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PRESIDENT'S ADDRESS.

To the Members of the China Medical Missionary Association.

Dear Brethren:

It was a very great surprise to learn of the honor which you have seen fit to confer upon me. I have never coveted such a position, and feel unworthy of it. But as such has been your pleasure I feel under special obligations to the Association, and will endeavor to do all I can to help advance its interests.

The need and usefulness of such an Association I had in mind for some seven years before it was finally organized, and since then it has been my fixed purpose to aid it in every possible way. Its ten years' history fully justifies its organization and continued existence. Notwithstanding the many obstacles with which we have had to contend we have been able, with capable and earnest men at the head and the aid of its many members, to steadily advance along the lines proposed in our Constitution, and have won the recognition, respect and appreciation of physicians and medical and missionary societies in other countries as well as in China.

With these proofs of the need and utility of our Association we may well have courage to go forward and take up the duties and problems that now confront us. It is not my purpose to enlarge upon them in an address of this kind, but it is proper to briefly refer to some of them by way of emphasis and to remind ourselves of what still needs to be done. And, first, it is to be hoped that all the members will take interest enough in the seven motions presented in the December No. of the Journal to vote upon them, and as far as possible, in the affirmative, in order to facilitate the operations of the Association.
A second pressing duty is the early preparation or completion of a medical Anglo-Chinese Dictionary. The advance of medical science in China will be greatly hindered till this is accomplished, and it may not be apparent to many of the members how much depends upon the completion of this work. Many of you perhaps know that there is a strong desire on the part of some to make radical changes, at this time, in nearly all departments of medical nomenclature, and the work of such changes has already begun, so that no medical work in Chinese, now in progress, should be finished until some standard list of terms can be settled upon. And as our Association has taken up the work of furnishing a Medical Dictionary we should see to it that the work is accomplished at an early date.

The next thing I would refer to is the need of an illustrated medical journal in Chinese. I believe I was the first to call attention to this subject some eight years ago. Eight years previous to that Dr. Kerr had started a small medical quarterly, but for various reasons, was not able to continue it long. The large number that have since gone out from the numerous missionary hospitals in China, and the increasing demand for such a journal, are sufficient reasons for a renewal of the subject, and it is gratifying to know that Dr. Cousland has been interesting himself in the matter the past year and has made some progress, but he needs our sympathy, interest and help if we would see it accomplished.

Another very important duty resting upon us all is to do our part in helping to sustain our Journal and continue to make it what it was intended to be, a valuable medical and missionary journal. I notice that of about three hundred and fifteen articles, written by one hundred and thirteen authors for the ten volumes of our Journal, one hundred and twenty-seven of them, or more than one-third were written by eight persons, and more than two-thirds of all the articles were written by thirty-four writers. Or in other words, eight persons contributed more than one-third, twenty-six the second third, and seventy-nine the other third. This will be seen to be out of all proper proportion to our membership and ability. It has been stated several times, and I wish to lay emphasis upon it once more, that the greatest burden of this Association rests upon the chief Editor of the Journal, and it should be remembered that medical missionaries are exceedingly busy people, and can give but comparatively little time to this kind of work. Hence the necessity of each one doing his share.

Then, too, we need a broader representation in the Journal. China is a large country, and varies a good deal from North to South and East to West. We need to hear from all parts of the empire and thus become of mutual aid as well as keeping in touch and sympathy with each other. Other countries are also becoming more and more interested in us, our work and the condition of medical science and medical missionary work in China. The education of
President's Address.

Chinese medical students to supply the varied needs of this great country, is also one of the main objects of our work in China, and it should occupy a prominent place in our thoughts, plans and efforts for the good of this people. We should endeavor, first, to select the best material China affords and then utilize every available means to prepare men and women, the most efficient possible, for the responsible work in which they are to engage. This suggests, also, the need of preparing more medical books and revising those already in use, in order to meet the rapidly increasing demands of the medical students and graduates of the numerous hospitals already scattered over the country. The purpose of China to improve her army and navy and standard of education and open up the country with railroads, etc., will create a corresponding demand for well-educated physicians; and herein is indicated our duty as an Association. Because, while China has begun to change, the transition must of necessity be slow, and none are so well suited as medical missionaries to help supply these varied needs. I have thus briefly referred to some of the things that need our immediate attention. It will probably require many articles from different writers to give proper emphasis and the necessary impulse to action. But it is hoped that each one will feel that the continued success of the Association depends upon his proportionate effort, and that he is in duty bound as a member to contribute his share.

