interstitial keratitis as shown in Tables III and IV was based, for the former, on the positive history of exposure, definite finding of a scar as suggesting primary sore, and positive reaction of Wassermann; and for the latter, on the association of the disease with peculiarities like Hutchinson teeth, a positive Wassermann reaction of the parents' blood, the denial of exposure, the negative finding of a scar suggesting primary sore, and the positive Wassermann reaction.

By looking at the figures in Table IV one cannot but note that the acquired syphilitic cases seem to be rather common in China, while they are rarely seen in other countries. It is possible that among these cases of interstitial keratitis are a few of tuberculous origin, for which, unfortunately, the tuberculin test has never been sufficiently made. There is no doubt that the study of the present material is in no way adequate for drawing any conclusion on this question. It is, however, our hope that future workers will soon throw more light on the subject.

The very common clinical picture of interstitial keratitis is fully described by many authors in two forms, namely, peripheral, and central, and it is also stated that the former is the most common form of the two, as illustrated by Spicer (41) who found only 10% central form in 700 cases. But it seems to the writer that the central form is very frequently met with in China, particularly in the so-called acquired cases.

The interval between the involvement of the first and second eye varies considerably, and most of our cases have intervals of a few weeks. Quite a number of patients very frequently give a history of both eyes being involved simultaneously. However, in the case anatomically reported by *Ling* (21) the second eye was not involved until the time of enucleation, i.e. a little over one year after the onset of the first eye. A long interval of 19 years recorded by *Juler* (17) is undoubtedly seldom seen.

TABLE III

Age of onset in Congenital Interstitial Keratitis

<i>Age of onset</i>	<i>In Patients</i>	<i>Out Patients</i>	<i>Total.</i>	<i>%</i>
5-10	1	3	4	14.2
11-15	6	1	7	24.2
16-20	6	1	7	24.2
21-25	3	3	6	21.4
26-30	1	0	1	3.5
30 over ..	1	2	3	10.7
	18	10	28	

TABLE IV

Age of onset in Acquired Interstitial Keratitis

<i>Age of onset</i>	<i>In Patients</i>	<i>Out Patients</i>	<i>Total</i>	<i>%</i>
15-20	1	1	2	7.1
21-25	1	1	2	7.1
26-30	5	3	8	28.5
31-35	0	5	5	17.8
36-40	4	6	10	35.7
40 over ..	0	1	1	3.5
	11	17	28	

Other evidences of congenital syphilis: 7 cases have typical Hutchinsonian teeth, 1 case is suggestive of this, 2 cases have enlarged spleen and liver, 1 case has syphilis of tibia, and 1 case has syphilis of fibula.

Age of onset: The majority of cases shown in the table are found to be almost of the same ages as those of *Greeff's* (9) and *Igersheimer's* cases (16), but of much later ages than in *Hutchinson's* (15) or *Stephenson's* (30) cases. We have never seen one case between 1-5 years of age. This is most probably due to the fact that children of this age are seldom brought to the clinic for treatment of their eye diseases. It is very interesting to note that the figures of acquired syphilis are found between the ages of 25 and 40.

In the present material there are only three cases of iritis. This small number of recorded iritis is most probably due to the density of the corneal infiltration, through which the iris cannot be carefully observed. Naturally the hyperaemia of iris as a very early sign of iritis is also invisible, especially in dark pigmented eyes.

Besides interstitial keratitis, some rare cases have also been recorded, such as deep punctate keratitis (*Mauthner*) (22), keratitis profunda pustuliformis (*E. Fuchs*) (7), deep keratitis.

The opinion of syphilis as the etiology of herpes zoster varies considerably with different authors. *Wilbrand* and *Saenger* (36) in their dealing with the etiology of herpes zoster did not mention syphilis at all. *Meller* (23) saw a syphilitic patient suffering from herpes zoster ophthalmicus and iritis, and was of the opinion that this was a case of herpes iridis. *Head* and *Cambell* (13) found 14 out of 21 cases of herpes zoster ophthalmicus to have syphilis. *Brown* and *Dujardin* (3) found 4 of 1000 cases to be syphilitic herpes zoster. *Igersheimer* (16) observed that a lady had binocular syphilitic retrobulbar neuritis (temporal atrophy afterward) and 3 years later developed left side herpes zoster ophthalmicus with basal meningitis, and he urged that one should always keep in mind the possibility of having syphilitic neuritis of the trigeminus in herpes. The five cases of herpetic affection of cornea recorded have strongly positive Wassermann reactions and one of them seems to be of syphilitic origin, this is briefly reported as follows:

Case 6: Li Chen Yi, age 36, hospital No. 20845, was admitted on July 4, 1928, with the complaint of impairment of hearing of right ear, numbness of right half of the body, difficulty in speech and blurring of vision of right eye. On examination, besides herpes zoster of right cornea, iridocyclitis of the same eye and basal meningitis were also found. It is

interesting to note that the eye condition and sensory disturbance of the right face were improved to a certain extent after 6 injections of neosarsphenamine. However, this case could not be followed up as the patient went to his native province, Hupei, immediately after discharge from the hospital.

A review of the literature reveals that many theories are contributed by different authors in regard to the question of neuroparalytic keratitis. The one suggested by *Wilbrand* and *Saenger* (36) is most logical and is noted below, i.e., that neuroparalytic keratitis is due to irritation of the distal end of the cut or diseased trigeminus nerve. With regard to the latter *Igersheimer* (16) states that the most frequent cause of trigeminus palsy is brain syphilis in the form of basal gummatous meningitis. 25 out of 65 luetic trigeminus palsy cases quoted by *Wilbrand* and *Saenger* (36) are found to have neuroparalytic keratitis, 11 of which are proved to have gummatous meningitis by anatomical finding. The case recorded here may be of some clinical importance, a brief report of which is as follows:—

Case 7: Yin Lien Chiang, age 40, hospital No. 12262, was admitted on November 13, 1925, with complaint of blindness of the left eye and impaired vision of the right.

Patient stated that the vision of the left eye suddenly became impaired (in March, 1925) and was completely lost two or three days afterwards. One month later (April 1925) his right eye became inflamed with marked impairment of vision. There was photophobia and lachrimation, but no pain.

Past History: is nothing remarkable except the contraction of gonorrhoea in November 1921 and syphilis in May 1924, with definite primary penile sore which got well in about five months; then followed by general papulo-pustular eruptions, sore throat, aching in the bones and joints and falling of hair. In March 1925 patient had a severe attack of frontal headache and pain over his right face with a feeling of numbness, and at the same time he had also tinnitus of left ear and deafness of the right. Wassermann, strongly positive.

Family and Marital History: nothing remarkable.

Eye Examination revealed a big central ulcer of epithelium, measuring 3 × 4 mm. in size, of right cornea with ciliary injection and marked reduction of sensibility, and atrophy of eyeball of the left. Vision R. E. hand movement 1 ft. L. E. amaurosis and enucleated.

Neurological examination revealed anesthesia of all branches of the right 5th nerve, paresis of right 7th and 8th, probably due to gummatous meningitis. This case has been observed and received 7 courses of neosalvarsan during the last three years. It is interesting to note that the corneal erosion after running a long course, finally healed with a more or less firm scar. Observations made by *Wilbrand* and *Saenger*, show that this occurs in most of their cases, and the vision of this case is improved from hand movement to 1/60.

The case of intercalary staphyloma in which there is no clinical evidence of iris and ciliary body (real precipitate) being involved, is most probably a secondary lesion to a gummatous process started somewhere in the mesh of the ligamentum pectinatum or the very anterior portion of the ciliary body. This case of staphyloma of sclera with central retinitis is very likely a secondary lesion to a gummatous process of ciliary or choroid incidentally with central change of the retina.

IRIS AND CILIARY BODY

It is generally admitted that iritis is very common in syphilitic ocular diseases. Statistical study of *Groenouw* (10) shows 44.7% of iridocyclitis in 2020 cases suffering from syphilitic ocular diseases, and *Zimmermann* (40) found over 40% of iridocyclitis of all ocular lesions of acquired syphilis that he observed within two years time. In studying the present material we find 34.8% cases of iritis in 385 cases, among which positive tuberculin test is noted in 3 cases, gonorrhoeal urethritis in 10, advanced tuberculosis of the lungs in 3, and T. B. neck. 1. Whether the cases can be considered as pure syphilis or not cannot be decided. *Igersheimer* (16) states that the iritis of acquired syphilis occurs seldom under 20 or over 50-60 years of age. It is of interest to note that in the present material 5 cases are under the age of 20, i.e. 10, 16, 18, 18, 19; 11 over 50, i.e. 52, 52, 52, 52, 54, 57, 58, 62, 63, and 69; 37 between 20-30; and 45 between 30-40.

It has been known that iritis occurs in the majority of cases during the first year of infection and is also very frequently associated with secondary manifestation of the skin; and our findings in the present material agree with this principle exactly (Table V.) Quite a number of the cases were seen by the syphilologists of this institute and diagnosed as having a different type of skin lesions.

TABLE V.

Period between infection and the occurrence of iritis

Up to 6 months	32
6 months—1 year	18
2 years	8
3 years	2
4 years	4
5 years	3
7 years	1
10 years	1
11 years	1
14 years	2
20 years	1
30 years	1
30 years over	1
Total	75
Undetermined	58

Besides the diffuse type of iridocyclitis the nodular type is also commonly found with all its characteristics in the clinical picture (papules or gumma) which is of very great importance for diagnosis of syphilitic origin, such nodules being usually found at or near the pupillary margin and the root of the iris. Sometimes they are small and hardly visible clinically without the help of the corneal microscope and slit-lamp.

Of great interest is gumma of the ciliary body. 8 cases among the present material with iridocyclitis in the clinical picture of scleral or intercalary staphyloma, which are seldom seen in other countries nowadays were found in China and reported by *Li* (20) and *Ling* (21). *Ewetzky* (6) states that the function of the eye is usually destroyed in most of the cases. However, the vision of the case reported by *Li* was restored by vigorous antisiphilitic treatment from hand movement to 6/30.

It is to be noted that 11 cases of syphilitic iridocyclitis of the present material had secondary glaucoma, 5 eyes were enucleated, and 7 eyes became atrophic bulbi. The association of iritis with tertiary syphilis has been claimed by many authors to be very rare. There is only one case of aneurysm of aorta and perforation of septum recorded.

Antisyphilitic treatment for iritis is not only known as the best remedy to bring the symptoms to a fullstop and sometimes complete recovery of the disease, but also as an important therapeutic test available for a correct diagnosis in case the laboratory test is negative.

RETINA, CHOROID, AND VITREOUS

Retina: Isolated syphilitic disease of the retina is relatively infrequent. It may be monocular as well as binocular and occurs most frequently in the secondary stage of syphilis. It is seldom found in the tertiary stage, and almost always accompanied by more or less papillitis or choroiditis. According to *Groenouw's* (10) statement retina and choroid are affected generally at the same time in syphilis.

There are 9 cases of different clinical pictures and stages recorded as follows: central retinitis 1, exudative retinitis 4, retinitis proliferans 1, and diffuse retinitis 3. Besides the retinal changes, marked vitreous opacities are also found in all these cases. 8 cases of sclerosis of retinal vessels, a condition very frequently met with in the second stage of syphilis, are also recorded. In regard to the frequency of syphilitic retinitis among the Chinese, it naturally needs a further study of all the syphilitic cases. These 8 cases recorded are only those who were referred to us from the other departments of this institution. It may be added that in the old records sufficient attention was never given to the eyeground findings, which would have made the actual percentage of retinal syphilitic lesions much higher.

Choroid: Syphilitic disease of the choroid may be disseminated or localized at certain places, such as macula region and equator of the eyeball, with a typical clinical picture of yellowish spots in the early stage and pigment in an atrophic spot with choroidal structure at the late stage of the disease. In the visual field we find central scotoma, ringform scotoma, concentric contraction, sector-shaped or irregular scotomas according to the type and the location of the disease. In the present material there are 4 cases of chorioretinitis, 4 disseminated choroiditis and one exudative chorioretinitis with detachment of retina.

Vitreous opacities: The 6 cases of vitreous opacities recorded are either due to the exudate produced by cyclitis or anterior retinochoroidal diseases not visible with the ophthalmoscope.

OPTIC NERVE

According to the statistics made by *Badal* (1) in 20,000 eye cases he found 631 suffering from syphilitic eye diseases, 57 cases of which were optic nerve diseases (38 neuritis, 16 neuroretinitis, 3 choked disc). That is about 9% of all syphilitic eye diseases. In the present material out of 385 cases there are 5 optic neuritis, 3 papillitis, 6 neuroretinitis and 5 choked disc, i.e. about 5% of all the syphilitic eye cases.

The inflammation of the optic nerve may take place in any part of its course. It is generally believed that the inflammation is caused by local toxins produced by spirochetes either in the nerve itself or in its immediate neighbourhood. The degree of inflammation varies considerably; sometimes it is so mild that no visual disturbance is found. Such a lesion is usually discovered by accidental examination of the fundus in which very early signs either recent or old, of inflammation of the optic nerve are found, such as hyperaemia of the disc, or fine organized connective tissue and some vascular changes of the retinal vessels. The reason of the relatively rare observation of optic nerve changes is that the early and mild cases of optic neuritis do not come to the physician and that all our records are of accidental findings.

Retrobular Neuritis may be divided into two types, namely, first the axial or interstitial neuritis, in which the papillo-macular bundle is very frequently implicated, producing a central scotoma; secondly, the perineuritis in which the sheath of the optic nerve is affected producing a concentric contraction of the visual field. The 3 cases of retrobulbar neuritis recorded in which all the other etiological factors are excluded belong to the first type.

Choked disc is simply an ophthalmoscopic expression of the increase of the intracranial pressure in our cases as a result of secondary or gummatous syphilis of the brain meninges or spinal cord.

The percentage of choked disc produced by syphilitic cerebral disease varies considerably according to different authors. It is only about 10% by *Uhthoff* (34) and others while *Eleonskaja* (4) stated that it occurs as high as over 30%. If the disease is treated early enough, the prognosis is usually good as the case observed by *Uhthoff* (34) for 7 years, in which the choked disc subsided to the absolute normal with only very little pathological change. According to *Igersheimer* (16) after antisyphilitic treatment it may subside immediately or in 2 or 3 months; in the latter case secondary optic atrophy is often seen.

Primary optic atrophy, an important symptom of tabes, is known to be a progressive disease, and nearly all the cases turn into blindness eventually. Both eyes are usually involved but not at the same time. *Uhthoff* (34) saw only one monocular primary optic atrophy out of 300 cases.

The rare occurrence of chorioretinitis (3.86%) and iritis (0.176%) in primary optic atrophy stated by *Igersheimer* (16) seems to be well proved in China. There was not a single case of the present material showing such diseases.

The statistical study of the clinical frequency of primary optic atrophy in tabes quoted by *Igersheimer* (16) varies from 10-20% by different authors. *Uhthoff* (34) had the opinion that the highest is no more than 15%. It is very interesting and striking that *Wei* (35) in Peking found the percentage of primary optic atrophy in tabes in the Chinese as high as 23.33%.

