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INDICATIONS, CONTRAINDICATIONS AND END —RESULTS IN THE SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS.*

by

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FOREWORD.

Lest we may misunderstand, let it be stated at the outset that surgery is indicated in only a small percentage of cases, and that it does not supplant but supplement the medical and sanatorium treatment of pulmonary tuberculosis.

It is incumbent upon the physician in charge of cases of pulmonary tuberculosis that he should be familiar with the indications, contra-indications and end results to be expected in the surgical treatment of such cases. Whenever in doubt, a surgeon who is conversant with this type of treatment should be consulted without hesitation. In a varied and reactionary disease like pulmonary tuberculosis there should be the closest co-operation between physician and surgeon, without which many of the cases cannot be properly selected and rationally treated.

In most acute cases of pulmonary tuberculosis the saving of life by surgical measure is no less urgent than that of acute appendicitis and as in the latter disease, medical treatment is unreliable.

It is impossible to lay down any hard and fast rule in a given case as to when and what form of surgical treatment is indicated. But experience and competent knowledge of the subject should be the best guide.

There are quite a number of surgical procedures used in the treatment of pulmonary tuberculosis, such as phrenicectomy, artificial pneumothorax, thoracoplasty, multiple neurectomy, apicolysis, pneumolysis, oleothorax, etc. But as some of these methods are still unper-

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fected, and as also the time at my disposal is limited I propose to deal with only the first three, viz., phrenicectomy, artificial pneumothorax, and thoracoplasty. To-day, this trio constitute the most widely practised and accepted surgical treatments of pulmonary tuberculosis.

PHRENICECTOMY.

The term " phrenic evulsion " should replace " phrenic avulsion " and phrenicectomy should replace phrenicotomy.

This operation aims at evulsing at least 12 c.m. of the phrenic nerve. This is the minimum length required in order to rupture any accessory connection with the main nerve. When the nerve is sectioned the side of the diaphragm which it supplies is at once paralysed, and it rises to the level which it formerly occupied at the end of full expiration. In the succeeding few months the diaphragm continues to ascend until up to a certain level. This operation confers the effect of partial compression and partial collapse of the lung, particularly the base of the lung.

As tuberculosis spreads chiefly by lymphatics and as the flow of lymph is mainly dependent on lung movement, phrenicectomy has the advantage of securing rest without putting the lung completely out of function.

I. PHRENICECTOMY AS AN INDEPENDENT TREATMENT.

This is divisable into group A and group B.

(A) Phrenicectomy as an Early Treatment in the Control of Disease.

The operation is indicated in all early unilateral lesions, if proper medical and sanatorium treatment for four to eight weeks do not arrest the spread of the disease. In fact in the poorer classes we advise phrenicectomy as soon as we are satisfied that the opposite lung is clinically sound. As the reaction from the operation is slight, no harm can come to the patient; on the other hand it can confer a lasting benefit.

Before the operation is decided upon it is necessary to ascertain that the opposite lung is " quiescent " i.e. if any lesion exists it must be slight and inactive.

The operation is particularly beneficial in basal lesions, even with cavitation. Lesions in the apex and mid-levels are also favourably influenced though cavitation occurring in these localities should be treated with artificial pneumothorax supplemented by phrenicectomy.

The splendid effect of phrenicectomy in arresting early pulmonary tuberculosis is well illustrated in the following case. Within the last two years I had two young chauffeurs in my employ, who one after the other, developed pulmonary tuberculosis with hæmoptysis and

positive sputum. Radiography revealed in each a right unilateral subclavicular lesion. In the first case, phrenicectomy was performed 23 months ago and thereupon he was sent back to his village with no further or other treatment. After the 23 months he returned "clinically cured" as evidenced by the complete absence of symptoms, with considerable clearing of the radiograph and repeated negative sputum. On the other hand, phrenicectomy was not resorted to in the case of the second chauffeur, as it was then believed that the disease was very slight and after a month of hospital treatment he was discharged as very much improved. He was so well that he went back to motor driving against advice. Six months later, however, he returned with severe hæmoptysis, and on being X-rayed we found a diffuse bilateral infiltration with cavitation in the right lung. His chance of recovery is now very small indeed.

We must emphasize, however, that the best results are to be expected in case of chronic fibrous types.

(B) Phrenicectomy as a Palliative Treatment.

Phrenicectomy is indicated in all cases in which artificial pneumothorax failed, and when thoracoplasty is contraindicated. It is then the only effective measure at our disposal.

It may be advantageously performed in certain bilateral cases on the worse side, with the object of ameliorating symptoms and lengthening life. But this is not a good class of material and no definite promise should therefore be made.

However, when the patient is poor and unintelligent despite the fact that artificial pneumothorax is indicated, we often give phrenicectomy the benefit of the doubt, because in our experience these patients will not return for refills once they are temporarily improved. We must understand that the period required for artificial pneumothorax treatment is of 3 to 5 years. It is fair to say that we must not rely too much upon phrenicectomy as a self-sufficient treatment; every case operated upon should be examined at least quarterly for the succeeding five years.

(C) Phrenicectomy as a Symptomatic Treatment.

Phrenicectomy is indicated in cases of dry irritating cough or persistent hiccup due to basal adhesions. It will also relieve the heart in cases of gross displacement due to intrapulmonary fibrotic contractions.

II. PHRENICECTOMY AS A SUPPLEMENTARY TREATMENT.

(A) Phrenicectomy Supplementary to Artificial Pneumothorax.

(1) In all advanced cases phrenicectomy is insufficient, it must be supplemented by artificial pneumothorax or thoracoplasty, and, as such, it is the most valuable adjunct available.

We made it a rule to perform a preliminary phrenicectomy in all artificial pneumothorax cases. We are more than convinced that it lessens the liability to pleural effusion. In our experience the incidence of this complication is far below the 40% published by leading authorities.

Phrenicectomy has the further advantage that, when the lung is finally allowed to re-expand, in a case of artificial pneumothorax, it will have a smaller hemi-thorax to reoccupy, hence closed cavities and fibrosed lesions will be less likely to be separated or pulled asunder, reactivation of the disease is thus more safely guarded.

(2) When collapse of the lung by artificial pneumothorax is incomplete owing to pleural adhesions, phrenicectomy is especially indicated in order to ensure a more complete compression.

(3) In artificial pneumothorax cases, phrenicectomy has the merit of lessening the rate of absorption of the introduced gas. The interval for refills is, therefore, lengthened by ¼ to ⅓ of the usual time.

(B) Phrenicectomy as Supplement to Thoracoplasty.

(1) As the difficulty of a satisfactory collapse of the lung in thorocoplasty cases is generally admitted, phrenicectomy is not considered a necessary adjunct.

(2) In cases of poor surgical risk a preliminary phrenicectomy may bring about such a marked general improvement of the patient that it renders the operation of thoracoplasty possible, and with less operative risk. Indeed, when thoracoplasty is indicated in a case of very poor surgical risk, a preliminary phrenicectomy should be performed in order to test the condition of the opposite lung and the integrity of the cardio-renal system.