Let us all seek to fulfill the duties of the hour during another biennium, as an encouragement to those whom you have chosen especially to look after the work, as a duty to the Association and medical science, and as a duty to Christianity, without which all of our other labors would be of no lasting good. The possibility of a long and useful mission, lies yet before us, and it is for us to determine, to a large extent, the measure of its successes.

In conclusion, I think you will all unite in giving a hearty vote of thanks to all of the retiring officers and a double vote to the Editor who has served us so faithfully and well and has kept up the reputation of the journal, both in style and quality of matter. I think that thanks are also due to all those who have contributed to the Journal, both for past services and as an encouragement to do more in the future. And also to any who have aided the Association in any way.

Let it be remembered, also, that we desire physicians not connected with the Association, whether medical missionaries or not, and any others, to feel free to contribute to the different departments of the Journal anything consistent with the purpose of the Association, and to co-operate with us in any way to help further its interests.

Pagoda Anchorage, February 20th, 1897.

H. T. Whitney.
PERIPLEURITIC ABSCESS.

By Dugald Christie,
Moukden Hospital, Manchuria.

There is a form of suppurative inflammation of the thoracic wall which is not infrequently met with here. The disease is not mentioned in any text-book I have seen, but there is an article on the subject in the British Medical Journal of February, 1893, in which it is described as a complaint of great rarity. The majority of the cases which have come under observation here were seen after the acute stage had passed and the abscesses had already formed, but the account given by the patients of the earlier stages of the disease indicates severe constitutional disturbance.

The clinical history is briefly as follows: The first symptom of the attack is, in each case, sudden chilliness, quickly followed by high fever. On the second or third day severe pain develops on one side of the chest, more commonly the left. Over a large area the skin becomes red and the tissues swollen, the slightest movement of the body or arm causing great pain. These symptoms increase in severity till an abscess is formed, and only subside when it bursts, which usually takes place about ten days after the beginning of the attack. In none of the cases seen by me was there any lung trouble or indication of pleurisy. In a few there was a history of overstrain, caused by carrying heavy loads on a bamboo pole placed across the shoulder; but, in the majority, injury, strain and pulmonary symptoms are conspicuous by their absence.

Three cases have been recently under treatment in the Moukden Hospital, whose history corresponds with the above. When admitted, the abscesses had already burst. In all of them the opening was situated a little below and two inches to the inside of the nipple, with sinuses leading underneath the muscles. About a third of the lower part of the chest on the affected side was red, edematous, and very tender to pressure. Percussion and auscultation revealed nothing abnormal, and the axillary glands were not affected. In the last case the temperature on admission was 101° F. and the pulse 120.

The treatment is simple and quite satisfactory in its results. The abscess cavity and sinuses are laid freely open, explored with the finger, thoroughly washed with an antiseptic solution and drained. Sometimes unhealthy granulations have to be removed with a Volkmann's spoon.

The etiology of the disease seems to me most obscure. The condition is evidently not secondary to any inflammatory or suppurative action in the pleura, nor have I detected disease of the ribs in any instance. Unfortunate-
Atresia Ani.

ly we have been unable to watch any cases from the commencement, and the
majority come under treatment after the abscesses have burst and the condi-
tion is aggravated by the application of irritating native plasters. My own
opinion is that, although the patients do not themselves attribute the disease
to strain, the carrying of heavy loads suspended to the bamboo pole, already
referred to, has a large share in its causation. All the cases I have seen were
men of the working class, and this is the universal method in Manchuria of
carrying heavy burdens.

ATRESIA ANI.

By Dugald Christie.

Moukden, Manchuria.

The following case is interesting as showing the possibility of a child
living and even thriving in spite of a serious congenital malformation, and is,
I think, worthy of special note in view of the exceptional minuteness of the
fistulous opening.