The theories attributed to the pathology of the disease may be divided into three groups: first, the atrophy commences in the nerve fibers or retina or axones (*Uhthoff* (34) 1880 and others). The conclusion was made by the observation of very marked changes in the retinal ganglion cells. Second, the atrophy commences in the papilla (*Elschnig* (5) in 1899, who found that the nerve fibers in the disc are replaced by the overgrowth of thick glial tissue). Third, the atrophy takes place in the optical tract up to the geniculate body by *Stargardt* (29) who in 1911 found the early changes in the intracranial or forameral portion of the nerve, and the chiasma; and the degeneration of the orbital portion in a fairly late stage. And

it was proved later by the positive finding of the presence of spirochetes as small foci by *Noguchi* (25) and *Igersheimer* (16), and reconfirmed by *Behr* (2) (1926).

Besides the primary optic atrophy the most common disease of the optic nerve as shown in Table I is the secondary optic atrophy 24 in number, following choked disc, papillitis, or papilloretinitis.

OCULAR MUSCLE

The external ocular muscles are usually involved in syphilis of the central nervous system from basal lesions, and the third nerve is the one most frequently involved though this is not always the case. The involvement of the muscles is due to gumma, exudate or periostitis attacking usually more than one muscle, while the involvement of single muscle is more or less on a toxic basis. When the syphilitic processes are localized near the superior orbital fissure very frequently all of the three ocular muscles are involved. The frequency of the involvement of the ocular muscles in this material is shown as follows: oculomotorius 17, trochlearis 11, abducens 10. The involvement of the ocular muscles of individual cases is self-explained by Table I.

ORBIT

Syphilis of the orbit is known in two groups: 1. periostitis of orbit, and 2. gumma in the depth of the orbit; the former starts usually with headaches and orbital pain followed by swelling of the lid margin and chemosis of the conjunctiva with a little or without any proptosis; while the latter starts usually with dull pain of the head. The exophthalmos is a very important symptom followed by total ophthalmoplegia and secondary optic atrophy resulting from pressure and the invasion of gummatous process into the nerve. But it is very difficult to differentiate these from the other orbital tumors, because they give exactly the same clinical picture. The following is one of the two cases of the second group showing the typical picture of the disease in a very late stage and the therapeutic effect of antisymphilitic treatment.

Case 8: Liu Ke Fu, 39 yrs. old, hospital No. 20992, merchant in occupation, was admitted on July 16, 1928, with complaint of swelling and protrusion of the right eye.

Present Illness: 7 months before admission patient had severe right side headache followed by vomiting; then the eyeball gradually turned to the nasal side until 2 months later when he noticed that it began to bulge forward and gradually increased in size up to the present condition. Two months before admission patient noticed that the lower quadrant of the conjunctiva became edematous hanging out of the lower lid, with numbness on the right side of the head. Vision was lost ever since the beginning of the protrusion. No history of tuberculosis, had gonorrhoea for 2 months 7 years ago. Had ulceration of scrotum at the same time. Married for 10 years. Had 3 children, all of them died of measles. No history of abortions.

Physical examination negative, except that linear scars were found on the scrotum up to the pubic region and numbness of right side of the head at the temporal region. Neurological examination: the supraorbital and supra-trochlear branches of the trigeminus were totally paralyzed. Other cranial nerves normal. There was no evidence of spreading of the "tumor" into the cranial cavity. E. N. T. examination negative. X-ray Report: Destruction of outer and inferior wall of right orbit, apparently by soft issue neoplasm.

Eye examination: Complete ptosis of the upper lid. Marked chemosis of the lower quadrant of the bulbar conjunctiva hanging over the lower lid, the latter being pushed downward. There was dry crust on top of the chemotic conjunctiva. Pupil transversely oval and semidilated, no reactions. Fundus: secondary optic atrophy. Macula and periphery normal.

Exophthalmometer measurement: O.D. 24, O.S. 16 (Fig. 5).

O.D. the ptosis remains unchanged but the chemosis of the bulbar conjunctiva was very much reduced by antisyphilitic treatment. The exophthalmometer measurement was reduced from 24 to 18.5 mm. After 8 injections of neoarsenphenamine and mercury inunction, September 17, 1928, the exophthalmometer measurement was o.d. 17. The ptosis remains unchanged. Ocular movements were still nil.

SUMMARY

Among 23,713 eye patients 380 cases, or 1.6% were found to be of syphilitic origin. These figures are comparatively much less than those obtained by *Badal* (1) in which he found 3% of 20,000 eye cases suffering from syphilitic ocular diseases. These figures certainly do not represent the actual percentage of syphilitic ocular diseases among the Chinese, owing to the fact that not sufficient attention was paid to this matter, especially to the diseases of Uvea, Retina and the vascular lesions of retina in the years past. A further clinical study on this line is necessary.

(1) *Lid and Conjunctiva.*—Of the 380 patients there were 9 cases, or 2.3%, recorded. Primary lesions of syphilis of the

eyelid were met with in two cases and syphilitic ulcer of the eyelid in the early stage of secondary syphilis was also found in three cases, gumma of the lid in four cases. Lesions of the conjunctiva which are claimed by many authors to be as frequent as lesions of the eyelid were found only in 1 case in this present material.

(2) *Lacrimal Organ*.—Syphilitic disease of the lacrimal organs was found only in one case, or 0.3%, of the 380 patients. The clinical picture was of gumma of the lacrimal sac region.

(3) *Cornea and Sclera*.—83 cases, or 21.8%, of the 380 cases were recorded under this heading, among which 54 cases were found to be interstitial keratitis. Of great interest are those of acquired interstitial keratitis. These are seldom found in the other countries, but were found here even higher than the congenital type of the disease. Syphilitic diseases of the sclera were found in 4 cases in the form of scleritis and episcleritis. The two cases of intercalary staphyloma and staphyloma sclera with central retinitis were most likely to be a kind of gummatous processes of the sclera (gummatous scleritis) originated from either the uveal tissue or the sclera itself.

(4) *Iris and Ciliary Body*.—Of the 380 patients there were 134, or 35.3%, suffering from syphilitic iritis or iridocyclitis. This proves to be the most frequent ocular syphilitic lesion of the luetic eye diseases, a fact in agreement with the report by many authors in other countries.

(5) *Retina, Choroid, and Vitreous*.—Of the 380 patients there were 34, or 8.6%: retinitis 10 cases; sclerosis of retinal vessels, 8 cases; choroiditis 5 cases; chorioretinitis, 4 cases; and vitreous opacities 6 cases.

(6) *Optic Nerve*.—Of the 380 patients there were 85 cases, or 22.4%, affected with optic nerve diseases, among which the most frequent diseases were primary and secondary optic atrophy, being 39 and 23 cases respectively.

(7) *Ocular Muscles*.—Of the 380 patients, 33, or 8.7%, were affected with muscle disorders; the third nerve being the one most frequently involved.

(8) *Orbit*.—Orbital diseases in lues are comparatively rare, only 2 cases, or 0.5%, were recorded in the present material.

REFERENCES

1. *Badal*: Recherches statistiques sur les manifestations oculaires de la syphilis.—Arch. d'opt. Tom. 6. 1886,

2. *Behr*: Über die anatomischen Grundlagen und über die Behandlung der Tabischen Sechervenatrophie. Münch. med. Wochenschr. 1926.
3. *Brown and Dujardin*: Liquor cerebrospinalis bei Herpes zoster und die Beziehungen des Herpes zoster zur Syphilis.—Brain. 1919. Bd. 42. S. 86. Ref. Zeitschr. f. d. ges. Neurol. Bd. 21. S. 64. 1920.
4. *Eleonskaja*: Über die Erkrankungen des Sehnerven bei Lues cerebri.—Russki Ophth. jour. vol. 1 p. 280. Ref. Zentralbl. f. d. ges. ophth. Bd. 11. S. 76. 1923.
5. *Elschnig*: Zur Anatomie der Sehnervenatrophie bei Erkrankungen des Centralnerven—systems.—Wiener klin. Wochenschr. 12. Jahrg. Nr. 11. p. 275. 1899.
6. *Ewetzky*: Über des Syphilom des Ciliarkörpers.—Berlin u. Wralsch. 1899. XX. S. 618. u. Ophth. Klinik. 190. VI. S. 21. 1904.
7. *Fuchs, E.*: Über Keratitis pustuliformis profunda.—Arch. f. Ophth. G. Bd. 90. S. 67. 1915.
8. *Galezowski*: Troubles visuels lacrimaux. Tumeur lacrymale syphilitique.—Guerison. Rec. d'Opht. p. 179.
9. *Greeff*: Die Keratitis in ihren Beziehungen zu Allgemeinerkrankungen.—Vossius, Abhandl. Bd. 1. 1897.
10. *Groenouw*: Die pathologie-anatomia, p. 788.
„ Handbuch der Augenheilkunde. Dritte Auflage. p. 1232.
11. *Hahn*: Handbuch der Haut und Geschlechtskrankheiten. XVII/2. S. 110.
12. *Hamburger*: Über den Gebrauch Wassermannscher Histopinsalbe in der Augenheilkunde.—Klin. Monatsbl. f. Augenheilk. LI. Bd. I. S. 813.
13. *Head and Cambell*: Handbuch der Haut und Geschlechtskrankheiten. XVII/2. S. 435.
14. *Hippel, v.*: Über Keratitis parenchymatosa.—Arch. f. Ophth. Gd. Bd. 39. S. 204 und B. 42. S. 194. 1893.
15. *Hutchinson*: Syphilis. London, 1885.
16. *Igersheimer*: Handbuch der Haut und Geschlechtskrankheiten. XVII/2.
„ Spirochätenbefunde an der Sehbahn bei Paralyse.—Deutsch. med. Wochenschr. 1921. Nr. 26.
17. *Juler*: Two cases of tertiary syphilis lesions of the eye.—Ophth. Rev. p. 238.
18. *Korns*: Further statistics on communicable diseases among Domestic Servants.—China Med. Jour. 35:382. July. 1921.
19. *Lennox*: Neurosyphilis among the Chinese.—Arch. of Neurology and Psychiatry. v. 9. Jan. 1923.
20. *Li*: Syphiloma and syphilitic iridocyclitis.—Arch. of Ophth. v. 53. 1924. p. 531.
21. *Ling*: Spontaneous Healing of Syphiloma of the Ciliary Body.—China Med. Jour. April, 1927.
22. *Mauthner*: Syphilitische Erkrankungen des Auges in H. Zeissls Lehrbuch der Syphilis.

23. *Meller*: Zur Klinik und pathologischen Anatomie des Herpes zoster uveae.—*Zeitschr. f. Augenheilk.* Bd. 43. S. 450-479. 1920.
24. *Münchheimer*: Über extragenitale Syphilis-infection.—*Arch. f. Dermat. u. Syphilis.* XL. S. 191-236.
25. *Noguchi* and *J. W. Moore*: A Demonstration of *Treponema Pallidum* in the Brain in cases of General Paralysis.—*Jr. Exp. Med.* Vol. XVII. p. 232. Feb. 1913.
26. *Porej-Korschitz*: Die Topographie des syphilitischen Schankers. Charkow.
27. *Sia*: Routine Wassermann Test on 502 Inpatients.—*China Med. Jour.* 35:39. Jan. 1921.
28. *Snell* and *Chang, P. I.*: Report of Routine Wassermann Test at Soochow Hospital for one year.—*China Med. Jour.* 35:362 (Jan.) 1921.
29. *Stargardt*: Über die Ursachen des Sehnervenschwundes bei der Jabes und der progressiven Paralyse.—*Arch. f. Psychiatrie u. Nervenkrankh.* Bd. 51.
30. *Stephenson*: Some remarks upon interstitial keratitis with especial reference to pathogenesis and treatment.—*Ophthalmoscope.* p. 66.
31. *Stock*: Pathologie der Tränenorgane.—*Graefe-Saemisch.* 1925. 2. Aufl.
32. *Terson*: *Encyclop. franc. d'opht., Jour.* 5. 1906.
33. *Tsen*: The Prevalence of Syphilis in Peking. First Report.—*The Nat'l. Med. Jour.* Vol. VI. p. 159. 1920.
34. *Uhthoff*: Untersuchungen über die bei Syphilis des Zentralnervensystem u.s.w.—*Arch. f. Ophth. G.* Bd. 39.
 „ Über infektiöse Neuritis optica.—*Bericht über die 28. Versammlung der Ophthalm. Ges. Heidelberg.* S. 30-49.
 „ *Handbuch der Haut und Geschlechtskrankheiten.* XVII/2. S. 349.
 „ Beitrag zur Sehnervenatrophie.—*Arch. f. Ophthal.* Vol. XXVI. p. 244. 1880.
35. *Wei*: Tabes Dorsalis Among the Chinese.—*The China Med. Jour.* August 1927.
36. *Wilbrand* and *Saenger*: *Neurologie des Auges* 1901. Bd. 2. S. 203., 274. u. 300.
 „ „ Die Aetiologie des Herpes zoster.—*Neurol. des Auges.* Bd. 2. 1901. S. 203.
37. *Wilbrand* and *Staelin*: Über die Augenerkrankungen in der Frühperiode der Syphilis.—Hamburg. 1897.
38. *Wolfram* and *Stimmel*: Zwei Fälle von Primäraffect der Bindehaut.—*Zeitschr. f. Augenheilk.* Bd. 24. S. 141. 1910.
39. *Notes on Chinese Medicine.*—*Chinese Medicine.*—*China Med. Jour.* 1918. XXXII. 349.
40. *Zimmermann*: Syphilitic iridocyclitis with a consideration of factors influencing its occurrence.—*Arch. of Ophth.* Vol. 53. 1924. p. 549.
41. *Spicer*: Parenchymatous Keratitis, Interstitial Keratitis; Uveitis Anterior.—*Brit. Jour. of Ophth.,* 1924.

INVESTIGATIONS ON THE EFFECT OF HORMONES ON
THE SEDIMENTATION VELOCITY OF
RED BLOOD CELLS.

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Since Fahraeus (4) in 1918 reported that the red blood cells in blood obtained from pregnant women settled with much greater speed than cells secured from normal persons, an extensive literature, on both clinical and experimental investigations, has accumulated upon this subject. Many writers found that the sedimentation rate of red blood cells increases more or less during acute infectious diseases and markedly during chronic ones, while it has been proved that proteins and protein derivatives accelerate the sedimentation velocity of red blood cells. Theories of the cause of this vary.

On the other hand, studies on the relationship between sedimentation speed of red blood cells and hormones were reported by some investigators, their results do not agree, which is probably due to the complex nature of endocrine activity.

In this report, the variation of sedimentation velocity of red blood cells by the injection of casein solution was observed and then the effect of endocrine organs has been studied.

EXPERIMENTAL PROCEDURE.

Normal rabbits of 1600-2100 grms were used.

As casein solution, 5% casein and 1% natrium bicarbonicum were dissolved in water by warming in an incubator and were then filtered.

For the measurement of sedimentation speed of red blood cells, Westergren's apparatus (Leitz's model) was used and blood was drawn from the cervical vein.

The numbers of the first transverse line in tables show the time (in hours) after injection and the first longitudinal line shows the time in hours after the fixation of pipettes in Westergren's apparatus.