(3) Partial thoracoplasty of the upper seven ribs supplemented by phrencectomy may in the future replace Sauerbruch's classical operations of extrapleural thoracoplasty, as these two operations in combination are much safer, and the patient is less deformed afterwards.

GENERAL REMARKS UPON THE STATISTICS OF SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS.

As no two cases of pulmonary tuberculosis are alike, and that accurate classification according to the type and extent of the disease is almost impossible, one must be careful in accepting statistics, because the result of any treatment is absolutely dependent upon the individual resistence of the patient, the degree of activity of the disease, and the duration of sanatorium or other treatment concurrently prescribed. In the present state of our knowledge, a small percentage of cases will die whatever may be the form of treatment, either because the disease is too advanced for effective control or the resistance is nil or too much below par.

However for the purpose of study and of gaining conviction some form of statistics is unavoidable.

END RESULTS OF PHRENICECTOMY.

Phrenicectomy has been practised in our clinic during the past four years chiefly as a supplementary treatment to either artificial pneumothorax or thoracoplasty. It is therefore difficult to assess the value due to the phrenicectomy alone.

We have, however, the records of 20 cases in which, in addition to general measures, phrenicectomy was the sole active method of treatment. Eight of these were with absolute indications and twelve were with relative indications. The age of the patients ranging between 16 to 64 years. The results of the two groups are as follows :—

I. Cases with Absolute Indication or Cases of Choice.

Of the 20 cases in which phrenicectomy was the sole active method of treatment, 8 were performed with absolute indications. The results are all the more remarkable because although they were mostly unilateral cases, they were by no means cases in the very early stage of the disease, as evidenced by physical findings. Besides, all 8 had positive sputum. The result in this group is very encouraging and is hereunder :—

" Clinical cure " 2. Markedly Improved 2. Improved 1. No Result 1. Dead 1.

Of those improved, the improvements were in temperature, pulse rate, cough, sputum and in body weight. The gains in weight varied from 5 to 38 lbs., with the average gain of 10 lbs. The two cases considered as " Clinical cure " are now over two years. Their positive sputum became repeatedly negative. The result in these two cases was all the more remarkable, because one was complicated with diabetes, and the other with syphilis. Of course both received appropriate treatment concurrantly.

The results in this group, conformed very closely to the statistics from certain clinics abroad which claimed 50% of those operated upon as remarkedly improved with 25% of these as cases " Clinically well." This is not surprising as most of their cases are likely to be earlier than cure.

II. Cases with Relative Indication or Cases of Necessity.

This is a hopeless class of material as the operation was done as a palliative either to ameliorate suffering or in an attempt to control the activity of the disease in the worse lung, when other methods had failed or were contraindicated. All of these had definite bilateral lesions, most of whom were in the advanced stages with cavitation. The result is as hereunder :—

Improved 5. No Result 1. Unknown 1. Dead 5.

ARTIFICIAL PNEUMOTHORAX.

When air or gas is injected into the pleural cavity the lung collapses and this may be carried to any desired extent provided there is no adhesion between the pleural surfaces, and the heart is sound.

This induction of artificial pneumothorax in the treatment of pulmonary tuberculosis is now universally recognised as the most valuable single procedure. When indicated, there need be no fear of its being too drastic a measure; because Nature has provided us with an abundant surplus of lung tissue, and it is estimated that two-thirds of a good lung is quite ample for normal life.

It is an interesting fact that in the majority of cases, there is a time sooner or later, usually sooner, which suitably lends itself to artificial pneumothorax treatment. Unfortunately however by the time most of the patients present themselves for examination, owing to the advanced stage of the disease, the pleura has become adherent, and artificial pneumothorax is impracticable. There is therefore an increasing tendency among specialists to utilize artificial pneumothorax treatment as early as possible, as too often by waiting for improvement with ordinary treatment the pleura has become adherent.

Among various surgical methods of treatment, artificial pneumothorax is the method of choice in the vast majority of cases, in which a part or the whole of the lung needs to be collapsed. The success of the collapse depends entirely on the state of the pleura, viz., whether it is free or adherent, and if adherent, to what extent? But in any given case if collapse is insufficient, no harm is done by discontinuing the treatment.

If the collapse is complete, the result is sometimes almost miraculous, as the long suffering symptoms are at once relieved, the period of convalescence is shortened, and the patient can safely return to his original environment or work, if necessary.

INDICATIONS FOR ARTIFICIAL PNEUMOTHORAX.

For convenience of description these may be divided into those for (A) unilateral and those for (B) bilateral lesions.

(A) Indications for Artificial Pneumothorax in Cases of Unilateral Lesions.

1. *When the Disease is Acute.*—In pronounced acute lesions as evidenced by the toxic symptoms and physical findings, the tendency of spread of the disease to the opposite lung is very great. It is often safer to collapse the lung as soon as possible. In fact the more acute the infection, the quicker artificial pneumothorax must be applied and the greater must be the compression given.

2. *When the Disease is Subacute or Chronic.*—In the less acute cases, if phrenicectomy does not arrest the course of the disease, and if inspite of strict bed-rest and open air treatment for 2 to 3 months, the disease progresses, then artificial pneumothorax is indicated. During this period, the chest should be radiographed at frequent intervals, and whenever unmistakable evidence of spread occurs, collapse should be induced forthwith.

3. *When There is Severe or Repeated Hæmoptysis.*—When successfully induced it is the most certain measure of arresting hæmorrhage. But this should be done only as a last resort because copious or repeated hæmoptysis is found usuaully in advanced and bilateral cases.

4. *When There Are Cavities With Copious Sputum.*—In the presence of cavitations, it is almost impossible without active treatment to render the sputum T. B. free, and as these patients are a constant menace to those around them, collapse of the lung with its cavities is indicated.

5. *When the Patient Belongs to the Poorer Class.*—Under the present social condition in this country, it is not possible to expect a patient of the poorer class to undergo prolonged treatment in an institution, because without exception he has to earn his living in support of himself and family. Artificial pneumothorax will greatly shorten his residence in the hospital provided he thoroughly understands and seriously undertakes to return for refills for a period of three to five years, besides having a supplementary phrenicectomy performed. Once the lung is collapsed, he is less likely to infect the family and can return to his work, which is his main source of worry.

6. *When There are Extra-Pulmonary Complications.*—Tubercular laryngitis of the non-progressive type (unless there is ulceration of the epiglottis with dysphagia) often improves when the original focus is collapsed. Intestinal tuberculosis absolutely contraindicates the induction, but when the diarrhœa is due to toxæmia, then improvement may be expected at once following the collapse therapy.

(B) Indications for Artificial Pneumothorax in Cases of Bilateral Lesions.

When the lesion is bilateral and therefore in an advanced stage, treatment is rather one of necessity than of choice.

The principles of the treatment may be said to be the same as those described under unilateral lesions with the exception that the opposite lung is also involved. The result naturally is not so good as those in unilateral cases.

The rationale of the treatment is that collapse of the worse lung may remove so much toxæmia and cause so much general improvement that the limited lesion in the better lung also improves. On the other

hand collapse of one lung may aggravate the disease in the other by the added strain. This is especially so in acute bilateral cases.

Before commencing treatment, there must be a certainty that the contralateral lung is functionally sound.

The best results in bilateral cases are to be expected in chronic cases with very marked fibrosis and with the lesion predominantly confined to one lung.

CONTRAINDICATIONS TO ARTIFICIAL PNEUMOTHORAX.

1. *Miliary Tuberculosis.*—This is an absolute contraindication.

2. *Disease in Contralateral Lung.*—If the lesion is more than one-sixth of the lung with considerable activity, or if it is chronic but with more than a quarter of the lung involved, or if the disease is scattered or if it is localized but with cavitation, artificial pneumothorax is contraindicated. Asthma, Emphysema and a tendency to bronchitis also contraindicate the induction.

3. *Certain Complications of Pulmonary Tuberculosis.*—Cases with terminal complications such as tuberculous enteritis and progressive ulcerative laryngitis are absolutely unsuited to the treatment.

4. *Disease of Other Vital Organs.*—Pronounced diseases of the heart and kidneys and neurasthenia are distinct contra-indications.

END RESULTS OF ARTIFICAL PNEUMOTHORAX.

In order to prove the value of artificial pneumothorax one must show statistics based on a large series of cases treated over a number of years. As our own series is too small and too recent I cannot do better than to present statistics published by the Matson Brothers and Bisaillon. These three authorities together reported 480 cases, all of which had been observed for more than two years.

The results are tabulated under the following headings in the order of importance:—

1. Type and amount of disease.
2. Character of artificial pneumothorax.
3. Status of contralateral lung.

Their "Clinically well" cases were those with complete absence of signs of activity and with continuous negative sputum for more than two years. Their best results were in fibrous cases without cavitation.

TABLE OF RESULTS OF ARTIFICIAL PNEUMOTHORAX ACCORDING TO THE TYPE OF DISEASE.

Type	% *Clinically Well*	% *Arrested*	% *Dead*
Fibro-caseous disease	40	16	31
Fibro-caseous cavernous	25	24	29
Similar with much cavitation ...	27	16	46
Caseous pneumonic and broncho-pneumonic	23	3	53

This table shows that the most favourable cases were those of the fibro-caseous type without cavitation, as 40% became "Clinically well," and 16% were arrested. Even acute cases are hopeful, provided satisfactory collapse is obtained, as contrary to expectations the "Clinically well" amounted to 23% of those treated.

TABLE OF RESULTS ACCORDING TO THE COMPLETENESS OF LUNG COLLAPSE.

	Cases	% *Clinically Well*	% *Arrested*	% *Dead*
Satisfactory collapse..	235	48	18	22
Partial collapse.....	245	11	12	58
No free pleural space	120	5	9	66

From this table it is clear that success depends largely upon the degree of collapse, and that the benefit accrued from a partial collapse contrary to expectations is very slight.

TABLE OF RESULTS ACCORDING TO THE STATUS OF THE OPPOSITE LUNG.

Contralateral Lung	% *Clinically Well*	% *Arrested*	% *Dead*
No disease	52	20	14
Deep peribronchial infiltration..	45	24	20
Disseminated bronchogenic Caseous tubercle (aspiration disease)	26	26	33
Active fibro-caseous infiltration (apical)	48	22	22
Quiescent fibro-caseous infiltration (apical)	50	24	20

One would expect that the end-results of artificial pneumothorax would depend, above all else, on the integrity of the opposite lung, but the Matsons and Bisaillon proved that only 16% of the fatalities were due to the spread of disease in the functioning lung, and they emphasized that it is in the collapsed lung especially and not in the functioning lung that the elements of success or failure are to be found.

Judging from the above three tables which show the results according to type of disease, degree of collapse and the condition of the opposite lung, it is evident that except the first type namely the type of disease over which we have no control, the other two are largely depending upon our efforts. If surgical interference is promptly made, the collapse of the lung is more successful, and the conditions in the contralateral lung may never arise. All these point to the danger of delay. Clive Riviere has said: "Let us preach widely, therefore, the reproach that lies in failure and the need of early decision if pneumothorax is in question."

THORACOPLASTY.

In the operation of thoracoplasty the object is to secure the permanent collapse of the lung by rib resection, so that the chest wall can fall inwards towards the mediastinum.

Thoracoplasty should not be performed, however, unless or until the patient has sufficient resistence as marked by fibrosis.

When artificial pneumothorax is incomplete or impossible owing to pleural adhesions, thoracoplasty is the only effective remedy at our disposal but it must not be unduly delayed, because cavitation diminishes the chances of success.

The advantage of thoracoplasty is that when once performed, the patient is made safer to return to his former surroundings and is not required to attend treatment regularly, as in artificial pneumothorax cases, for the next three to five years.

As in artificial pneumothorax, left-sided cases do better than right sided ones.

There are two disadvantages of thoracoplasty, viz:—

1. The immediate mortality of the operation, which is 7.5%.

2. The impossibility of again utilizing the lung, should disease develope in the opposite side.

INDICATIONS FOR THORACOPLASTY.

Thoracoplasty is indicated in all those cases in which artificial pneumothorax had been tried and failed because of difficulty to obtain sufficient collapse of the lung. But one must bear in mind that lesions in the better lung may be of such a type and extent that though per-

missable in artificial pneumothorax treatment, may absolutely contra-indicate thoracoplasty. In considering its application do not forget that activity is more important than the extent of disease.

Thoracoplasty is indicated in artificial pneumothorax cases which at the end of the prescribed period when the lung having been allowed to re-expand, there is a reactivation of the disease.

It is also indicated in certain cases of pyothorax, whether primary or secondary, to artificial pneumothorax.

CONTRAINDICATIONS OF THORACOPLASTY.

Thoracoplasty must never be done in " ultra acute " cases, nor in those with a pronounced cachexia and a failing heart.

Patients between the age of 30 and 40 do better than those younger or older. The age should be estimated by resiliency of the lung tissues, the condition of the circulatory and renal systems, etc.

Emphysema, Asthma and a tendency to bronchitis contraindicate the operation.

THE END RESULTS OF THORACOPLASTY.

There is a close similarity of results between thoracoplasty and artificial pneumothorax as revealed by statistics.

Alexander in 1925 published statistics of 1,159 cases collected from clinics throughout the world with the following end results:

" Healed " 36.8%. Improved 24.4%. No benefit or died 38.75%. From this it is seen that the " improved " including the " healed " totalled 61.2%.

It should be pointed out that these figures were collected from men who were proficient in thoracic surgery, and that the technique and the rapidity with which the operation is performed make an enormous difference in the immediate and end-results.

TRACHOMA OUR GREAT SCOURGE.**

by

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It is not without hesitation that the writer ventures to present such a topic before a group of scientists who are specialising in widely separated fields. Nevertheless, he feels that there are a number of reasons which justify him in engaging the attention of his most intelligent audience on this important subject.

You all who are citizens of the Chinese Republic should naturally be interested in the affairs of China. During the present period of Reconstruction, you should especially take to heart any programme which is a prerequisite in the building of a strong and powerful China.