I. The Effect of Casein Solution on the Sedimentation Velocity of Red Blood Cells.

The acceleration of sedimentation velocity of red blood cells by proteins and their products has been recently proved by several investigators, Brat (2) maintained that peptone and gelatine accelerate the sedimentation speed of red blood cells. Ishiwari (9) injected 2 c.c. of peptone subcutaneously and found acceleration of sedimentation velocity of red blood cells at one hour after the injection as compared with that of before injection. Tsuzumi (18) (19) observed the acceleration of sedimentation rate of red blood cells after the injection of horse serum-globulin, the globulin of white of egg, peptone, histamin, and various amino-acids. Yo (23) found acceleration of sedimentation velocity of red blood cells, after injecting human blood serum and milk.

In these experiments, an attempt was made to find out the results of casein solution on the sedimentation speed of red blood cells by observing the sedimentation rate at 1, 2, 3, and 24 hours after the injection of 5% casein solution (5 c.c. per 1 kg.) intravenously and comparing with the rate before injection.

TABLE 1.

	<i>Before Injection</i>	<i>After Injection</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	2.3	2.0	2.5	3.0	2.0
2 hrs.	4.0	4.0	5.0	5.0	4.0
3 hrs.	5.2	6.5	7.0	6.3	6.0

Experiment 1. Male, 1600 g. The sedimentation speed of red blood cells was increased at 2-3 hours after the injection of casein solution and returned to normal rate as shown in table I.

TABLE 2.

	<i>Before Injection</i>	<i>After Injection</i>			
		<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hour	1.2	1.8	0.6	1.2	3.5
2 hours	2.0	3.0	1.7	2.3	4.8
3 hours	3.0	4.6	2.6	3.7	6.8

Experiment 2. Male 1700 g. The sedimentation speed is already increased at 1 hour after injection of casein solution and at 2 hours after the injection it diminishes, but it again accelerates at 3-24 hours after the injection, as shown in table 2.

TABLE 3.

	<i>Before</i>	<i>After Injection</i>			
	<i>Injection</i>	<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hour	0.8	2.0	1.4	2.0	2.0
2 hours	2.0	2.5	2.9	3.0	3.0
3 hours	3.0	4.0	4.0	3.9	5.5

Experiment 3. Male 1800 g. The sedimentation speed accelerates from 1 hour after the injection of casein solution and it persists 24 hours, as shown in table 3.

Reviewing the above three experiments, it is seen that the sedimentation speed of red blood cells markedly accelerates after the injection of casein which confirms the work of other investigators.

II. The effect of extirpation of various endocrine organs on the acceleration of sedimentation velocity of red blood cells.

As above mentioned, the acceleration of sedimentation velocity of red blood cells was shown to occur after the injection of casein solution. The variation velocity of red blood cells after the injection of casein solution was later observed in parathyroidectomized, thyroidectomized, orchidectomized or ovariectomized animals, to show up the relationship if any between various endocrine organs and the acceleration of sedimentation velocity of red blood cells after the injection of casein solution.

1. *In parathyroidectomized animals.*

In parathyroidectomized rabbits 5 cc of 5% casein solution per 1 kg. was injected intravenously and then the variation of sedimentation velocity of red blood cells was observed.

TABLE 4.

	<i>Before</i>	<i>After Injection</i>			
	<i>Injection</i>	<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	1.8	1.9	1.8	1.8	2.0
2 hrs.	3.2	3.0	3.2	3.3	3.0
3 hrs.	5.2	5.0	4.5	5.0	5.2

Experiment 4. Male 1700 g. 4 days after parathyroidectomy. After the injection of casein solution, there is almost no change of sedimentation velocity of red blood cells, as shown in table 4.

TABLE 5.

	<i>Before</i>	<i>After Injection</i>			
	<i>Injection</i>	<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	1.5	1.5	1.5	1.5	2.0
2 hrs.	3.0	2.5	2.3	2.5	3.0
3 hrs.	4.5	3.5	3.5	3.5	5.0

Experiment 5. Male 1800 g. 18 days after parathyroidectomy. There is no change of the sedimentation velocity of red blood cells after the injection of casein solution, as shown in table 5.

As in tables 4 and 5, the acceleration of sedimentation velocity of red blood cells does not occur in parathyroidectomized animals after the injection of casein solution. Therefore, it shows that the existence of parathyroid hormone is necessary for the acceleration of sedimentation velocity of red blood cells by the injection of casein solution.

2. *In thyroidectomized animals.*

Many investigators have studied the relationship between thyroid gland and the sedimentation velocity of red blood cells. Borokund and Mordwinkina (1) found an acceleration of sedimentation velocity of red blood cells in thyroidectomized animals as compared with controls, and Okada (13) also confirmed this same result. Ueno (22) found that the acceleration of sedimentation velocity of red blood cells appears in animals fed with powder of thyroid gland and in thyroidectomized animals, and it is more marked in the latter. He also found that the accelera-

tion of it is absolutely or relatively dependent on the globulin content of blood serum. Trifon (17) maintains that the sedimentation velocity of red blood cells diminishes during hyperthyroidism. But Takebayashi (16) found that thyroidectomy has no effect on the sedimentation velocity of red blood cells.

In these experiments the variation of sedimentation velocity of red blood cells is observed in thyroidectomized rabbits after the injection of casein solution.

TABLE 6.

	<i>Before Injection</i>	<i>After Injection</i>			
		<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	1.2	1.5	1.5	1.5	1.8
2 hrs.	2.3	2.4	2.5	3.0	3.0
3 hrs.	4.0	4.5	3.5	3.5	4.2

Experiment 6. Male 1800 g. 7 days after thyroidectomy. The acceleration of sedimentation velocity of red blood cells appears from one hour after the injection of casein solution and it continues until 24 hours as shown in table 6.

TABLE 7.

	<i>Before Injection</i>	<i>After Injection</i>			
		<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	1.4	1.2	1.7	1.9	2.3
2 hrs.	2.5	2.4	2.5	3.0	3.5
3 hrs.	3.5	4.2	4.3	4.2	5.5

Experiment 7. Male 2000 g. 4 days after thyroidectomy. The sedimentation velocity of red blood cells accelerates 2 hours after the injection of casein solution as in table 7.

TABLE 8.

	<i>Before Injection</i>	<i>After Injection</i>			
		<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	1.5	2.0	2.5	1.5	1.5
2 hrs.	3.2	3.5	3.5	3.2	3.5
3 hrs.	4.0	4.5	4.5	4.6	5.0

Experiment 8. Male 1800 g. 5 days after thyroidectomy. The sedimentation velocity accelerates in 2-3 hours after the injection of casein solution as shown in table 8.

Thus, thyroidectomy causes the acceleration of sedimentation velocity of red blood cells after the injection of casein solution, as occurs in normal rabbits by the injection of casein alone.

Therefore, the existence of thyroid gland is not necessary for the acceleration of sedimentation velocity of red blood cells by the injection of casein solution.

3. *In orchidectomized animals.*

There are very few investigators, who have investigated the relationship between orchidectomy and sedimentation velocity of red blood cells. Borokund and Mordwinkina (1) found an acceleration of sedimentation velocity of red blood cells in orchidectomized rabbit and guinea pig as compared with controls.

In these experiments, the variation of sedimentation velocity of red blood cells in orchidectomized rabbit after the injection of casein solution was as follows.

TABLE 9.

	<i>Before Injection</i>	<i>After Injection</i>			
		<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	2.0	1.9	2.0	2.0	2.0
2 hrs.	3.2	3.5	3.8	3.8	3.7
3 hrs.	5.0	5.0	5.5	5.5	5.2

Experiment 9. Male 1700 g. 5 days after orchidectomy. No variation of sedimentation velocity of red blood cells occurs after the injection of casein solution as shown in table 9.

TABLE 10.

	<i>Before Injection</i>	<i>After Injection</i>			
		<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	2.0	2.2	2.1	2.0	2.2
2 hrs.	3.7	3.8	3.5	3.5	4.0
3 hrs.	5.2	5.0	4.5	4.5	5.0

Experiment 10. Male 1700 g. 6 days after orchidectomy. There is a slight acceleration of sedimentation velocity of red blood cells one hour after the injection of casein solution, but there is no significant variation of it as shown in table 10.

Thus, if casein solution is injected into an orchidectomized rabbit, then no variation of sedimentation velocity of red blood cells appears.

So, the existence of testicles is necessary for the acceleration of sedimentation velocity of red blood cells by the injection of casein solution.

4. *In ovariectomized animals.*

Takebayashi (16) maintains that ovariectomy has no relation with the sedimentation velocity of red blood cells.

In these experiments, the variation of sedimentation velocity of red blood cells was observed in an ovariectomized rabbit after the injection of casein solution as follows.

TABLE 11.

	<i>Before</i>	<i>After Injection</i>			
	<i>Injection</i>	<i>1 hr.</i>	<i>2 hrs.</i>	<i>3 hrs.</i>	<i>24 hrs.</i>
1 hr.	1.6	2.0	1.9	2.0	2.2
2 hrs.	3.2	3.8	4.1	3.8	3.7
3 hrs.	4.4	5.5	5.4	5.8	5.9

Experiment 11. Female 1950 g. 6 days after ovariectomy. The acceleration of sedimentation velocity of red blood cells appears from one hour after the injection of casein solution as shown in table 11.

Thus, the acceleration of sedimentation velocity of red blood cells after the injection of casein solution does not appear in an ovariectomized animal. So, perhaps, the existence of ovaries is not necessary for the acceleration of sedimentation velocity of red blood cells.

SUMMARY AND CONCLUSIONS.

1. 5 cc of 5% casein solution per 1 kg. was injected intravenously into normal rabbits, and acceleration of sedimentation velocity of red blood cells was found to occur.

2. After parathyroidectomy and orchidectomy injection of casein solution causes no acceleration of sedimentation velocity of red blood cells. Parathyroid and testicle are necessary for

the acceleration of caseinous acceleration of red blood cells sedimentation velocity.

3. Thyroidectomy and ovariectomy cause the acceleration of sedimentation velocity of red blood cells after the injection of casein solution. Therefore thyroid and ovary are probably unnecessary for its acceleration.

REFERENCES

1. Borokund, M. R. und V. I. Mordwinkina: Beitr. z. Klin. d. Tuberk, Bd. 63, H. 1, S. 128, 1926.
2. Brat, H.: Zeitschr. f. klin. Med., Bd. 56, S. 380, 1905.
3. Chahovitch, X., Arnovljevitch V. et Chahovitch Mme.: C. R. Soc. Biol., T. 97, p. 1532, 1927.
4. Fahraeus, Robin: Bioch. Zeitschr., Bd. 89, S. 355, 1918.
5. Idem, Physiol. Rev., Vol. 9, No. 2, p. 241, 1929.
6. Gawrilow, Raphael: Virch. Arch., Bd. 269, S. 340, 1928.
7. Georgopoulos, M.: Zeitschr. f. klin. Med., Bd. 102, S. 46, 1926.
8. Greisheimer, Esther, M., and Olga H. Johnson: Amer. J. Med. Sc., Vol. 179, No. 6, p. 816, 1929.
9. Ishiwari: Chu Gai Izi Shimpo (Japan), No. 998, p. 1226, 1921.
10. Knosp, J.: Kl. W., Bd. 7, S. 1909, 1928.
11. Linzenmeier, Georg: Arch. f. Gynäekol., Bd., 113, S. 608, 1920.
12. Nitzescu I.-I. et Missir V.: C. R. Soc. Biol., T. 97, p. 1107, 1927.
13. Okada, J.: J. Biophysics, Vol. 2, p. 38, 1927.
14. Idem, Mitteil. d. med. Gesel. z. Nagasaki (Japan), Bd. 4, Nr. 5, 1926.
15. Reyner, C. E.: J. Lab. and clin. Med., Vol. 14, No. 7, p. 630, 1929.
16. Takebayashi: Zeitschr. d. Japan. mikrobiol. Gesell., Bd. 19, 1925.
17. Trifon, Nina: C. R. Soc. Biol., T. 101, No. 17, p. 232, 1929.
18. Tsuzumi: Keio Igaku (Japan), Vol. 6, p. 135, 1926.
19. Idem, Ibid, Vol. 6, p. 177, 1926.
20. Tuda-Sakae and Tsuzumi: Ibid, Vol. 1, p. 721, 1921.
21. Ueda: Tokyo Iji Shinshi (Japan), No. 2469, p. 1146, 1926.
22. Ueno: Vol. 2, p. 805.
23. Yo: Fukuoka Ikadaigaku Zasshi, Vol. 21, No. 7, p. 1, 1928.

Clinical Notes**ACROMEGALY WITH DIABETES AND
OTHER COMPLICATIONS.****Report of Case**

HUGH L. ROBINSON, A.B., M.D., LINTSING, SHANTUNG.

Acromegaly and diabetes have frequently been reported as occurring in the same patient, but it is of some interest to find this combination in a Chinese woman, along with other complications.

Mrs. Wang Wei, aged 43, No. 462, came to the Lintsing Memorial Hospital, November 5, 1927, complaining of an abscess of the left buttock. The condition was extensive and seemed to demand in-patient care. She was admitted. After she was put to bed the physician went to examine her and found an ambulatory patient giving her several pieces of candy which she had just purchased for her at the hospital gate. This occurrence aroused suspicion of diabetes.

Present Illness:—Thirteen years before she had a small swelling near the anus which broke down and discharged pus. This lesion gradually got somewhat better, but other similar sinuses opened in the same vicinity and on the posterior aspect of the thigh. She has gotten steadily worse.

Past History:—Though denying any other illnesses at all, diligent questioning revealed the following:—She had scarlet fever at 8 years, smallpox at 14, dysentery at 19 and at 40 and several other times. She had had sore eyes in childhood and at 30, and a number of other times. She had purulent drainage from the left ear in childhood. A sore throat occurred at 14, and several times later. She had an occasional cough and a hemoptysis of several ounces a year ago. Has been somewhat dyspnoeic for 5 years. Has had innumerable attacks of generalized abdominal pain, not severe. Menstruation ceased 4 years ago at 39. The last of her teeth dropped out a year ago. For 15 years she has had polydipsia, now drinking 4 to 5 large pots of water daily. She has nycturia 5 to 6, with occasionally a

little smarting urination. Twenty years ago she was stout, but has gradually lost a great deal of weight and considerable strength. She is constantly thirsty and eats much sugar. She says that there has been no increase in the size of her hands and feet or change in her face since she reached adult life.

Family History:—Father living and well, mother living and dyspnoeic. One brother living and well, one died of a wasting disease, possibly tuberculosis. Two sisters living and well, husband living and well, three children alive, one died of tetanus neonatorum.

Physical Examination:—Well nourished. The chin and zygomata are prominent, the face is very long from top to bottom, and quite wide across the forehead. The nose is prominent for a Chinese woman. The hands are large, the fingers short and as large as a Western man's. The feet, though bound, are nearly normal in length, about one and a half the usual size of bound feet. The ribs are wide apart and the chest large with flaring lower ribs.—Toothless, the tongue protrudes as far as the point of the chin, extremely large and blunt. Lungs show impaired resonance above, especially in the right back. Bronchial breathing in the middle back, bronchovesicular above, with increased voice, no rales. Systolic murmur heard only at the pulmonic area.—Just to the left of the rectum there is a purulent sinus and all over the left buttock and one third the way to the popliteal space, nearly the whole width of the back of the thigh, there is swelling, dark discoloration, induration and tenderness, the whole area studded with purulent sinuses out of which pus oozes on pressure of the affected area.