You must still recall when you left China you had your eyes inspected and lids everted by a doctor, either over there or at a port of entry in this country. Your scientific curiosity must have been aroused as to the necessity of such an obtrusive investigation. When foreigners go to our country, they do not have to be examined. Is that fair?

From a merely personal standpoint, anyone with a pair of eyes cannot but have some concern about his ocular health. That delicate visual mechanism enables you to appreciate the beauty of Nature and to acquire your profound erudition. How priceless it is! Can you afford to have it impaired by that treacherous disease, trachoma—or any disease for that matter?

Trachoma is a contagious disease which gives rise to granulation or roughness of the conjunctiva, the smooth conjoined lining membrane of the eyelids. It is by no means a new malady. It probably existed in Egypt as early as the nineteenth century B.C. The disease described by our Sun Ssu Miao (孫思邈) in Tang Dynasty (唐朝) known as Lien Sheng Feng Li (瞼生風粟) in the famous ophthalmologic treatise, Yin Hai Ching Wei (銀海精微) apparently signifies trachoma. Horace and Cicero suffered from this infirmity. When Shakespeare made Lancelot Gobbo say that his father was " more than sand blind —he was gravel blind," this great English writer was mindful of the widespread, ocular affliction in his days.

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** Read at the Annual Meeting of the American Branch of Chinese Science Society in New York City on September 11, 1931.

That trachoma is contagious is well established. Treacher Collins, recording his experience as an ophthalmic surgeon to the London ophthalmia schools, portrayed the following dramatic incident. "Some of the children when their eyes are cured are very loth to depart from these pleasant surroundings to return to their parish barrack schools in London. Various tricks are played by them to keep up discharge from their eyes, or to make them injected, so that they may not be sent away. One child, whose name peculiarly enough was Sly, was admitted with marginal blepharitis and slight conjunctivitis; this was cured and all treatment was stopped preparatory to her leaving the school. She was then caught by the nurse taking discharge from another child's eye who was suffering with trachoma and deliberately putting it into her own. The symptoms of acute mucopurulent ophthalmia rapidly set in, and two months later typical trachoma follicles on the tarsal conjunctiva were recognized. After a year's treatment the trachoma was cured."

During the World War hundreds of conscripted soldiers in the armies of the Russian and of the Austro-Hungarian Empire infected themselves with Trachoma in order to avoid active military service. They accomplished this by placing within their conjunctival sacs bits of cotton soaked in the secretion of trachomatous patients. We certainly have ample evidence of the facility with which this horrible disease can be transferred from one person to another.

As you know, America is the land of opportunity for the downcast and depressed in Europe. A vast number of immigrants flocked to the U.S.A. from Ireland following the Irish famine, then from Italy and other countries around the Mediterranean Sea, and later from Poland and Russia. They bring with them more than their strong bodies, their hopes and ambitions—often an eye disease. Perceiving the imminent danger, the American Ophthalmological Society in 1897 urged their Government to take immediate steps against the further importation of trachoma. The Government was quick to respond. In a very short time, the Surgeon General of the U.S. Public Health Service officially proclaimed the disease as "dangerous contagious." An alien, suffering from it, is excluded from admission to the United States. The alertness with which the American Government attempts to stamp out a contagious disease should incite our National Government to make similar efforts.

Generally, the onset of trachoma is insidious. In the incipient stage, the victim may have no knowledge of his disaster. Later on, there may be ocular discomfort, redness, lacrimation, photophobia, pain, discharge, drooping of the lids, rapid loss of vision, etc. The patient may go through untold suffering until finally he becomes totally blind. Trachoma mutilates the beautiful organ of sight; it causes

misery; it interferes with education; it diminishes one's working capacity. Who can guess what great possibilities awaited the unfortunate one had his vision not been destroyed? Furthermore, trachoma not only depresses the economic and social status of the individual, it frequently involves that of his family. It is thus a link in the vicious cycle of ignorance, poverty, and disease, each being the result as well as the cause of the others.

Trachoma is quite widespread in the world. All races would suffer equally from it if exposed to conditions which favour its spread. It was very prevalent in England. By careful control, it has become practically extinct there. The percentage of infection in Egypt is extremely high. Over 90% of the Egyptian population is infected.

Let us focus our attention on the number of victims in China. At the Jones Child Welfare Exhibit in Canton, Y. P. Chan and Frank Oldt (2) participated in the examination of 1,602 persons. They found the incidence rate of trachoma to be approximately 15%. S. P. Chang (3) examined 1,843 students in ten different schools in Peiping. He discovered 416 cases of trachoma, i.e., 22.2%. C. H. Chou's (4) study showed that among the 4,150 new eye patients treated in Peiping Union Medical College Hospital from May 1, 1928 to April 30, 1929, 1,393 patients, or 33.5% were suffering from trachoma in one phase or another. H. J. Howard's (5) investigation near Paotingfu gave the following results: "In one school which represented the children of school age from seven adjoining villages, 47.2% of the boys and 66.7% of the girls, or 56.5% for both, were found to have trachoma. In that village 90% of the adults had trachoma, which made an average for that village including both children and adults, of 67.5%. In another village a school maintained by the Presbyterian Mission showed 68% of the children with trachoma. Two more villages were visited and in one 79% and in the other 80% of the people had trachoma." Howard (6) further stated: "From statistics I had gathered, I had come to the conclusion that fully one hundred million of Chinese people have trachoma, and that probably five million new cases, mostly children, develop each year. I had estimated that not less than one million Chinese are blind in both eyes, and that three or four million are blind in one eye; further, that not far from twenty million have had their vision so much impaired by inflammation and the formation of scar tissue, due to trachoma, that they are able to eke out only the barest kind of existance."

You may wonder what the etiology of this loathsome disease is. Unfortunately, it is still undetermined. Numerous eminent workers have sought for the causative agent during the last half a century. Now and then we hear about the discovery of the specific cause. But none of these claims could be substantiated. The latest piece of research which might shed some light on the etiology of trachoma was

performed by the brilliant Japanese scientist, Noguchi (7). However, his untimely death cut short his valuable service for humanity. While there are reports which confirm his labour, other able investigators, among whom is F. F. Tang (8) of National Central University, Woosung, fail to verify it.

It would be beyond the scope of this paper to discuss the technical methods of treatment and the medications administered in cases of trachoma. Nevertheless, I want to remind you of the gospel of scientific medicine. The good results derived from a proper course of therapy are nothing short of a miracle. Too great stress, however, cannot be laid on the importance of early treatment. It would be folly to expect too much from any remedial measure after irreparable damage has occurred.

I cannot condemn too strongly the old school of Chinese medicine as it is practised to-day. Let me note here two prescriptions from an authoritative textbook of medicine:—

At sunset, the patient travels to a bush where there are birds. While scaring the poor creatures he has to mutter the following words:

紫公！紫公！
我還汝育；
汝還我明。

Having repeated the above for three consecutive evenings, he is expected to find his vision improved!

An alternative:

赤眼神！赤眼神！
我今知道你緣因。
你是相公前掃街人！
只因灰塵吹入目，
至今留下赤眼人。

You may say those are superstitions. Read Pillat's (9, 10) two articles describing the injuries done to the eyes which were mildly afflicted with trachoma. Just imagine the self-styled eye specialists, some of whom are old women, with absolutely no knowledge of anatomy or physiology, performing operations on the delicate visual organ! Acupuncture without the least aseptic precaution is the usual method of choice! Other times medical treatment in the form of 珍珠散, 撥雲散, or 靈光散 is employed. Buy any of these drugs from a Chinese drug store, apply it to the eye of an experimental animal, and observe the result yourself. It is simply inconceivable that in the twentieth century, and in a civilized country such outrageous atrocities could have been committed ad libitum.

Preventive medicine is gradually taking the place of curative medicine. To combat trachoma, or any other diseases, prophylaxis should be the first consideration. The slow development of our public health system, and the gross neglect of the simple rules of hygiene and sanitation among the majority of our people have let all kinds of infections flourish throughout the entire country. The indiscriminate use of the common towel, basins, and various household utensils constitutes the chief factor in the dissemination of trachoma. The lack of physical examination in schools, factories, and other public institutions also promotes the diffusion of this malady. "An ounce of prevention is worth a pound of cure." You, too, play an important part in the revitalization of our national health.

In conclusion, may I be allowed to quote the remarks of our well-known ophthalmologist, T. M. Li (11)?

"Trachoma is undoubtedly the greatest single cause of the economic losses that are occurring in China to-day. But it truly appalls one to find that so much apathy exists concerning a disease which has made millions of people blind, and several times that many nearly blind. It seems as though the people have come to look upon it as a necessary evil. The duty devolves upon us who know that trachoma is not a necesary evil to lay the foundation plans for eradicating it from our land. Are we ready and willing to give ourselves to this service, or shall we leave it to those of nobler spirit and of greater zeal,—to those of a generation yet to come?"

The eradication of trachoma is without doubt a gigantic problem. But, we can say with confidence that it is not an impossible task. England did it. We will!

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INDIVIDUAL AND RACIAL CHARACTERISTICS OF THE BLOOD.*

by

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It does not need much mental effort to understand why the blood is universally regarded as the life-giver to the body, and an examination of medical history shows that the study of the blood can just as truly claim to be the giver of life to the science of physiology and the study of medicine, for before the circulation was understood anything approaching a correct physiological conception of any part of the human body was impossible.

Three hundred years ago, medicine was still in the stagnating calm that followed the teachings of Galen 14 centuries before. Galen's book had become the medical bible, and Galen's statements the medical law, irrefutable, undeniable; nor was this state of affairs merely the outcome of man's lack of investigation, and the decline of learning through the dark ages, but it was positively fostered and actively preached by the powerful church of Rome. At this time Anatomy was taught by the Professors sitting in front of their students and reading Galen to them, barbers meanwhile illustrating the lecture from rough dissections, and when the book differed from the body Galen the infallible was unquestionably believed, for was not his teaching 14 centuries old and that of the poor dissected body but perhaps 3 score years and ten.

In the veins ebbed and flowed crude blood endued with natural spirits derived from the liver, while a similar ebb and flow of blood endued with vital spirits took place in the arteries. These vital spirits were derived from the mixing of air with the crude blood, the air being drawn into the expanding heart from the lungs. The heat, which is innate in the heart and placed there by God in the beginning of life, helped the process. No wonder the church backed Galen, and no wonder a thinker like Harvey was dissatisfied with the beliefs of the profession he joined at the very beginning of the 17th century. Harvey took an Arts degree at Cambridge in 1597 and proceeded to Padua where he took his Doctorate in Medicine in 1602, after which he returned to England to conduct those classical researches to which he applied that remarkably cogent, yet simple reasoning which distinguishes the genius. The outcome was that in 1628 he was able to publish his great work in book form, a work which is everywhere acknowledged to-day as the foundation of modern medicine. This book contains two beautiful sentences, sentences which were destined

* Read before the Hong Kong University Medical Society on 5th November, 1931.

to silence forever Galen's blind followers and which with their context should be in every physiological textbook. These are his words. Talking of blood he states "I began to think whether there might not be a motion, as it were, in a circle. Now this I afterwards found to be true." No ebb and flow in the blood vessels, but a circulation! One way traffic is not the invention of 20th century man to cope with 20th century motor cars in 20th century cities; it is older than man himself; out by the arteries, back by the veins. Why out by the arteries? to carry nourishment to the tissues. Why back in the veins? To get oxygen and give off CO_2. Behold the birth of modern physiology! Harvey removed God (so the church thought) and innate heat from the heart of man, and Harvey, had he lived elsewhere than in England, would certainly have paid for his discovery with his life.

Harvey was followed by a host of workers. First came the physicists and the elucidation of the physics of the circulation of the blood. In a quiet Rectory field in England, the Rev. Stephen Hales with a brass tube (for there were no glass tubes in those days) measured the blood pressure of his mare. Malpighi, born 1628, using the newly invented microscope found that blood was not homogeneous but was a straw coloured fluid, coloured red by countless numbers of red cells suspended in it. Then the white corpuscles were found. What were these cells doing? You can actually see physiology getting in to its stride. Turn the microscope onto muscle, and glands, bone and brain, and see the birth of histology, the study of the cellular structure of the body. Next came Lavoisier, who after laying the foundations of chemistry, explained the functions of the blood in transportation of oxygen and carbonic acid gas, explained the physiology of respiration, and set in motion the general chemical investigations of the body.

Then for a time the supremacy of the theory of Chemical regulation of bodily functions was userped by the theory of Nervous regulation, presented during the last century by an army of investigators, led by such people as Ludwig, Claude Bernard, Pavlov and Sherrington. But towards the end of last century chemistry, to use a modern sporting term, staged a comeback. Improved methods of chemical analysis led to the discovery of minute amounts of substances in the blood which chemically controlled the nervous regulation of physiological processes. Surgery helped to prove that these substances were actually secreted by a set of glands known as the ductless glands, glands which previous to this were thought to be atavistic or functionless. Such strides have been made in the last few years that chemists have probed the secrets of the body's own chemical factories, and two of the active principles of these powerful internal secretions can now be manufactured in the laboratory. They are adrenaline and thyroxine. This work is still going on and each year adds to our knowledge of these

potent chemical substances floating around in the blood, the latest clinical advance of such knowledge being the Zondek-Ascheim test for pregnancy.

But during this remarkable chemical advance of the last century the microscope has been turned to other uses, bacteria and a whole host of micro-organisms have been discovered, studied and classified and the inevitable outcome of their study in relation to man introduces us to the science of Immunology.