The urine was strongly positive for sugar. She was given a diet of cabbage, spinach and bean-curd, with meat or an egg, one bowl, three times a day. After one day of this diet there was still sugar, and so insulin, 10 units, each meal, was given for three meals, decreased to 7½ the next day. Her Sachs-Georgi test was \pm . Ascaris eggs were found in the stools. Five days after admission she was sugar free without insulin on the above diet, and she was operated upon under chloroform. The middle of the affected area was slit the whole length, the sinuses and all affected areas curetted and counter drainage openings made at the depths of the flaps. The uppermost sinus was found to communicate with the rectum, and so the external sphincter was cut.



Mrs. Wang Wei, No. 162

After operation serosanguineous drainage was profuse. Tincture Opii was given for seven days, but the bowels moved daily after the fourth day. There was irregular temperature, reaching a maximum of 99.6° the 4th day. Diet as before was continued after operation with the addition of a little vermicelli once a day with insulin, 5 units, each meal, for the day following operation only. Sugar showed occasionally in the urine. She was extremely dissatisfied with the vegetable diet and demanded carbohydrate foods. A little rice caused sugar to show in the urine and it was given only once. She developed a diarrhoea, and examination showed many flagellates in the stool. She was given one injection of emetine, 0.065 gram, and this insult, added to the detested diet, caused her to leave against advice. Her operative wound showed improvement but was far from healed.

Diagnoses:—Fistula in ano

Abscesses of the left buttock and thigh

Diabetes mellitus

Acromegaly

Ascariasis

Infection with flagellates

Pulmonary Tuberculosis, quiescent.

GUNSHOT WOUND OF FEMUR*

Report of Case

F. BREWER, M.D.

A Chinese soldier, age 22, was admitted two days after a gunshot wound of the upper thigh. The missile had passed from before backward through the left femur, four inches below the lesser trochanter, shattering the bone and making a large exit wound. There was one loose fragment about three inches long, four of about one inch, and smaller pieces of bone and shell about the fracture. After traction was applied there was a bone defect of nearly two inches between the upper

*Presented at the XIXth Biennial Conference of the China Medical Association, Shanghai, February, 1929.

square-ended fragment and the lower pointed fragment, the loose pieces lying posteriorly.

We were confronted with a problem of reduction and immobilization which would allow access to the large wound just below the gluteal fold. The ring of a Thomas splint pressed either on the wound itself or on the short upper fragment, making immobilization and wound treatment both impossible. Accordingly calipers were applied to the knee and suspended from a pulley almost directly overhead, a slight forward inclination being opposed by elevating the foot of the bed six inches. The leg and heel rested on a padded splint suspended horizontally.

Weights were attached sufficient to make the injured thigh of normal length and alignment. A tube and eusol injections were used in the wound for three weeks, afterward simple gauze drains. Drainage was free and dependent. The supuration continued of course till all dead bone was removed. There was no splint, traction being sufficient for immobilization. X-ray showed good alignment with a defect of nearly two inches as before noted. There was easy access to the wound. As callus formed traction was reduced allowing bone ends to come closer together. It was considered hopeless to expect good union without shortening.

At eight weeks several large pieces of dead bone were removed. A few days later the calipers were taken off and the knee was suspended by a sling attached to the same pulley. While being moved in bed the patient fractured the callus causing a sharp angulation outward and much pain. Calipers were reapplied above the earlier position. A persistent tendency to outward angulation was counteracted by lateral traction with weights, even as an earlier angulation backward was corrected by traction upon the dressing toward the head of the bed. After a month the calipers were removed and the knee suspended by a sling as before. Callus was still plastic. A splint was tried but was entirely unsatisfactory. Gentle motion was given at this time and earlier to stimulate the callus. At this time it was fourteen and one-half weeks since the injury.

Six weeks later all support was removed. The thigh was about one and one-half inches short. There was an outward angulation about 35 degrees at the fracture because the patient

would not submit to sufficient lateral traction. The legs were placed in wide abduction as for fracture of the neck of the femur and tied to the bed to prevent further deformity. And if the callus was sufficiently plastic to allow of further deformity by muscle action, we could confidently expect some correction under this treatment, and I do think there was a slight improvement. The patient, however, after a few days insisted upon leaving the hospital to present to his general claims for compensation. There was firm bony union, all wounds were healed, and there was free motion in all joints. Total duration of hospital treatment, one hundred and sixty-two days.

**THE CASTOR OIL
TREATMENT OF ACUTE BACILLARY DYSENTERY**

T. B. WELCH

The author recounts his experience in Trinidad and in Kenya Colony with Mascarenhas. Treatment is as follows. On day of admission to hospital the patient is given 2 oz. of castor oil, (or 1 oz. if his condition is poor); on second and third days 1 oz. hourly by day. "These courses were then repeated until the patient had had one complete course after that in which he had passed mucus" Little or no restriction of diet.

The author claims for this regime—simplicity; a very greatly reduced death-rate; actual duration of symptoms in the first instance not long; relapse unusual and very mild; convalescence prompt; the patients lose little in condition; no patient had developed chronic or asthenic dysentery; abdominal pains absent or slight, defaecation not exhausting and daily number of stools not large. Boase has tried this treatment in Uganda and found it equally effective.

Trop. Dis. Bull. November, 1929.

Hospital Technology Section**I.H.T. TUITION CLASSES****Report and Programme**

GEO. HADDEN, M.B., Ch.B., Hankow.

The first classes of the new I.H.T. series at Hankow came into session in September. Dormitory accommodation restricted the classes to 7 in Pharmacy, and 9 in Laboratory,—and even then one student occupied a stretcher bed on an open balcony outside! In addition we have had one student in Business Management, and several advance students in the Laboratory during the Summer.

The students have come from the following Provinces:—

Hainan	2
Kwangtung	2
Fukien	5
Chekiang	2
Kiangsu	1
Shantung	1
Chihli	2
Shensi	1
Hunan	2
Korea	1
Hupeh	1
	—
Total	20

It is both interesting and encouraging to note how widespread the demand has been,—20 students representing 11 Provinces (if one may so include Korea and Hainan),—and from what great distances the students come. If in addition we recall that our last Anking Class contained students from Kweichow Province, from Formosa, and from Kalgan outside the Great Wall, and that our reservations include the Provinces of Kwangsi and Szechuen, the picture becomes almost impressive! The distances alone demonstrate graphically how unique our service is for such a universal need.

To I.H.T. workers it is particularly encouraging, even thus early in our resumed work, to have 4 further reservations booked by hospitals which have already had students with us at Anking.

The students are an attractive lot of men. They vary from 20 to 30 years of age, and vary still more widely in language, in ability, and in education; but all of them are keen, and anxious to learn; and it is extraordinary how language difficulties accommodate themselves after the first few weeks.

The present courses end with February, and the Spring Class comes in during the first week in March. Applications for reservations in the new Class are now in order.

The main courses in Pharmacy and Laboratory are of six months each. Associated with them, students may have tuition in Records-Keeping, Case-History-Taking, and Anaesthetics if so desired. Tuition in Book-keeping, Business Management, Administration, and X-Ray are temporarily in abeyance, but we hope to resume them in our curriculum in due time.

There are no fees. Books cost about \$6. Maintenance is \$9 a month. There are no educational requirements beyond a good working knowledge of Arithmetic up to, and emphasising *Proportions*: we presume that hospitals sending men consider them worth sending. We accept only students sent by Hospitals; otherwise we should be swamped. Besides, our business is with Hospitals, their problems, and their staff difficulties. Students live in dormitory accommodation in the Union and Hodge Memorial Hospitals. They bring their own bedding and mosquito nets.

This notice of the Spring Class dates is regrettably late, but even distant hospitals should not therefore hesitate to apply for reservations. Telegrams may be addressed—"Hadden, Union Hospital, Hankow." We shall in any case reply by telegraph if it seems necessary, or if so requested.

The I.H.T. is accepting two women students in Pharmacy this coming term. In September we hope to be able to accept more; but we have yet to solve some further problems in dormitory accommodation.

The above article was received too late for the January issue of the Journal; the following note has therefore to be added to it.

For the convenience of Hospitals who are late we will receive students all through March and early April, and give them special attention to bring them up with the rest of the class.

Please enquire by telegram. The single word "Pharmacy" or "Laboratory" will mean "Can you accept one student in Pharmacy or Laboratory" as the case may be. The telegram will automatically give the town of origin, but do not forget to sign with a sufficient address for a reply.

RECORDS KEEPING WITHOUT AN ENGLISH-SPEAKING CLERK.

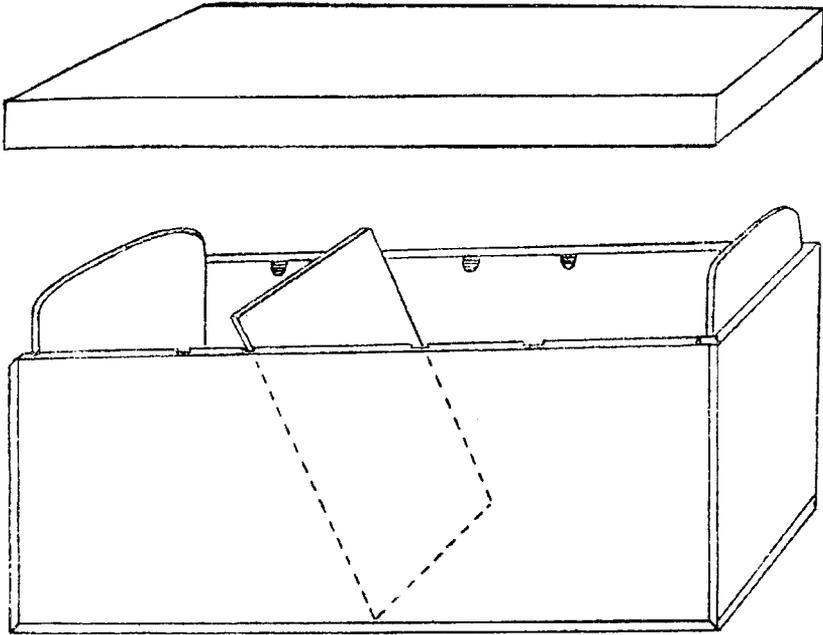
GEO. HADDEN M.B., Ch.B., Hankow.

The substance of this article was published three years ago as the first of the I.H.T. series of articles. The only excuse for republishing it is that the stock of reprints is exhausted, and the demand for it continues.

Records are worth keeping, and they are easy to keep. Every hospital that records its temperatures on charts might just as well file those charts intelligently in a box as bundle them up in paper parcels. And that, after all, is Records Keeping! What we may write into our Records is quite another matter,—and irrelevant: but it is certain that we shall find encouragement to write if we are able, when we want it, to find again and use what we have written.

The first requisite of a Records system is to have some one place to which the wards may send their Charts, and where it is some one person's business to receive them, and to file them in a box. That person may well be our Gatekeeper. If he can read and write, he and his gatehouse offer almost ideally both place and person. His Office is never shut, he has abundant leisure, and he takes a pride in his work. As for ability, any man who can read and write Chinese—however illiterately—has no difficulty in filing and indexing by the I.H.T. Three-Initial method. If the Gateman cannot write, we must

fall back on any other member of the staff who has a more or less permanent working place,—the “Accountant,” whoever he may be, the Dispenser, or the Laboratory Assistant.



The Filing Box at its simplest has an unhinged, removable lid, kept in place by the projecting tops of a couple of thin boards screwed inside the box ends. It measures—if built to take standard C.M.A. case-sheets filed vertically—2 ft. \times 12½ in. \times 9 in. (inside)—of which about 2½ in. is lid. A moveable partition with a crossbar that fits into slots in the inner half of the upper edge of the box-sides adapts the box for the amount of material actually filed. This box will file from 500 to 1000 Case Histories according to their bulk: two of them will hold the year's Records for most hospitals. The tabbed filing cards (vide infra) supply the necessary stiffening to the filed mass of papers, which would otherwise be very limp.

System of Filing

We need, for hospital purposes, to trace our cases by Name, by Number, and by Date, and for our professional purposes we want to group them by diseases. Of these four different classifications we may choose any one for the actual filing, and

devise some kind of index for the other three. It matters little which we choose. A simple grouping in the file means a complex index, and vice versa; wherefore we may consult our professional convenience and file by Disease Groups,—which offers the supreme advantage of bringing all our cases of a kind together where we can see them at a glance, and in such form that we can bind them at the year's end into permanent records of our own experience.

We decide, then, to file by Disease Groups, and index by Name, by Number, and by Date. By Disease Groups, be it noted,—not by Disease Names, which would imply a rigid nomenclature too exacting for most of us, and impossible to our very humble Registrar. The Grouping system will work with our most homely nomenclature, or it will accept the most elaborate; indeed the P.U.M.C. has associated a grouping system with its own Nomenclature expressly to make things easier for its Registrars. Our own Grouping system is designed to make possible our Three-Initial method of conveying our filing instructions to the Registrar, the simple invention which makes possible to every hospital in China a real system without the aid of an English-speaking clerk.

That the system achieves its aim is testified by the report (vide *infra*) of the Inspector appointed by the American College of Surgeons to survey hospitals in China applying for registration,—for which “An adequate system of Records” is one of the pre-requisites. The report is based on a very thorough investigation of the results at St. James Hospital, Anking, where the system dealt with the records of a staff of seven doctors, and was entirely in the hands of a Gate-staff recruited from amongst the hospital coolies. An exacting test! And yet the system was developed in a one-man country hospital for one man country hospitals,—to all of whom (vide *infra*) the C.M.A. commends it.

The Three-Initial Grouping System

The Three-Initial filing-table reproduced herewith will tell more of the method than a page of description.

**Three-Initial
Disease Grouping and Records Filing Table**

for use with non-English-speaking filing technicians

1st Initials.

Indicating the Primary Groups.

M edicine	E ye
S urgery	N ose-Ear-Throat.
D ermatology	O bstetrics
V enereal	G ynaecology

2nd Initials.

Subdividing the Primary Groups—mainly on an anatomical basis.

<i>MEDICINE.</i>	<i>EYE.</i>
A limentary	L ids
C irculatory	C onjunctiva
R espiratory	K ornea
U rinary	I ris, Uvea, Lens
N ervous	R etina and Nerve
L ocomotor	O rbit and Eyeball
G eneral Diseases	M iscellaneous
F evers and Infections	<i>NOSE-EAR-THROAT.</i>
T oxicology	N ose and Sinuses
P arasites	T hroat and Larynx
M iscellaneous	E ar and Mastoid
<i>VENEREAL</i>	<i>DERMATOLOGY.</i>
S yphilis	P arasitic
G onorrhoea	M iscellaneous
C haneroids	<i>OBSTETRICS.</i>
P himosis (Septic)	N ormal
<i>SURGERY.</i>	A bnormal
B one and Joints	B abortion
H ead and Face	P uerperal fever
N eck	C hild
D orsum and Spine	<i>GYNAECOLOGY.</i>
C hest	V ulva, Vagina, Pelvic floor
A bdomen	U terus & Tubes
R ectum and Anus	O varies
U ro-genital	P regnancy etc.
L imbs	B ladder and Urethra
O s and Oesophagus	M ammae
G roin	M s miscellaneous
A xilla	
Br east	
M iscellaneous	

3rd Initials.