Thus far medical science has been striving to obtain general information concerning the blood, but now the stage is set for detecting individual differences. If the blood is of such importance to the individual why not in cases of necessity transfer it from an animal to man, or from one individual to another? There are remarkably few historical records of such attempts at transfusion, first of all on account of the fact that blood outside the body readily clots. The very puncture which liberates the blood from the circulatory system sets in motion a chain of chemical reactions which results in the clotting of the escaped blood and the patching up of the puncture. There is a tremendous fortune for the person who can introduce nature's automatic puncture-mender into the motor car industry. The accounts of early transfusions make very interesting reading, but many of them read more like speculations than descriptions of actual operations. Libavius of Halle gave the technique of the operation in 1615, but I shudder to think of the result of the operation if his instructions were followed accurately. Here they are:—

> "Let there be present a robust healthy youth full of lively blood. Let there come one exhausted in strength, weak, enervated, scarcely breathing. Let the master of the art have little tubes that can be adapted one to the other; then let him open an artery of the healthy one, insert the tube and secure it. Next let him incise the artery of the patient and put into it the feminine tube. Now let him adapt the two tubes to each other and the arterial blood of the healthy one, warm and full of spirit, will leap into the sick one, and immediately will bring him to the fountain of life, and will drive away all languor."

You must remember nothing was known of the circulation of the blood at the time that was written, and one might reasonably expect the immediate fountain of life to be rigors and the driver away of all langour to be death itself.

In the writings of ancient Rome and Egypt the operation is mentioned and even recommended, but whether it was ever performed is doubtful. If it was, the percentage mortality must have been very high. A famous reference to transfusion is the case where the blood of three youths was given to Pope Innocent VIII in 1492. This story

has been denied as oft as it has been asserted, but the latest explanation is that the blood was taken by mouth, and called a transfusion. After Harvey's discovery however, the reports of transfusions become much more frequent and more positive. Sir Christopher Wren, at Oxford, injected some infusions into veins of animals and it was but a step to inject the blood from another animal instead of the infusion. The blood was taken from the carotid artery and infused into the jugular vein, the only drawback being that the transfusion always resulted in the death of the donor animal.

In 1667 the first really successful tranfusion resulting in the preservation of both donor and recipient was performed in France, 9 ounces of arterial blood of a sheep being given to a human. 5 months later a similar operation was successfully performed in England. It is interesting to note that the main uses for transfusion in those days were to restore youth and health, and to cure mental diseases and calm violent dispositions. In the latter cases the blood of the docile sheep was always chosen and for the former cases the blood of young animals or youths was to be preferred. Controversy was rife in medical circles on the advisability of the operation; the protagonists claimed great cures and the antagonists pointed to just as many fatalities and predicted the growth of horns on people who had received sheep's blood; even Pepys, the famous diarist alludes to this burning question of the period and states that he rather looked forward with interest to the result of transfusing the blood of a Quaker into an Archbishop. A year later in France and Italy transfusion became practically an illegal operation, and in England and elsewhere public opinion made it just as rare as on the Continent.

In the early years of last century, Blundell, a lecturer in Physiology at St. Thomas's and Guy's Hospitals, did a great deal of work on the scientific and experimental side of transfusion, and, with an apparatus of his own design (Blundell's Impellor), he obtained good results on animals, but his results in the wards were hardly favourable to say the least. Yet he had faith in his opinions and stated concerning transfusion "after undergoing the usual ordeal of neglect, opposition, and ridicule, it will hereafter, be admitted into general practice. Whether mankind are to receive the first benefit of it in this or any future age from British Surgery, or that of foreign countries, time, the discoverer of truth and falsehood, must determine." How wisely Blundell wrote! Yet how much infinitely more wise Nature is. Scientists in their zeal yearned for Nature to give up her secrets, but Nature calmly smiles "Not yet." Successful and wholesale transfusions in the hands of men who knew no asepsis or antisepsis, who knew nothing of bacteria and blood parasites, might easily have resulted in the destruction of all the civilized peoples of the time. And I am sure that could Blundell come back now he would be thankful he had not discovered

the pathway to successful tranfusions a century ago, and looking at the warring world of 1914—1918 he would say " Your need is greater than ours," for it was the great war that persuaded Nature the time was ripe for her to unguard her secret. The war, that is blamed for so much, should be thanked for much too. War has slain its thousands, but has saved its tens of thousands.

As mentioned above the chief obstacle to successful transfusion was the clotting of the blood. As the physiology of this action was discovered, so was the method of preventing it perfected, and at last in November, 1914, the citrate technique was discovered and the operation was put on a sound basis. But still in the early stages of the war alarming reactions and fatalities continued to occur in large numbers until someone bethought himself of some physiological work done years before on an obscure subject known as Iso-hæmagglutination or to use a commoner name Blood Grouping. For years this had been treated as an academic fancy, but now it advanced from obscurity into a place of prime importance among the medical advances of the period, and thus Landsteiner's prediction came true that the successful operation of transfusion would be the first real application of the knowledge of blood grouping. His second prediction, that blood grouping would be of great use in some medico-legal problems is even now rapidly proving to be a true prophecy.

With blood grouping it is, as in most other scientific advances, very difficult to state exactly when the discovery was made. The ball was started rolling so to speak by Shattock in England in 1899 when he was working on the abnormal rouleaux formation caused by serum of fever patients especially those with pneumonia. He writes " On adding one loop of normal human blood to one loop of the pneumonic serum an immediate result was obvious to the naked eye, the drop appearing as though it held a deep red precipitate in suspension." It is doubtful whether this was true agglutination but Shattock may have been on he track. At any rate next year (1900), Landsteiner, an Austrian, made the startling discovery that the serum of some individuals had the power of agglutinating the cells of other inviduals. It had been known for some time that the serum of one species would clump the cells of another species and in view of all the recent work in Immunology, this action was called hæm-agglutination to distinguish it from agglutination of bacteria. Hæm-agglutination of cells of another species had to be distinguished from that of cells of the same species so we get in one instance hetero-hæmagglutination, and in the other iso-hæmagglutination. Landsteiner, examining blood for 20 individuals found that they fell into three distinct groups. In 1902, one of Landsteiner's assistants named Sturli working with von Decastello found a small number of bloods which did not fit into any of Landsteiner's three groups. They were looked on as exceptions to the rule until

1907 when Jansky in Austria produced his momentous work. By means of over 3,000 cross agglutinations he proved the existance of four groups. Landsteiner's work was correct, and Sturli's exceptions were really an independent group. What exactly are the characteristics distinguishing these groups? The cells of the first group were not agglutinated by any serum at all. The cells of the second, were agglutinated by serum from the 1st and 3rd groups, and the cells of the third, by serum from 1st and 2nd and the cells of the fourth by serum from 1st, 2nd and 3rd. Notice no cells are agglutinated by serum from the same group. The groups were numbered I, II, III and IV in the order just described. Unfortunately Jansky's work was not well known and Moss in America classified the groups in 1909, and by a piece of bad luck his numbering differed from Jansky's so that Moss' numbering to the groups described above would be IV, II, III and I. Notice the numbers are not transposed Jansky II and III are the same as Moss II and III, but Jansky I is Moss IV, and Jansky IV is Moss I.

Moss' work became widely known and his classification is followed in America and parts of Europe, while that of Jansky is followed in the rest of Europe. Many people giving statistics of blood groups apparently do not know which classification they are using or if they do they do not see the necessity of stating it and hence their work is useless. There is no doubt as to Jansky's prior claim and most of the scientific journals which specialise in publishing this type of work use his grouping where ever numbers are wanted. But recently an international classification has been suggested which we shall discuss in a minute.

The action of hæm-agglutination is so like agglutination of bacteria that it is only natural that Landsteiner should turn to Immunology for his explanations. He assumed that in the blood of humans, there are two kinds of iso-agglutinins and two corresponding iso-agglutinogens. The agglutinogens are on the cells and the agglutinins in the serum; and further there is a reciprocal relationship between these elements whereby the presence of an agglutinogen in a blood precludes the presence of its corresponding agglutinin in its own serum; similarly the absence of an agglutinogen implied the presence of its corresponding agglutinin. The agglutinogens have been named A & B and the agglutinins α & β, and therefore in every blood we must have one representative of the A α factor and one of the B β. If you want a mental picture to help you understand and remember these facts, think of the agglutinogens as hooks on the cells and the agglutinins as links in the serum. The phenomenon of agglutination therefore becomes the satisfying of the hooks on the cells by their own specific links, with the consequent clumping of the cells.

If you now turn your attention to the above classification you will see that the cells of Group I are not clumped by any sera at all, they

therefore have no hooks i.e. neither A nor B agglutinogen is present on the cells of this group, therefore its cell formula is O; but as every blood must have representative of the A α & B β factors the serum of this group must have both α & β agglutinin present. Group I serum formula must therefore be $\alpha\beta$.

Group II cells are clumped by sera of Groups I and III therefore some agglutinogen is present and it is named A. Its serum cannot therefore contain α but as its serum is active it must contain β. The cell formula of Group II is therefore A and its serum β. Similarly Group III cells contain B and its serum α and Group IV cells AB and serum O. The International classification takes advantage of this knowledge and designates each group according to the type of agglutinogen present and therefore Groups I, II, III and IV (Jansky) become Groups O, A, B and AB.

We are now in a position to understand why transfusion failed so often; the donor's corpuscles were merely clumped in the recipient's circulatory system, treated as foreign bodies and rejected (i.e. if the recipient did not die meantime). Therefore before every transfusion, the recipient's blood must be grouped and a donor found preferably of the same groups. If that is not possible, the donor's cells must not contain an agglutinogen which would react with an agglutinin in the recipient's serum or else clumping will inevitably result. The serum of a Group IV (AB) person contains no agglutinin at all. He therefore can receive any blood without clumping and is hence oft termed a Universal Recipient. Similarly Group I (O) people have no agglutinogens on their cells, and thus are incapable of being clumped by any serum at all. Such a person is a Universal Donor. The factors giving rise to these individual characteristics of blood are definitely hereditary, but we by no means understand this part of the work thoroughly yet. We do know however that it is Mendelian in this respect that for a factor to be present in one generation it must have been present in one or other of the parents. The result of this is that one can always say one of two things with regard to parentage of a child either (*a*) this infant cannot be the child of these two parents of (*b*) it is possible for this infant to be the child of these two parents. Blood grouping has thus come to be used in medico-legal work of late years expecially in Germany and it might also be used in maternity homes where worried mothers are sure they have been given the wrong baby. Although here it should be noted that the mother must not only know the father but also his blood group. It is also of use in criminal cases, for by grouping a sample of blood, its possible origin is necessarily limited to individuals of that group. Thus for instance if blood stains are found on articles belonging to a suspected murderer, the stains should be immediately examined, and, if found to be of human origin, should be grouped. When proved to be human, the defence is

usually that the accused had cut himself and the blood was therefore his. If his group is different from the grouping given by the stains, these blood stains could not possibly have come from a cut in his own body. The help of blood grouping therefore is mainly in the direction of narrowing down the field of suspects, definitely eliminating some people but of itself not definitely incriminating others.

Great as the advantage of the study of blood grouping is to physiology, genetics, immunology, clinical medicine and clinical surgery, its help to anthrophology is claimed by some to be its greatest practical application. The racial side of the work started during the war, on the Macedonian front. There two enterprising and far-seeing medical officers L. & H. Hirszfeld, finding individuals of 16 different peoples at their disposal, grouped 500 members of each. The first thing they found was that the frequency with which each group occurred varied from the frequencies of the other groups e.g. they found of English people 46.4% were group O, 43.4% Group A, 7.2% Group B and 3.0% Group AB. An inequality in percentage was found in every race studied. But their second finding was much more interesting and important. This inequality in percentages is not the same numerically in every race investigated, and its variation is related to geographical distribution of the race. Thus the Hirszfelds found that the incidence of Group A was highest amongst people in the North West of the Eurasian landmass and as one passed from the North West to the South East the incidence of A fell and that of B rose, until B is a maximum in India where the percentages are Group O 31.3% Group A 19.0% Group B 41.2% Group AB 8.5%. As one passes from India northeast to Japan the incidence of A again rises and B falls.

The explanation generally given of these findings (and one which in my humble opinion is by no means necessarily the correct one) is that these two factors of the blood A and B arose as two separate mutations, the A amongst a primitive race of people in Europe the B amongst another primitive race in Asia. The blood groups of both these races would be two in number O & A in the case of the former and O & B in the case of the latter. Migrations later took place with consequent mingling of races leading to the appearance of four groups in the human race O, A, B & AB. The higher the percentage of A in a race, the greater would be the amount of the European stock in its antecedants. Thus A predominates in far off Iceland and B in Oriental India.

You might ask are there any hæmatological traces left in existing races of either of these suspected primitive peoples? Yes. The pure blooded Australian aborigines show practically only two groups O & A. 54.1% O, 42.1% A, 3.0% B, .8% AB. Half blooded natives show a greater incidence of the B factor. The pure blooded North American

Indian shows also that A factor to be much more common than the B whose percentage is down about 2% and AB less than 1%.

These results are explained by stating that the Australian continent was cut off from the rest of the world at a very early period, at a period before the mixing of the two primitive races had taken place, and their isolation during this long period is mirrored in their peculiar blood group distribution. While the rest of the world's inhabitants were to some extent being mixed racially, the Australian aborigines and in fact all its animal and plant life remained unaltered by mixtures from without. The blood group proportions form excellent racial characteristics to study because they cannot be altered by racial habits e.g. should it become the custom of young ladies in a tribe to consider that young men with wooley hair make the best husbands then gradually the wooley haired males will preponderate amongst the fathers and also (if it be a Mendelian dominant characteristic) perdominate amongst the children. Thus the type of hair in a tribe may through a long period of time be changed by the habits of the members of the tribe. But that is not so with blood groups, unless females suddenly take a liking to group A people and demand and authentic statement of blood grouping to be handed in at the time of proposal. Ladies fashions, like the dollar are liable to do anything, so science may yet live to see the racial physiology of the blood upset by them just as they are upsetting the anatomy of the human foot.