Subdividing the Secondary Groups—mainly by Diseases.

Medical Sub-Groups.

RESPIRATORY.	H aematopoietic
T uberculosis	S pleen
P leura	M etabolism
B ronchi	L ymph Tissues
L ung	FEVERS & INFECTIONS.
M iscellaneous	M alaria
ALIMENTARY.	T yphoid
M outh, Throat, etc.	Ty phus
S tomach	D iphtheria
L iver	C erebro-Spinal
I ntestines	L eprosy
A ppendix	K ala Azar
P eritoneum	Ch olera
D ysenteries	U ndiagnosed
Ms miscellaneous	Ms-Miscellaneous
CIRCULATORY.	PARASITES.
H eart Affections	As carides
V essels Affections	A nkylostomes
M iscellaneous	S chistosomes
URINARY.	M iscellaneous
A lbuminurias	NERVOUS.
M iscellaneous	F unctional
LOCOMOTOR	O rganic
B one and Articular	TOXICOLOGY.
M uscle and Connective	A cute
GENERAL DISEASES	C hronic
D uctless Glands	

Sub-Groups for

EYE.	DERMATOLOGY
	NOSE-EAR-THROAT.
SURGERY.	GYNAECOLOGY.
I nflammation (Bacterial)	Sc ars
I nfections (Protozoa, Fungi, etc.)	Co ntracture
S yphilitic	A dhesions
G onorrhoeal	St ricture
Tb.	O bstruction
Ta Trachoma	D isplacement (incl. Hernias)
N eoplasm	De formities (incl. Phimosia)
T rauma (incl. Burns)	H ypertrophy (incl. Elephantiasis)
U lceration	Fl uid
Gn-Gangrene	P aralysis
F istula	C alculus
V aricosity (incl. Haemorrhoids)	M iscellaneous
H aemorrhage	

This system is admirably adapted for use with the P.U.M.C. Nomenclature.

Records may be filed by Disease Groups, cross-indexed by Number, and Name; or by Number, cross-indexed by Name and Disease Groups. The former gives much more interesting Records: in ease of working there is nothing to choose.

The Grouping is deliberately clinical. Specialists will further obviously and easily expand their own subjects.

For full details apply to the Director, Institute of Hospital Technology, Union Hospital, Hankow.

As will be seen, the First Initial breaks up all possible material into eight primary groups. The Second Initial subdivides these groups,—the Medical by “Systems” (mainly), and the others mainly Anatomically. The Third Initial in its turn subdivides the Second,—on a kind of common “Pathology” basis for the Surgical, the Eye, the Gynaecological, and the Ear-Nose-&-Throat groups, while the Medical groups it subdivides individually as best it may.

Any possible grouping list is open to criticism. This one is deliberately clinical, and attempts a compromise between an incompleteness which leaves too much to the imagination, and an unnecessary elaboration which is cumbersome. It assumes that so long as a Group does not accumulate more than half a dozen or so cases in the course of a year it is unnecessary to subdivide it. On the other hand, if we are specializing in anything—from Eyes to Gynaecology—we can elaborate our own subject indefinitely by creating Initialled sub-groups. Nor need we even notify the Registrar. When he comes on an unaccustomed group of initials he writes him a new filing card—and the Group is formed.

The system works with astonishing ease. When we write “Discharge” on a patient’s chart, we fill in the Filing Initials. These are our instructions to the Registrar. The Ward Routine sends the Charts to the Filing Place, and the Registrar person does the rest. We should keep a copy of the filing-table in each ward, pasted onto a board and hung on its own nail. The ward nurse soon learns to fetch it when a patient is being discharged. Chart-sized copies of this filing-table can be had from the I.H.T. Director, Union Hospital, Hankow. (25 cts. for six).

The Registrar,—a man who can write Chinese—will not take half an hour learning to recognize and copy the 26 letters

of our alphabet, the names of the Months, and the numerals from 1 to 10. More than that he does not need. The Initials reach him in combinations of three, and his filing box will be fitted with tabbed, filing cards, each labelled with a "combination." The average file will use about 150 to 200 combinations.

When installing the system we shall probably sit down with the filing-table before us, and type out in capital letters a page of the more obvious combinations, for the Registrar to cut out and paste onto his filing-card tabs. Thereafter he will write for himself any new group that may come along. Probably we shall type about 40 or 50 M (edicine) groups; about as many of S (urgery); about 10 to 20 each of E (ye), and G (ynaecology); about 5 to 10 each of N (ose-Ear-&-Throat), and V (enereal); and 2 to 5 each of D (ermatology), and O (bstetrics),—for which last two we shall probably not go into the 3rd Initials at all.

Indexing

Our File complete, we have now to Index our material by Number, by Name, and by Date. Unexpectedly it is easy.

For the Index by Number, take a common Chinese soft-paper account book,—the larger size (about 11 in. × 8 in.), and in the first and every fourth column (such books are ruled vertically) write or stamp the numbers—ten to each written column—from 1 to whatever number of patients we expect during the year. In this book the Registrar indexes each patient. When case-sheets reach him for filing he notes the Number, and opposite the corresponding number in the book he enters the patient's Filing Initials. That is all. Then he files the sheets in the Box, and when we want them again, the Index tells us that No. 124, for instance, is in the MFT group (which is the Typhoids), where his number will exactly locate him.

For the Index by Date the Registrar merely adds each patient's Admission Date when he enters the Filing-Initials as above. The admission dates run in the same sequence as the admission numbers, so the completed Index is also a systematic index of dates.

Some hospitals prefer to Index by Discharge Number. It has the advantage of ending the year's record cleanly on December 31st. Such hospitals enter their cases consecutively in the Index book—irrespectively of case-sheet Admission num-

bers; and these index numbers become each patient's Discharge Number, which the Registrar now enters on his case-sheet, and by which he is filed. There are some difficulties. For instance, this additional Number needs to be entered on the Accountant's books, and on the O.P.D. sheets; or else—which is easy enough—we may make a second Index Book, giving a cross reference from the old Admission Number to the new Discharge Number.

For the Name Index, take such another book of 100 pages, and at the heads of its pages write all the family names of the neighbourhood in dictionary sequence according to the number of strokes. Any educated man will make the list. Some of the less common names may go two or three to a page; a few others may need two or three pages to a name: therefore before writing the names into the book, get them roughly appraised, and starred,—one, two, or three stars according as they are to go two to a page, one to a page, or two pages to one. Then write them into the book; and as each patient leaves the hospital, the Registrar enters his Ming-tzu (名字) on his proper family page, together with his Number, his Initials, and his Discharge-date,—which last is often invaluable, together with the Disease-Group, in locating a patient who has forgotten what Ming-tzu he gave when he was in hospital last.

All the information for Indexing is on the case-sheets; and any information that is on the case-sheets can be indexed if we have use for it,—notably an Index of Complications, or a Place-of-Residence Index for follow-up work, or for analyses of Place diseases.

Binding

At the end of the year bind the case-histories—Chinese fashion—into tough-paper-backed booklets of about 1½ or 2 in. thick, each containing as many Groups as a 1½ or 2 in. booklet will take. Separate Group from Group by a sheet of coloured paper—common tough brown paper serves, but an edging of red shows up better. Label each booklet on the back with the Year, and the Initials of the Groups it contains. Use a different coloured label each year. Also, give each volume a series Number so that we can tell instantly if a volume is missing or out of its place,—and make three or four “Dummies” backed with bright red to be inserted as a tell-tale when any volume is removed. Rank the books side by side—as books should be—on a high shelf where they can live undisturbed for

years. If the shelf is covered and curtained so much the better. Unpick the Index books for the year, and rebind them together, to be labelled, and dated, and ranked with the rest.

Manufacturing Tabbed Filing-Cards

We may make filing-cards, case-sheet size ($11 \times 8\frac{1}{2}$ in.), of thin cardboard, two sheets pasted together, with a strip of bamboo p'ih tzu (片子) about an inch wide inserted between them, and projecting an inch above the top to form the tab. Each tab on successive cards should be set an inch further to the right to look orderly in the Box.

Instead of cardboard, we may use half a dozen layers of newspaper pasted together. Cut the newspaper pages roughly into quarters, paste them together, press, dry, and send to the paper-shop to be cut cleanly to case-sheet size. The cards crinkle in drying, and should be pressed repeatedly during the process. A board, or an up-turned stool face down on top of another stool supplies an excellent press when loaded with a few bricks. Finally add the tabs as above, by pasting two cards together with a bamboo strip between.

The following is a report by the Inspector in China for the American College of Surgeons, who investigated the above system of Records-keeping at St. James Hospital, Anking, during 1926. The Report was published in the January number of the "C. M. J.", 1927.

"Having examined the I.H.T. system of records-keeping as it is installed at Anking, I should have no hesitation whatever, as regards Records, in recommending for registration under the A.C.S. a hospital that uses it. It meets practically all the requirements of the A.C.S. The histories are quickly and easily found by Name, by Number, or by Disease. I found the filing and binding by Disease-Groups an extraordinarily attractive feature. I know nothing under any other system at once so simple, and so conducive under our China conditions to an intelligent use of hospital records for study. I could wish that the feature were compatible with our own elaborate system in Changsha."

(Signed) J.R.B. BRANCH,

Inspector in China for the American College of Surgeons.

At the same time the C.M.A. Executive commended the System to the Association. Their commendation, as published in the "C.M.J." of January 1927, is as follows:—

"This system of Records-Keeping, as approved by the Council on Hospital Administration, has been adopted by the Executive Committee of the China Medical Association, and is strongly recommended for use in all our Hospitals."

(Signed) JAMES L. MAXWELL.

Executive Secretary.

Editorials

THE INSTITUTE OF HOSPITAL TECHNOLOGY

We would call special attention to the brief report of the Institute of Hospital Technology appearing under the I.H.T. Section in this issue of the *Journal*.

The I.H.T. has had to pass through periods of considerable difficulty since its first inception. To begin with it had a strenuous time in convincing the profession in this country of the importance of such work. Doctors are by nature rather sceptical of new ventures and wisely so, for they have constantly to meet an exuberance of enthusiasm for novel drugs and methods which the sobering experience of hard facts proves unwarranted.

Having at length got on its feet and begun its regular work the Institute had shortly after its first year to close down completely on account of the political troubles and the special involvement of Anking, the centre where it was then established.

Despite this setback, which must have proved fatal to any work not evidently founded on a real need, the Institute began again in Hankow last year. The enthusiasm roused on its behalf at the last Biennial Conference more than justified the re-opening of the work, and that such enthusiasm was well placed is shown in the report now issued.

The Institute has handled 19 students in the past year from ten different provinces and one from Korea, showing how widespread the need for this training is felt; and the accommodation for the coming year is likely to be strained to its utmost. The I.H.T. is to be greatly congratulated on commencing work for women students in the coming term.

The arrangements for placing the I.H.T. on its own footing under an independent Board of Management, as decided at the last Biennial Conference, have not developed as rapidly as might be desired, but we hope that the constitution of the Board will shortly be announced. Much time has been spent on considering the best plans for a Board and *festina lente* is an excellent saying when such important decisions are in hand.

We heartily congratulate the new Institute on its very successful first year and look confidently to its development in the future.

THE TYPHOID AND PARATYPHOID FEVERS

We have much pleasure in publishing in this issue a paper on the above subject by Dr. Herman Wylie. Such articles are of very great value in determining the incidence of important diseases in this country and we would plead for more of this nature. It is most commendable also that no claim is here put forward to speak from the experiences of one place for the whole of China, an example which we wish could be more frequently copied.

That the enteric fevers do not appear to be more frequent in China would seem strange, in view of the insanitary surroundings among which a large proportion of the population live. Dr. Wylie's figures are 1.5 per cent of total admissions. But of these typhoid cases 29 per cent were soldiers, who we may hope in a few years will not appear among the ordinary hospital figures, and 46 per cent were students, the high figure being apparently due to the contamination of water supplies by soldiers who had occupied the schools from time to time. This would therefore appear to be greatly in excess of the *normal* number. It would appear then that the percentage of admissions from typhoid might be practically halved to arrive at what might be called the normal. Now this is far below the percentage that was found in English hospitals when the Editor was a student. It is true that Dr. Wylie points out that half the diagnosed cases of typhoid would or could not be admitted to hospital; but even so the figures strike us as surprisingly low. For the experiences in the London hospitals thirty years ago were not those of epidemics of the disease but of a steady flow of cases.

The comparatively low figures for typhoid was always a source of surprise to us in our own hospital work out here, and we were led to wonder whether it might not be possible that prolonged and atypical cases of fever in infants and young children might not be really a disguised form of the disease, and whether the apparent relative immunity in later years was not due to an early and unrecognized attack of the disease. The very striking work of Minett on typhoid in infants in Hong-kong rather bears out such a suggestion.

It is important to note also in this connection a statement in the Shanghai Municipal Laboratories Handbook of Information just issued:

A considerable number of Chinese in normal health give positive reactions of this grade (1:40), probably the result of unrecognised attacks in early life.

A further enquiry into the whole subject is evidently called for.

SCARLET FEVER

A recent number of the Epidemiological Report of the League of Nations (R.E. 128) contains a very valuable paper entitled "General Review of the Scarlet Fever Problem in Recent Years." A short extract from this appears in *Current Medical Literature* in this issue of the Journal, but the whole article deserves careful study.

One part of it strikes us however as being thoroughly unsatisfactory, viz. the explanation put forward for the relative immunity to the disease of those living in tropical regions. The only reference made to this curious phenomenon reads as follows:

Snijders, who notes the fact that scarlet fever is much rarer in the tropics than diphtheria, puts forward other reasons in explanation of this fact. Scarlet fever is found only in the higher and cooler parts of tropical regions. This rare occurrence of scarlet fever is due, according to the author, not to the special unsusceptibility of coloured races to the disease, but to the climate and the sparseness of the population, which is scattered over a wide area.

Such a statement as this appears to us to be merely trifling with an important problem. No one with any knowledge of the conditions can suggest that Hongkong, for example, is an area marked by "sparseness of the population, which is scattered over a wide area." We are not aware of what the actual density of the population of Hongkong is, but it would seem to be comparable to some of the most thickly peopled cities on the globe, yet Scarlet Fever, repeatedly introduced, has as often failed to develop in epidemic form. Certainly there can be few cities more densely populated than Canton, yet we believe that an epidemic of Scarlet Fever has never been recorded there. Why is a disease so common and serious in North China, practically absent from South China? An answer to the question would be of the utmost value and certainly deserves some more thoughtful explanation than that given above.

THE UNIVERSITY HOSPITAL, TSINAN

In the Section of this *Journal* devoted to Association News will be found a full account of the closing down of the University Hospital, Tsinan. The whole story is nothing but a repetition of the closing of the Canton Hospital, the educational home of Dr. Sun Yat Sen, by a communist labour crowd tacitly supported by the Canton Authorities three years ago. The scandal of that affair was so great that the story of it was re-echoed over the whole world and did much to discredit the fair fame of China in foreign countries. Some excuse could be made for it however in that the Central Government had not yet got firmly on its feet and could hardly be expected to control local affairs in distant cities.

Since those days we have all rejoiced in the formation of a Central Government in China, its attempts to put just laws into practice and its determined efforts to control the Red elements among the people.

The position now is very different to what it was when the scandal of the closing of the Canton Hospital took place and if the Central Government allows the forced closing of the University Hospital at Tsinan to continue it can hardly escape the responsibility for such an outrage or for the discredit to its name the world over which this action is sure to bring.

The Tsinan Hospital is one of the largest and most progressive in China. It has done marvellous work through all these recent troublous years, it has educated more than 200 of China's scanty supply of doctors and in so doing has done service to this country of a value beyond price and it has produced men of a standard of education second to none in China.

That such an institution could possibly be closed by a group of local rowdies acting in the name of the Government is hardly credible, and that such an action should have the support of the provincial authorities speaks ill for those in power in Shantung. We trust that the Central Government will not hesitate to take steps to abate this scandal and to show in the clearest way that it will not have its fair fame besmirched by those who hold office with its authority.

THE PURCHASING OF DRUGS IN CHINA

Our attention has been called to the omission of the names of certain firms in Shanghai from the list of chemical or biological houses or agencies situated in China given in an article on the above subject in the October 1929 issue of the *Journal*.

Additions to this list are given below and we tender our sincere apologies to those concerned:—

Mee-Yeh Handels Compagnie, 16 Canton Road, Shanghai
and 11-13 Tungting Road, Hankow, S.A.D. 3.

British Drug Houses Ltd., Frost Bland & Co., 29 Szechuen
Road, Shanghai.

Both these firms are well known and carry a stock in China of a certain number of their more important biological and chemical pharmaceutical preparations. Some of the products of these houses and their agencies are among those most widely known and used and all their pharmaceutical preparations are reliable.

Messrs. Burroughs, Wellcome & Co., 5 Hongkong Road,
Shanghai, and

Messrs. Parke, Davis & Co., 4 Yuen Ming Yuen Road,
Shanghai,

appear in list B of the original paper as holding stocks of pharmaceutical chemicals abroad only. These firms should also have appeared under list A—Pharmaceutical chemicals (stocks in Shanghai).

China Medical Association Section

THE UNIVERSITY HOSPITAL, TSINAN

L. F. HEIMBURGER, M.D.

Notice.—Because of the present labor disturbances, this hospital and out-patient department are closed indefinitely.
January 5th, 1930.

Signed, L. F. HEIMBURGER, Medical Director.

This is the notice which now appears on the gate posts of the University Hospital, Tsinan, Shantung, China.

For over twenty years this institution has been serving the people of this vicinity without interruption although governments have changed, battles have been fought in the near vicinity, and bullets have pierced some of its windows. Even during the intense excitement of 1927-28 when the British and American staff were forced to evacuate Tsinan, the hospital was effectively operated by the loyal Chinese staff of doctors and nurses.

Every year during this period approximately 1500 seriously ill patients have received the benefits of modern medicine and surgery in its beds and from 20,000 to 45,000 visits have been made to its out-patient department. For these services the patient has paid not more than a third of the actual cost in 90% of the cases while over 5% have received relief without charge.

For over a decade men and women have been trained as doctors and nurses within its wards in order to more effectively serve their fellowmen in other parts of China. At present there are over 200 physicians and surgeons practising medicine and occupying important positions in public health fields in China who have received their training under the guidance of the staff of this hospital. Annually donations from England and America are received to the amount of over \$50,000 to help in this great work.

The hospital is recognized as the best and largest in Shantung and is the only hospital of this size doing such an extensive philanthropic work in this city of over 400,000.

So it was with many heartaches that the final decision was made to take the drastic step of closing such a well known work

even temporarily. To explain the reasons which made such action necessary we must review the various situations as they arose within the past four months. The activities of the hospital, which is closely affiliated with the Shantung Christian University, are intimately connected with the University so that the strike of the Arts and Science students in the latter part of November reacted upon the hospital. These students, led by six or seven agitators who in turn were instigated by the Commissioner of Education for Shantung Provinces, rose up demanding the resignation of the newly elected President of the University and the registration of the University. After days of parades, posters on every available place denouncing the various administrative bodies of the University and the President in particular, and threatened destruction of property, the President sacrificed his position for the sake of the University, hoping that affairs would settle down. Instead, the agitators took another tack and demanded registration which was now impossible because of the lack of a Chinese president. Thereupon, when the administrative bodies of the institution threatened to close, the students returned to work without their real object being obtained, and their organization split up.

Coincident with the student's strike the nurses in the hospital became dissatisfied with two of the supervising nurses and struck, making impossible demands. After days of conferences at which the role played by the outside forces was shown, 15 nurses were suspended for one month and the remainder of the nurses returned to their duties. But for over a week the patients were nursed by the few graduate nurses of the hospital who gave unsparingly of their time to these extra duties. After this there was no trouble about who was to administer the affairs of the hospital or nursing home.

During this strike of the nurses there were frequent rumors of disturbance among the employees but because the agitators were still in the great minority and the majority of employees were out of sympathy with any sort of disturbance nothing was attempted although we knew that in all probability outside agents were active in exciting them. So for the first half of the past month the hospital has been operating to capacity in a normal manner.

On December 16 a letter was written by the local labor union under the direction of agitators of the provincial union

and sent to the Chairman of the Temporary Administrative Committee of the University, the body appointed by the Board of Managers to take the place of the President. In this the following demands were made:—

1. A general rise in wages of \$3.00 per month with a minimum wage of \$12.00. -
2. A grant of \$50.00 per month by the University to the labor union.
3. The labor union alone to hire and discharge employees.
4. An office and meeting hall to be set aside by the University for the use of the labor union.
5. A full-time secretary to be set aside from the present employee's union for union work alone and the place vacated by him to be refilled by the University.

For two weeks these various demands were discussed pro and con by the University authorities themselves, with the employees' committee, and with representatives of the provincial labor union, the local Kuomintang and the local Community Welfare Committee of the Kuomintang.

Our own employees could have been easily satisfied if left to themselves because they realized that they were receiving wages equal to and in the majority of cases more than they could get in similar situations anywhere in Tsinan, but backed by the promises and threats of outside forces they remained adamant in their demands. Also the representatives of the Kuomintang and various committees which mix up in these affairs would not give in on any demand so that the authorities were compelled to break off all negotiations telling all parties concerned that if a strike was called the University and hospital would close and they would all be out of a job.

On December 31st the provincial labor union declared a three day holiday to celebrate the New Year. The Hospital, anticipating such a move, arranged with the employees so that these holidays could be taken in rotation without affecting the care of the patients. But contrary to this arrangement, a notice having been posted by the labor union that all must take a three day holiday, the whole force except for a few, went on a holiday without consulting the medical director. This was an indication of trouble.

On January 3rd pickets were posted by the provincial labor union assisted by our own workmen and a general strike was

in progress. Immediately steps were taken to empty the hospital of any cases which could be sent home. By the morning of the 4th almost two-thirds of the patients were discharged or in the process of being discharged. This left the most severe cases in two of the wards but by the evening of the 7th arrangements were made whereby these cases were transferred to several small hospitals in the city operated by some of our own graduates. On the 8th the last patient was discharged and the hospital officially closed and the doors locked.

During this time the local police and gendarmes were appealed to and after a great deal of waiting and palaver, eleven men were sent to the hospital to "protect the foreigners and property." But even with these on the premises several instances of sabotage were carried out although no foreigner was insulted or attacked.

But our loyal Chinese friends were suffering. First, the Chairman of the Administrative Committee of the University was dragged off to the Kuomintang headquarters by the labor union where he was put through the third degree "in a polite manner," as he expressed it. Other members of the Chinese staff were threatened so that eventually no Chinese would open his mouth in public, so the issue resolved itself into British-American Staff vs. the labor union.

Therefore the situation today may be summed up as an Anglo-Saxon administration opposed to an attempt of the local Kuomintang to take over the control of the University and Hospital. The Schools of Arts, Science, and Theology were closed by ante-dating the spring vacation period two weeks, the student agitators have been permanently expelled from the University, the Hospital and Out-patient department are closed, but the School of Medicine remains as the only functioning School of the University.

The most heartening situation has been the loyal support and helpfulness of our whole medical staff and medical student body. When the strike began in the hospital and cooks, janitors, laundrymen and stokers were dragged away by the pickets, Chinese and foreign members of staff and the student bodies of both the medical and nursing schools organized and took their places. An attempt was made to beat some of these volunteers which acts seemed to more and more cement the loyalty of the students and antagonize them to the workmen.

The strike has been active for just one week and already there are many employees begging protection so that they can return to work. We would gladly promise this protection if it were possible for us to guarantee such protection, but when we see how not only the whole police force but the highest authorities are intimidated by the local Kuomintang, we ourselves do not feel confident enough in our own safety much less can we safeguard others.

Some of us have very good grounds to believe that the present movement is closely allied to all the previous troubles of this academic year and is the result of a plan laid out by the local Kuomintang and Commissioner of Education for Shantung to close this institution, get rid of the Anglo-Saxon staff, and if not to take over the property, at least leave the way open to form a Provincial University in Shantung without a rival. It is a known fact that the Commissioner of Education has remarked that there is no place in Shantung for two Universities, so as long as the Shantung Christian University remains open there is no hope of the University he is planning being able to attract sufficient students. Therefore close the Arts and Science schools at Tsinan and we can have our school somewhere else.

The whole affair is most short-sighted on the part of the provincial authorities and very deplorable. It seems impossible that so practical a people and so sensible a nation can be very long hoodwinked by a group of high school boys and girls which make up the Kuomintang and seem to have the government of China in their hands just now. One cannot even now find one sympathetic note of approval or respect for such an organization. Merchants, scholars, and even the police have told me personally that the majority of the people of Tsinan today would far rather have the former bandit governor in office than the present clique.

With excessive taxation on imported and exported goods, levies for various sorts of things, labor difficulties, etc. the role of the private citizen in Tsinan is not an enviable one, and now that the largest and most liked institution must be closed because of intrigue and mandates from the authorities who seem to be the bosses now, the patience of the people is strained to the utmost.

Current Medical Literature

CLINICAL FORMS OF SCARLET FEVER

The division into clinical forms is of interest not only from the clinical but also from the epidemiological point of view. The frequency of the different forms of scarlet fever varies according to the country and at different periods. The results of active and passive immunisation also vary according to the forms of the disease; lastly, for the microbiologist and the epidemiologist the variety of clinical forms raises the fundamental question of etiology, the determination of the pathogenic agent of the disease.

While the normal and even the so-called toxic forms of scarlet fever can be attributed with more or less certainty to the haemolytic streptococcus of scarlet fever described by the Dicks, in many other forms the bacteriological factor is less certain. Direct bacteriological examination for the streptococcus in the different clinical forms and the specific therapeutic action of the serum indicate that the scarlet-fever streptococcus is not the only factor, but that another factor is present, either, as certain authors maintain, another pathogenic agent or another form of the same streptococcus.

From the standpoint of intensity, three forms of infection may be distinguished: normal, toxic and septic, to which may be added the forms accompanied by various complications. These may be consecutive in both normal and toxic forms, more particularly multilocular septic forms.

The frequency of toxic and septic forms would seem to be on the increase latterly, as evidenced by a number of authors. At the opening of this summary the case-mortality rate from scarlet fever was shown to be on the decrease; in England, the frequency of the disease has dropped during the last 30 or 40 years, the drop in the case-mortality rate has been even more marked.

An epidemiologist cannot ignore the distinction between the normal and septic forms of scarlet fever, the difference between these forms being such as to point to the presence of different microbes. Only the unit which heads the clinical table can

serve to establish a biological unit for these different forms. In the forms accompanied by complications the latter may also vary very considerably. In the opinion of most of the authors who have employed it, therapeutic serum has no effect on complications. At the same time, the use of this serum in normal or toxic forms of scarlet fever may in many cases prevent complications; though, once these have declared themselves, some other method of treatment other than the application of the serum must be employed. The explanation may perhaps be in the absence of local immunity, which does not occur with intramuscular or intravenous application of the serum. Again, the haemato-encephalic barrier may play an important part. The point of entry of scarlet fever being in most cases the mucous membrane of the tonsils or pharynx, substances designed to produce local immunity should perhaps be applied at this level. Several authors who, in addition to injecting the serum, have given local applications by insufflating dry serum into the pharynx, nose or ears, have obtained good results and appear to have prevented complications (MOROZKIN and GUREVITCH).

Epidemiological Report, League of Nations, July 15, 1929.

PASSIVE IMMUNISATION AGAINST SCARLET FEVER

Passive immunisation has been used in scarlet fever for a considerable time; it was in use, not merely before anything was known about the germ of the disease, but long before the Pasteur era. Passive immunisation did not really assume its present form until after the hypothesis of the specificity of the streptococcus as the pathogenic agent of scarlet fever had been put forward. Even in 1895, however, WEISSBECKER was using serum from convalescents to fight scarlet fever, with varying success. The first anti-streptococcal serum was obtained by MARMOREK in 1895 by vaccinating horses with the streptococcus, but this serum was not specially intended for the treatment of scarlet fever. Since that time, several sera have been proposed; that most used has been MOSER'S, put forward in

1902. This serum also was obtained by immunising horses with living cultures of streptococci derived from the hearts of persons who had died of scarlet fever, and cultivated on blood. Moser's serum exercised a favourable influence on the general condition of the patient, on the rash and on the temperature. It was administered in strong doses varying from 30 to 100 or 200 c.c. This serum was abandoned on account of the severe serum reactions it produced, which even appear to have caused death in some cases. An anti-streptococcal and anti-scarlet-fever serum was put forward by DOCHEZ and Lillian SHERMAN in 1924. This serum, which soon came to be widely used, was also prepared with living strains of haemolytic streptococci isolated from scarlet-fever patients and cultivated on gelose. It was used with success in scarlet fever by BLAKE, TRASK and LYNCH among others. These authors experimented with it in 13 cases of scarlet fever at Newhaven in doses varying from 40 to 200 c.c., and apparently with good results. According to the statistics of the Newhaven Health Department, however, the scarlet-fever fatality-rate at the same period in cases not treated with the serum was 1%, whereas the fatality-rate in cases treated by those authors was about 7.6%. BLAKE reports that serum-disease occurred in all the cases treated with this serum. The specific treatment of scarlet fever on a large scale began with the Dicks in 1924. They immunised horses by subcutaneous injections of scarlet-fever toxin, and thus obtained an antitoxic serum which they concentrated in the usual way. It is this serum that is now commonly used in the treatment of scarlet fever in several countries.

In practice, passive immunisation against scarlet fever is at present carried out either with an anti-streptococcal anti-scarlet-fever antitoxin, or with serum from a person convalescent after scarlet fever, or with a combined vaccine, or with other products derived from scarlet-fever patients, such as milk.

* * * * *

We may conclude, with the majority of authors, that:

1. Anti-scarlet-fever serotherapy yields the best results in pure toxic and even hypertoxic cases: it shortens the duration of the disease, improves the general condition,

causes the toxic symptoms to disappear, and seems to prevent or alleviate complications.

2. On the other hand, passive immunisation has little or very probably no effect in septic cases and in cases accompanied by complications. It has no effect on the complications.

4. Serum-sickness very frequently occurs after serotherapy, but seems to be much less frequent and less severe when serum from convalescents is used than when antitoxin is used.