The position of the races in this part of the world as shown by blood groups has not yet been definitely established, and I am at present gradually accumulating data which I hope will help to clarify the situation. We are here at a parting of the ways from Southern Asia, north to Japan and south to Australia, and it is therefore of the utmost importance to investigate the percentages especially amongst aboriginal tribes in this part of the world before modern facilities for travel result in further racial mixing. This was one of the reasons that prompted Professor Faid of the Physics Department here and myself to carry out some of this work last summer amongst the native tribes of British North Borneo; and although we have not yet by any means classified the large amount of data we collected, we have indications that two of the tribes there have definitely separate blood pictures

	O	A	B	AB
Dusuns	56.76%	20.42%	20.69%	2.13%
Muruts	43.28%	14.78%	37.63%	4.31%

The Dusuns approach the South Chinese and Japanese type and the Muruts the Indo-Manchurian type. The Muruts are hill people generally and probably represent the oldest aboriginal inhabitants of Borneo whereas the Dusuns are coastal people who have intermarried

much more with other oriental races expecially the Chinese. This evidence does not prove the old theory that the Dusuns are descendants of Chinese but it does definitely show trances of racial intermixing.

This paper has, I am afraid, been rather sketchy. I have endeavoured to show you how our knowledge of the blood has led up to the modern achievements of modern medical science. The position of medical science two hundred years ago could not be better expressed than by a 4 line satire written about one Dr. Letsom who was at the time President of the Medical Society of London and who was famous for his help to the poor. It runs as follows :—

"When patients come to I,
I purges, bleeds, and sweets 'em.
If after that they chance to die,
What's that to I? I Letsom."

No doctor of our time would be pleased to think his healing art was limited to purging, bleeding and sweating, nor should we at this time be satisfied with our present meagre knowledge, and I sincerely hope that some of your powers of observation, work and deduction may be so stimulated that the medical world in years to come may look back with pride and thanks to an important scientific advance which emanated from a graduate of our University.

Acknowledgments

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Review of Books

"*Diagnosis and Treatment of Venereal Disease*": David Lees, M.B., F.R.C.S., Etc., Messrs. E. & S. Livingstone, 16 & 17, Teviot Place, Edinburgh. (2nd Edition 1931). Price 15/- nett.

This book is the ideal volume for the study of venereal diseases for the student and the practitioner.

It is not so much a collection of current literature as a result of the vast clinical and practical experience of the author. More imposing works have been published during the past few years, but in the opinion of the reviewer none have the same practical value as this volume.

The subject has been dealt with in a concise and effective manner, and brings before the student all the essentials of Venereal Disease from the clinical and practical sides.

This is the second edition and has been added to in many ways, especially in the treatment of neuro-syphilis and especially the benefit of tryparsamide in this connection. After an intensive clinical trial Mr. Lees has come to the conclusion that this drug has completely altered the prognosis in neuro-syphilis.

The illustrations, especially the new coloured plates, help greatly in reading the context, as the reader sees these in front of him as he reads.

Altogether it is a very sound volume and should be in the hands of all students who are studying for examinations, and practitioners, who want a good guide for treatment of Venereal Diseases in general practice.

"*An Introduction to Hygiene*": By W. Robertson, M.D., D.P.H., F.R.C.P. (E.). L. & S. Livingstone, Edinburgh. 6/- net.

This small book is not intended as a text book of Hygiene or to replace those already in existence. All that is claimed for it by the Author is that it may prove a useful introduction to this very large subject, for graduates interested in it.

The book is well printed and easy to read. The subject matter is clear, concise, and to the point, and is divided into convenient short chapters. The chapters are arranged in an excellent grouping beginning with the organization of the Public Health Service, the various Public Health Acts, Laws and Regulations, and for this reason the book should prove an extremely useful handbook to those employed in Public Health Administration.

The subject matter is up to date in view of recent knowledge. The introduction to Infectious Diseases in Chapter VI clarifies the procedure in dealing with Infectious Diseases from a modern standpoint.

Under the heading of "Enteric" it is noted that the domestic filters of Pasteur-Chamberland and Berkefeld types are given as adequate in preventing the spread of Enteric by means of water. Filters of this type are excellent if properly looked after and the candles washed, scrubbed and boiled at least every 3 days; a practice seldom carried out. On the other hand it has been definitely shown that when not properly looked after organisms can grow through them.

A Printers error has crept in or Page 142, Paragraph 3. It is unfortuante that "Collection and Disposal of Household Refuse" has been included in the chapter on Water Purification. This should form a separate chapter or be grouped with House Drainage under the heading "Collection and Disposal of Household and other refuse."

In conclusion the book is an excellent handbook in Hygiene and should prove as a noteworthy aid to students in Public Health.

"*Midwifery by Ten Teachers*": Edited by Comyns Berkeley, J. S. Fairbairn, Clifford White. 1931 Edition. Price 18/-. Published by Edward Arnold & Co. London.

This, the fourth edition, has undergone general revision and brought up to date.

The simplicity of details, excellent illustrations, and the attractive general lay out, call for special mention. As one would expect, the views of Berkeley, Fairbairn and others constituting the London School, are adhered to in the main; and no doubt some Authorities will encounter statements which do not altogether conform to their views.

As stated in Chapter X, one is apt to mix up the types of Albuminuria in a case of pregnancy, when different terms such as "low reserve kidney," "pregnancy nephrosis," "pregnancy kidney," "recurrent toxaemia," are used. When grouped under he heading of albuminuria of pregnancy the meaning is clear and to the point.

In the treatment of Eclampsia all lines of treatment are mentioned. Students find it difficult to select the best line of treatment. If stress is made on one definite line of treatment say Tweedy's treatment for Eclampsia and the others mentioned, it would impress the student much more.

Mention is made of diseases associated with pregnancy, and of the line of treatment from an obstetric point of view.

The arrangement in Section II dealing with normal labour, followed by abnormal labour, and contracted pelvis is excellent, and is supported by instructive plates. Management of labour with disproportion

written by ten teachers in Midwifery of the London Schools gives us the essence of treatment in all types of contraction.

In the treatment of accidental haemorrhage, rupture of membranes, tight binder and repeated doses of pituitrin and plugging is preferable to operative interference. Hermans " dictum on the essentials of treatment of placenta praevia viz early turning, slow extraction, antiseptics " still holds good; and the half breech should be the method of choice in all cases.

Infant feeding has always been difficult to the student of medicine and in this chapter the details are given compactly. The material contained in this volume comprises some of the most important in the whole of obstetrics and real advances have been made from the old Edition. The completeness of the book may be judged from the inclusion of blood transfusion and an X-ray of a 16th week foetus.

Throughout the book problems are approached from the clinical and and theoretical points of view.

The book merits the greatest respect.

" *Ante-Natal Care* ": By W. F. T. Haultain and E. Chalmess Fahmy. 2nd Edition. Published by E. & S. Livingstone.

This is a book of only 127 Pages, and it may be regarded as more or less comparable to that part of a small text book of Midwifery which deals with the hygiene diagnosis and complications of pregnancy.

There is also a chapter on Post natal care.

The book is clearly written and contains much valuable information which will be found useful to those engaged in Ante-natal work. The subject matter is sound and up to date. We have no hesitation in recommending the book.