5. The results obtained from serotherapy suggest that even if *Streptococcus scarlatinae* is really the causal agent of scarlet fever, the septic forms of the disease and the nature of the complications point to the existence of a symbiosis. Comparing scarlet fever with diphtheria, we find that, as regards the latter disease, all authors agree that the diphtheritic bacillus has the same morphological character in the benign as in the malignant forms, but the same cannot be said of the streptococcus, which is known to exist in several forms, and in which mutation is admittedly possible.

* * * * *

This lengthy survey has shown that the problem of scarlet fever is a highly complex one. Whereas, in our study of diphtheria, the scientifically established facts could be classified in logical order, in the case of scarlet fever an enormous amount of contradictory and at times chaotic data has to be presented. The specificity of the scarlet-fever streptococcus appears to be becoming more and more certain. The part played in this, as in other infectious diseases, by groups of microbes remains to be proved. This part appears to be a very important one, and its investigation may possibly lead to the discovery of the true significance of the presence of the streptococcus in scarlet fever patients.

Epidemiological Report, League of Nations, Aug. 15, 1929.

ENCEPHALITIS LETHARGICA IN JAPAN

The end of the summer and the beginning of the autumn of 1929 were marked by the recurrence of an outbreak of encephalitis lethargica in Japan. As is known, there was a widespread epidemic of this disease in Japan in 1924, when 6,551 cases of encephalitis were recorded in 42 out of the 46 prefectures of Japan. The 1924 epidemic gave rise to much discussion on the subject of this disease, since, although the cases observed showed the clinical symptoms of encephalitis, the epidemiological characteristics more closely resembled poliomyelitis. Moreover, the season at which this epidemic broke out—August to October 1924—was quite exceptional for this disease, which is usually rife during the winter months. Geographically, it affected more particularly the island of Shikoku and the prefectures of the main island facing Shikoku (Shugoku). Cases also occurred in a district situated on the west coast of Japan in the northern part (prefecture of Toyama).

Another and much less severe epidemic visited Japan in 1926. This outbreak, like the one in 1924, claimed many victims on the island of Shikoku (prefecture of Kagawa). The district of Shugoku was also much affected, as well as the prefecture of Osaka, to the north-west of the island of Shikoku. The 1926 epidemic was much less severe than that of 1924 and much more circumscribed. Like the former outbreak, it occurred between August and October.

This year's epidemic followed exactly the same course as the earlier ones. The first cases were notified at the end of August and occurred again on the island of Shikoku and in the district of Shugoku; that is to say, the eastern peninsula of the main island. From the outset, the epidemic was much more serious than that of 1926, and, by September 7th, 877 cases and 20 deaths had been notified. The epidemic has continued to spread, and, although it is abating, it has affected a very large number of prefectures. It is a curious fact that the districts most affected have on each occasion been the same, namely, the

island of Shikoku and the area of Shugoku. By October 12th, 1929, the total figures for Japan were 1,304 cases and 587 deaths. It will be noticed that the case-fatality is very high. The largest number of deaths (95) was recorded in the prefecture of Sisoka, on the main island, at the head of a small gulf facing the northern end of the island of Shikoku. Next comes the prefecture of Okayama, also facing the island of Shikoku, and very severely attacked by the previous epidemics. Apart from these foci situated in an area which had been affected by the earlier epidemics, there are centres in other parts of the main island, and also in the prefecture of Hokkaido on the island of that name.

The recrudescence of encephalitis lethargica in Japan, occurring at the same season and in the same areas, naturally suggests an endemic focus. This endemicity and this seasonal appearance are from the bacteriological point of view very important factors, since they may assist research into the nature of this disease and into its pathogenic cause. Discussions took place concerning the origin of encephalitis lethargica when the first cases were recorded in Europe during the war. While some authorities claimed that the disease had been imported into Europe by Annamite coolies and Chinese, others believed that it had been imported into China from Europe. The presence of cases of encephalitis lethargica in nearly every country in the world may mean, however, that there are several foci of this disease. It is possible, too, that each outbreak confers a general immunity upon the inhabitants of those areas where it occurs. The existence of isolated epidemics—limited in space and time—like those of Japan, makes it possible to determine the length of the social immunity acquired by the population against this disease. The epidemic of 1926 was separated from the 1924 outbreak by two years and that of 1929 from the previous epidemic by three years. Are epidemics of encephalitis lethargica, like most epidemic diseases, periodical? It is not yet possible to say.

Epidemiological Report, League of Nations, Sept. 15, 1929.

A SIMPLE CHEMICAL TEST FOR PREGNANCY

SIR,—The Zondek-Aschheim test for pregnancy, which consists in the injection of urine into an immature female mouse, has proved to be of considerable service. In practice it has its drawbacks. It requires that a large stock of immature female mice shall always be maintained, and therefore the test is bound to be expensive. It requires also that the specimens shall be sent by post, a procedure that is apt to become a nuisance. Manifestly it would be far better if some test which could be carried out by the practitioner himself, and which did not involve the use of mice, could be devised. An attempt to provide such a test has been made.

In view of the fact that a connexion has been demonstrated between the elaborated products of the pituitary and compounds of the β -iminazolyl type (histamine, histidine, and tethelin), it was thought advisable to test for the presence of such substances in the urine of pregnant women which has been sent here to the pregnancy diagnosis station for examination by the Zondek-Aschheim test.

The chemical method employed was that described by Knoop for the detection of histidine (see also Hunter). 2.5 c.cm. of urine is pipetted into a soft glass test tube (6 in. by 3/4 in.), and 1 c.cm. of bromine water is added. This latter consists of one part of bromine water of the ordinary laboratory strength, diluted with twice its volume of tap water. The mixture should be brought to the boiling point, when a positive reaction is indicated by the presence of a pink coloration, which rapidly fades, however. In negative reaction the original yellow colour is maintained.

It should be noted that the hydrogen-ion concentration of the urine will effect these results, and as changes occur with bacterial contamination, this especially should be avoided. All the urines examined were five to seven days old. If to male, or non-pregnant female, urine a small trace of histidine is added a positive reaction is obtained, whereas the addition of urea, alloxantin, xanthin, alloxan, or arginine to such urine yields a negative result. It would thus appear that the test possesses a certain degree of specificity.

Up to the present 60 urines have been examined, and the results may be tabulated as follows:

Zondek-Aschheim test positive; this test positive	24 cases
Zondek-Aschheim test positive; this test negative	1 case
Zondek-Aschheim test negative; this test positive	2 cases
Zondek-Aschheim test negative; this test negative	33 cases

The correlation between these two tests has been worked out according to the Pearsonian formula, and χ^2 is shown to possess a value of 48.41, which indicates that a very close relation exists between the findings of these two tests. I am, etc.,

CECIL I. B. VOGEL, B.Sc., Ph.D.

Animal Breeding Research Department,
Edinburgh, Oct. 22nd.

B. M. J. Nov. 2, 1929.

MICROCEPHALIC IDIOCY FOLLOWING RADIUM THERAPY FOR UTERINE CANCER DURING PREGNANCY

LEOPOLD GOLDSTEIN, M.D., AND DOUGLAS P. MURPHY, M.D.

Microcephalic idiocy, as a distinct entity, is a rare condition. Probably not more than one out of every hundred idiots is microcephalic. Nevertheless, it appears to be the most common, single, developmental disturbance observed in children born following therapeutic postconception pelvic irradiation by either radium or the roentgen ray.

The present case of microcephalic idiocy, occurring after postconception radium therapy, is being reported for several reasons. Heretofore, few such cases have been recorded. The child described in this communication has been observed for a longer time than any of the microcephalic idiots previously reported. We have been able to secure exceptionally complete records of the physical condition of the mother, and of the physical and mental development of the child. It is also an interesting fact that this is the second case of microcephalic idiocy occurring after irradiation for carcinoma of the cervix complicating pregnancy, to be reported. The first case observed was reported by Petenyi.

REVIEW OF THE LITERATURE

During the past year, the Gyneccean Hospital Institute of Gynecologic Research of the University of Pennsylvania has been studying the effect of ovarian irradiation upon the health and development of subsequent children. From a review of the literature on ovarian irradiation, and from data contained in the replies to 1700 questionnaires which were sent to leading gynecologists and radiologists throughout the United States, 106 women can be reported who had received irradiation therapy during pregnancy. Seventy-four of these women were delivered of full-term children. Thirty-eight of these children (51 per cent) presented disturbances of health or development of a more or less serious nature. In this group, there appeared an exceptionally high incidence of grave mental and anatomic defects. Among these 38 unhealthy and defective children, born after postconception irradiation therapy, 16 microcephalic idiotic children were found. Fifteen of these children were born of women who received radium or x-ray treatment early in pregnancy. The case reported by Petenyi, and the one here reported, occurred after irradiation in the latter part of pregnancy.

DISCUSSION

The possibility that postconception pelvic irradiation can produce cerebral arrest in the embryo is emphasized by numerous experiments reported in the literature. One of us in a recent review of the experimental animal evidence bearing upon ovarian irradiation, drew the conclusion that "irradiation of the developing embryo was extremely likely to injure its health and future development."

It has also been shown that the brains of very young animals are inhibited in their development and may be severely damaged by the roentgen ray. The cerebral defects experimentally produced in newborn animals may well be compared with the arrested cerebral development that followed irradiation of the intrauterine fetus in the case reported in this paper.

Irradiation experiments upon the brains of young dogs have been reported by Brunner, and Krukenberg. The former irradiated the heads of four young dogs from a large litter on the fourth day after birth, with small doses of hard filtered

roentgen rays. Ten to fourteen days later, the irradiated animals were found to be backward in growth, and exhibited epileptiform convulsions. Microscopic sections of the brains of these four dogs showed high grade cellular swelling. Krukenberg x-rayed two dogs, one over the fore part, and the other over the hind part of the body. The first dog, irradiated over the fore part, developed poorly during the following two months, and could not walk properly or feed himself. His head and eyes remained smaller than those of a normal dog of the same age. He had suffered from a cerebral defect, as shown by his ataxia, tremor, and visual disturbances. The second dog, irradiated over the hind part, developed normally.

An exhaustive study of our case has been made in order to determine, if possible, whether any relationship exists between the maternal irradiation and the arrested mental and physical development of this child, as it is of great interest to know if the irradiation was the cause of the cerebral defect. The records of the sixteen reported cases of microcephalic idiocy seem to point to irradiation as the cause of the cerebral arrest. If such a relationship exists (and the present study seems to confirm the conclusions drawn by the authors of the previously recorded cases), then it is always extremely important to consider carefully the possible danger of producing mental or other defects in offspring if pelvic irradiation therapy is employed during pregnancy.

The frequency of microcephalic idiocy, in the children born after irradiation therapy given in the early months of pregnancy, seems to indicate clearly that the irradiation was the causative factor. The case reported by Petenyi of a three-months' old, imbecilic, microcephalic child, that was born after roentgen therapy in the fifth and sixth months of pregnancy for carcinoma of the cervix, and the case reported in this paper, both indicate the probability of fetal damage as a result of pelvic x-ray or radium therapy when given late in pregnancy.

This potential danger of ovarian irradiation given during pregnancy necessitates a consideration of the question of artificially interrupting such a pregnancy in order to prevent the birth of a mentally or anatomically defective child. The existence of such a serious complication as a uterine carcinoma during gestation makes the question of the therapeutic procedure to be employed extremely important. Both the welfare of

the mother and the health of the fetus must be considered before administering any type of treatment. If irradiation is the treatment of choice, the likelihood of fetal damage should be seriously considered. The circumstances surrounding each individual case deserve careful study and consideration. Basing our views on the frequency of microcephalic idiocy after postconception pelvic irradiation and upon the condition of the child described in this report, we are of the opinion that *no pregnancy should be allowed to continue to term when such radium or roentgen therapy has been employed.*

The value of deep radium therapy for cancer of the cervix in a young pregnant woman is shown in this case report. Complete cure resulted from the employment of 6480 milligram-hours of radium given in two treatments. Another interesting feature of this case is that an artificial menopause was not produced by the large amount of irradiation employed. The patient has had regular menses from 1917 (after eight months of amenorrhea) until her normal menopause, at the age of forty years, in June, 1927, or for a period of eleven years.

The circumstances surrounding the case of microcephalic idiocy described here strongly suggest the conclusion that the cerebral arrest was due to the fetal irradiation.

Am. Jour. of Obstet. and Gyn. Aug. 1929.

COMMON DISEASES AMONG INFANTS AND CHILDREN IN THE PUERICULTURE CENTERS OF MANILA

E. Goco, M.D.

SUMMARY

1. To sum up, of the total number of infants and children that came to the centers, 60 per cent were affected with disease, and this high percentage of sick children bears a certain relation to the percentage of undernourished children. The most frequent diseases found among them were the respiratory diseases, skin diseases (specially eczema and scabies), conjunctivitis and trachoma, intestinal parasites, diseases related to nasopharyngeal obstruction (adenoids, and tonsil and sinus enlargement), infantile beriberi, pertussis, diseases connected with digestive disturbances (gastroenteritis), measles, malaria, dysentery, etc.

Due to the less extensive use in the Islands of artificial feeding, cases of gastroenteritis among infants were few; but after the age of 2 years the cases suffering from this disease tend to increase in number. Infantile beriberi cases have decreased considerably, due to the extensive use of tikitiki extract. Respiratory diseases are relatively more frequently observed during the rainy season (that is, between the months of June and September) than at any other season of the year, and diseases connected with digestive disturbances are relatively higher in number during the hot season.

2. In order to promote child welfare it is necessary not only to institute health and hygienic measures, but also to eradicate undernourishment among infants and children by removing the most frequent causes thereof.

3. The only effective measure for preventing undernourishment among children is the establishment of child health centers and nutrition clinics, because in such institutions undernourished children and the initial period of many diseases can be detected early, resulting in a reduction of infant mortality at minimum cost.

Among the total of 54,111 sick children that had come to our centers from 1923 to 1928, inclusive, the most frequent diseases found were:

	Total case	Percentage
Respiratory diseases	8,667	15.9
Skin diseases	5,661	10.2
Conjunctivitis and trachoma	3,468	6.4
Intestinal parasites	3,285	6.0
Nasopharyngeal obstruction, adenoids, tonsil and sinus enlargement	3,240	5.9
Infantile beriberi	2,739	5.0
Whooping cough	593	1.0
Gastroenteritis	581	1.0
Measles	497	0.9
Malaria	468	0.8
Dysentery	336	0.6
Otitis media	248	0.4
Multiple abscess	175	0.3
Nephritis	227	0.4
Tuberculosis, general form	159	0.2
Stomatitis, simple and aphthous	136	0.2
Parotiditis epidemica	123	0.2
Others	23,496	43.4

Jour. of the Philippine Islands, Med. Assoc. Nov., 1929.

Customs Report

ICHANG

Medical Report for the Year Ending 31st December 1928

Apart from one or two cases of dysentery during the summer season the health of the foreign community has been uniformly good. In the beginning of the year there were only some twenty foreigners resident, but as the year passed the numbers gradually increased, and there are now some seventy living here.

In the spring of the year as conditions locally returned to their more or less normal state it was noticeable that the Chinese authorities were making some sort of attempt to carry out measures of sanitation and cleansing of streets and drains. Such attempts, however, were but spasmodic and in the absence of any definite plan of campaign the good was quickly undone. Malaria and dysentery were prevalent during the late summer and early autumn, but not more so than is usual. The troops in occupation were all An Huei men and among them there were several cases of Relapsing fever.

Pneumonia has always been a rare disease in this port so that when one comes across several cases as the writer did towards the end of the year, the question arises why? Here again it is interesting to note that all the cases occurred among the soldiers who do not belong to the district.

(Signed) T. C. BORTHWICK.

Customs Medical Officer,

Ichang.

Book Review

CLINICAL METHODS. Ninth Edition. By ROBERT HUTCHISON, M.D., F.R.C.P. and DONALD HUNTER, M.D., F.R.C.P. Published by Cassell & Co., Ltd. London. Price 12/6 net.

This favourite handbook, known to almost every British trained doctor as 'Hutchison & Rainy' rather than by its name 'Clinical Methods', has now been in the hands of the printers 31 times, including its nine editions and all their reprints, and has reached a total of 87,000 copies. Two editions have been published in Chinese by the C.M.A. Council on Publication. Following the death of Dr. Rainy some years ago, Dr. Hutchison has found a new collaborator in Dr. Donald Hunter of the London Hospital, who assisted him in the 1924 edition.

The book is almost exactly the same size as in its eighth edition. Several additions have been made, notably in the chapters on Examination of Blood, where paragraphs on Estimation of Platelets, Bleeding Time, Blood Grouping, Reticulocytes (with a new plate) are now found: on the Nervous System where amongst other changes the Examination of Squints and Diplopia occupies increased space: on Examination of Pathological Fluids: and on Bacteriological Methods, rewritten by Dr. G. T. Western. Unimportant or out-of-date information has been omitted.

In other parts of the book the changes are few. Two new plates of Schistosome ova take the place of the old inadequate figure, and a new coloured plate of certain bacteria is the frontispiece.

The handbook, in this ninth edition, will assuredly increase in popularity.

J. L. H. P.

Correspondence

Prescriptions

The Lester Chinese Hospital
Shanghai.

Dec. 30, 1929.

The Editor,
China Medical Journal.

Sir,—In your December issue you published an article by Mr. J. Cameron, entitled "Prescriptions, How long do they keep in China." There is one section of that article regarding the economy of the use of Concentrated Hydrogen Peroxide with which I do not agree, and these are my reasons.

A. I doubt if many upcountry hospitals have facilities for storing Conc. Hydrogen Peroxide; if they have not, there arises a distinct danger of the container bursting with possible injury to persons. Moreover if such a breakage does occur, as they have actually done in the P.U.M.C. one wonders where the economy comes in.

B. The writer states that in order to prevent such happenings, a capillary tube should be placed in the cork, this we are told "Allowed the Oxygen to expand." "Escape" should have been added to that phrase, for that is what happens, therefore Oxygen is lost, and that means that when the Concentrated solution is diluted down to what should be a 3% solution, there is every possibility that it would be considerably under that.

C. The prices quoted by Mr. Cameron are very much higher than one pays in Shanghai. He quotes \$1.10 for a 20 oz bottle Hydrogen Peroxide 3%. As I

write I have a quotation before me for a very excellent brand that is up to B.P. standard, and the price asked for a 20 oz bottle is 0.70. And there are cheaper brands on the market here, the quality of which I cannot vouch for, though the sellers are prepared to guarantee them.

D. How many Up Country Hospitals have the facilities and the time for making Distilled water, and for the diluting?

To such people as would like to try it out, I would suggest that the finished product be tested for strength. And I would recommend the following test as a rapid one for the estimation.

Titrate 2 cc. in the presence of a little dilute Sulphuric Acid with a solution of Potassium Permanganate 5.06 Gm. per litre until decolourised. Each volume of this solution is equivalent to an equal volume of Oxygen. 1 cc of 10 Vols H_2O_2 decolourises 10 cc of the Permanganate, and 1 cc of the 20 Vols will decolourise 20 cc of it.

The explanation is 2 $KMnO_4$ equals 5 atoms of Oxygen. Therefore 316.06 Gms. equals 55.8 litres Oxygen. i.e. 5.66 Gms. equals one litre of Oxygen. Therefore 1 cc of the Permanganate solutions of this strength equals 1 cc of Oxygen or 0.00287 Gm. approximately.

I cannot close this letter without thanking Mr. Cameron for his very great contribution to Pharmacy in North China.

I am,

Yours sincerely,

O. G. R. BEYNON.

The Editor,
China Medical Journal,
23 Yuen Ming Yuen Road,
Shanghai.

January 10, 1930.

Dear Sir,

Mr. Beynon has been good enough to send me a copy of his letter to you dated 30th, December 1929, in which he disagrees with my suggestions concerning the use of Concentrated Hydrogen Peroxide Solution.

(A) During 1928-29 we purposely stored our concentrated hydrogen peroxide solution in our "explosive" godown, in a pit about 6 feet below ground level, as an experiment to ascertain if it would be possible for inland hospitals to carry this solution in stock during the warm Summer months. We found that it would be possible only if each bottle carried a small capillary tube through the stopper.

It is interesting to note that our present stock which we have had for more than one year in the same godown was supplied to us with special glass stoppers, each stopper having a V shaped groove which makes it impossible to seal the concentrated solution; there is no capillary tube required.

(B) We have found from *experiments* dating back to 1925 (1.2.) that the loss of the concentrated hydrogen peroxide solution on storing in China is almost nil.

Supposing there was a loss of one per cent in the strength of the concentrated solution, this loss could be made good when preparing the 3% solution by adding a little more of the concentrated to the distilled water.

Naturally one should always estimate the strength of the diluted solution before issuing it to the wards or to out patients.

(C) Unfortunately Peiping is not Shanghai, we enclose a page of the latest price list we have here, dated December 1929, showing the current price of liquid hydrogen peroxide to be \$1.10 per 20 oz. bottle. In order to verify this price we communicated with three chemical agents in Peiping this morning and were surprised to find that the price today is \$1.55 per 20 oz. bottle of 3% hydrogen peroxide solution.

(D) Distilled water (3.) We have discussed elsewhere, it is essential to use only distilled water in making the dilute solution from the concentrated. We feel that the economy effected in preparing the dilute hydrogen peroxide solution at the hospital will convince medical superintendents that it is cheaper to make the distilled water on the spot rather than pay for its transport from abroad in the form of dilute hydrogen peroxide solution.

During 1929 by making dilute hydrogen peroxide solution ourselves from the concentrated, we saved this institution \$1440.00, enough said.

Yours sincerely,

JOHN CAMERON, F.C.S., Ph.C.
Peking Union Medical College.

REFERENCES

1. Some observations on Hydrogen Peroxide, C.M.J. 1925, January.
2. Hydrogen Peroxide, N. Med. Jl. 1925, February.
3. Water in China, C.M.J. in press 1930.

Syphilis in China

Hongkong, Jan. 1, 1930.

To the Editor,
China Medical Journal
Dear Sir,

With great interest I have read Dr. Snell's report of routine Wassermann tests, which appeared in the December issue of your Journal. The results at which Dr. Snell arrives conform very closely to my figures which I obtained formerly from a study of Wassermann examinations in the P.U.M.C.

My results have been already published in 1926 in an extensive paper on the subject, and my work covers a much larger series of cases than that represented by Dr. Snell's material. I therefore have to disappoint Dr. Snell in his claim to have reported the first large series of Wassermann tests from China.

I quite realise the difficulty of keeping pace with the current medical literature nowadays, but before publishing statements from China, like that of Dr. Snell's, our local medical literature—as published in China at least—should be consulted more carefully. Also in other instances I have noticed that writers in their articles to the *C.M.J.* utterly neglect what has been written

before on the same subject by other writers.

It would, in my opinion help a good deal to improve the standard of scientific writing and facilitate the finding of the necessary literature, if the existing journals in geographical China would cooperate more closely by briefly reviewing their respective articles, at least those of original work.

As apparently Dr. Snell has no knowledge of my article dealing with Syphilis in China and my figures have further been misrepresented by another writer (Lai, *C.M.J.* Jan. 1929). I will quote the final result of my observations which have been in extenso published in the *Caduceus* 1927 and partly also in the *C.M.J.* July 1929.

IN 22% of 6300 tested PERSONS out of a total of 15,000 admissions into the P.U.M.C. Hospital in 1925 the WASSERMANN TESTS WERE FOUND POSITIVE. This figure, as Dr. Snell's 21%, only represents an approximate morbidity, since it does not include the rest of the untested admissions. As I have pointed out formerly the real morbidity figure would probably be found somewhat lower, thus nearing those obtained by Korns and Lai.

Sincerely yours

M. O. PFISTER.

News and Comments**NATIONAL MEDICAL ASSOCIATION
NURSES ASSOCIATION OF CHINA**

As we go to press the Biennial Conferences of these two Associations are meeting in Shanghai. Accounts of the Meetings, which seem to be particularly well attended, will appear in our next issue. At the moment we can but record our heartiest good wishes to both these bodies for their Meetings.

**Return of Veteran
Mission Doctor**

Although Dr. Thomas Gillison officially retired last year after 46 years' work for the London Missionary Society, he is returning to China at the age of 70 as a voluntary missionary. His special purpose in so doing is to continue his valuable work of translating medical text-books into Chinese, although he does not intend to devote himself exclusively to such work.

Dr. Gillison went out to China immediately after completing his medical course at Edinburgh University, in 1882. From 1883 until 1918, he was in charge of the L.M.S. Hospital at Hankow and he then joined the staff of the medical school of the Shantung Christian University but returned to his old hospital in 1923. He was responsible for the translation into Chinese of such medical works as "Luff's Chemistry," "Mitchell Bruce's Materia Medica" and "Cunningham's Practical Anatomy."

N. C. D. N.

The Sino-Scottish Society

A Sino-Scottish Society has been formed in Edinburgh.

For some time there has been a movement towards this, and the inaugural meeting was attended to an unexpected extent by representatives of both nationalities, among those present being Mrs. Garden Blaikie, M.B., Ch.B.; Mr. Geo. Graham Brown, Dr. and Mrs. Edwards, Dr. and Mrs. Main, and Dr. Somerville, of Bonnyrigg. The Chairman, Mr. G. C. Gillison, called upon Dr. Dugald Christie, C.M.G., of Mukden, to explain the object of the meeting.

Dr. Christie detailed the steps which had already been taken in forming this Society, and the ways in which it would be of use in developing friendly relations between the two nations. It was of the first importance, he said, that the increasing number of Chinese attending our University and Colleges, who were going to be the makers of the China that was to be, should be enabled to see the best side of our national life, and should come into personal touch with us. The Society would also form a channel of communication with China, so that it could know of the arrival of students, and help to arrange suitable accommodation. It would also be ready to receive any Chinese who visited Edinburgh.

Mr. E. S. Lee, Chairman of the Chinese Students' University Union, and Mr. V. T. Yang also spoke.

The formation of the Sino-Scottish Society was then heartily and unanimously approved. Dr. Christie was made honorary president; Mr. E. S. Lee, chairman; Mr. Wallace, 5 Argyle Place, secretary; and Mr. G. C. Gillison, 16 Lauriston Gardens, treasurer.

Medical Diaries

We are in receipt of two Medical Diaries for 1930. Wellcome's **Medical Diary and Visiting List**, a publication which has now been available to the medical profession for many years and the value of which is so well known that comment is hardly called for. The 1930 diary more than keeps up the high standard of former years. The lists of the firm's preparations, therapeutic notes, posological tables and a host of other information as well as the actual diary part make this little volume an annual stand-by.

Medical Diary and Vademecum Bayer-Meister Lucius. The China Export, Import and Bank Co. have sent us a copy of Bayer's Diary as above. It is beautifully got up in English. It also, in addition to a list of the firm's products, contains a wealth of medical information and excellent chapters at the close on the technique of injections and on certain of the newer drugs.

For quick reference on subjects which are sometimes difficult to locate in the ordinary text books, these little handbooks are of great value.

The Izal Bulletin

"Of the making many books there is no end" was the Wise Man's comment nearly 3000 years ago. Just what his attitude would be in the 20th century, A.D. it is difficult to picture. For not only does new book follow new book in an unending stream, but new periodicals tend to fill the short periods of leisure still left for the modern reader.

From this point of view one can hardly be enthused over an additional one with the above title, for it is still true that "Much study is a weariness to the flesh." The weariness in this case is however relieved by interesting subject matter and excellent print. In truth there is doubtless a place for such publications and this being so we welcome this method of making more widely known an old friend of well tried value. The *Izal Bulletin* is published monthly by the Research Department of Newton, Chambers and Co., Ltd., Thorncliffe, Sheffield, England.

A new Ephedrine Preparation

A new preparation of Ephedrine in the form of an elixir, under the name of Elixoid Ephedrine Compound has been put on the market by Messrs. Burroughs Wellcome and Co. as an acceptable means of administering the drug to children and to adults who prefer fluid medicine.

High Blood Pressure

The upper limit of normal blood pressure for the average individual has been stated to be equal to his age in years plus 100.

WANTED COLUMN

A Dispenser is needed for the
C.M.S. Hospital, Ningpo.

Application to be made to

Dr. T. C. Goodwin

C.M.S. Hospital, Ningpo.

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For Sale

Bed-Side Xray Unit

1 Waite & Bartlett, U.S. Army
Bedside Unit complete with trans-
former and rotary converter. 10

M.A. type, operates on 110 volt
A.C. current. If available current
is D.C. the rotary converter is
needed, otherwise, operate without
converter.

Price Mex. \$650.00 without con-
verter—Mex. \$800.00 with con-
verter. May be seen at X-ray
Department Andersen, Meyer &
Co., Shanghai or write Dr. L. N.
Bell, Tsingkiangpu, Ku.

NEW MEMBERS PROPOSED

Chin, N. Y. M. D., B. S., St. John's, Private P. O. Box 1644, Shanghai.
Shanghai. Practice

Proposers: Dr. J. C. McCracken,
Dr. A. W. Tucker.

Sloan, William Robert, M. B., B. Ch., B. A. O., P. C. I. Kirin. Man.
M. D., Belfast

Proposers: Dr. E. M. Crooks,
Dr. Hugh W. Y. Taylor.

CHANGES IN MEMBERS LIST, 1930

Dr. Lucille M. Van has gone to Soochow Hospital, Soochow.

Dr. L. Pendleton Todd, 27 South Compound, Peiping.

Dr. Richmond Douglass, Ray Brook, N.Y., U.S.A.

Dr. E. E. Fleming, Ichowfu, Sung.

Dr. Ralph Bolton, Teianfu, Hup.

Dr. Mumford, Torridon, Somers Road, Reigate, England.

Dr. Pillat, 2 Augenlinik, Alserstrasse 4, Vienna 9, Austria.

Dr. Betow, Sienyu, Fu.

Dr. Wm. H. Turner, Nanhschow, An.

Dr. J. Mansfield Bailey, 1114 McKennie Ave., Nashville, Tenn., U.S.A.

Errata. Dr. G. H. Pearson. Paoking read 'Hun' instead of 'Hup'

Dr. Huff, M.P. to read M. Pool Huff.

Omission. Dr. C.C. Wang, K.M.A. Hospital, Kaiping, Hopeh.