The patient was a girl three years of age. Nothing had been noticed at
birth, except that the child cried incessantly, and that no meconium was
passed until the third day, when the deformity was observed for the first time.
When admitted to the hospital I found the abdomen tumid, hard, and at
some points tender; but otherwise the child was well developed, and apparent-
ly in good health. There was no trace of an anus, but a communication
existed between the rectum and the genital tract. The opening, which was
situated in the posterior commissure of the vagina, was very small, and when
fully stretched only measured $\frac{1}{8}$ of an inch in diameter. A bent probe was
passed through this opening into the rectum, and it was found that there was
considerable thickness of tissue between the end of the bowel and the external
surface.

The child having been placed in the lithotomy position and chloroform
administered I made an incision in the median line backwards, and by care-
ful dissection the rectum was exposed. On opening it a large quantity of
faeces escaped. The bowel was then drawn down and secured by sutures to
the skin. The edges of the vaginal opening were pared and carefully united.
The new anus was kept freely open, and, although for some days there was a
slight faecal discharge by the vagina it speedily diminished in quantity. The
child’s mother was called home before the cure was complete, but the patient
left us on a fair way to perfect recovery.
WISDOM TEETH.

By ROBERT S. IVY, D.D.S.

In your issue (March and June Nos. p. 18) I notice some remarks by Dr. Walton on wisdom teeth. To a certain extent I can endorse from my own observations what is there stated as to the irregularity of appearance and tendency to decay "as in the case of other races." The reasons for this are not far to seek. Wisdom teeth, developing as they do, when the other teeth are already in position and fully formed, are deficient in the amount of that inorganic material which is essential to resist the wear and tear of mechanical force. Their whole structure, compared with neighbouring teeth, is soft and lacking in resistive power. Another predisposing cause (referred to by Garretson) of caries in wisdom teeth, especially those in the lower jaw, is their painful and slow process of eruption; in some cases there remains absolutely no space in which they can make their appearance, hence not only is a chronic morbidity established, but the face of the tooth is overlaid by the gum and a receptacle is formed, which being constantly filled with food, etc., causes the tooth to decay. From my own observation I should say that wisdom teeth are more constant in appearance, more normal in shape and less predisposed to decay in the Chinese than in the foreigner. Out of fifty natives, varying in age from eighteen to forty, I found twelve who had never developed any wisdom teeth; thirty-four having these organs fully developed, undecayed and of good structure, and four having lost them. Taking the same number of foreigners, Europeans and Americans about the same ages, I found eighteen in whom they had never erupted, twenty-three had already had them operated on by a dentist, either filled or extracted, the remainder (nine) had them fully developed and in good condition.

The increasing contraction of the jaws in the higher civilized races is doubtless a factor in the gradual suppression of the wisdom teeth, for all anthropologists have observed that the jaw of animals is larger in proportion to the cranium than that of man, and the jaw of savage races is larger than that of civilized races. With increase in the capacity of the brain case there seems to be a decrease in the size of the maxilla. The substitution of food which requires but little exercise and power of the muscles of mastication will in a long series of generations at least diminish the size of the jaws. This evolution of food is now going on, with regard to the race, without regard to the intellectual development of the individual. But the cause of
the degeneracy of the wisdom teeth and maxilla is found in their disuse. This cause has been transmitted with increasing force to succeeding generations, for it is a recognized fact that the posterior dental portion of the jaws is always shortened in civilized races, which shortening may be attributed to civilized mankind habitually feeding on soft, cooked food, and thus using the jaw less.

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FLANNEL BANDAGING FOR LEG ULCERS.

By J. R. Wilkinson, M.D., Soochow.

In calling attention to this mode of treating leg ulcers I will say that the material was first brought to my notice by McBurney, of New York. I prepare the bandage in the following manner. Select flannel as free from cotton as possible; then take one corner of the end and bring it across the width of the cloth until it comes exactly even with the opposite side, thus making a right angle to the body of cloth. Press the bias fold and with a pair of scissors cut the cloth along this fold into strips of the required width. This gives the full elastic effect of the flannel, which is important. I have found by experience that four inches is the best width; since after the bandage has been washed several times it shrinks. Special care has to be taken to keep the cloth on the angle gotten by the above method, for the nearer across the flannel the bandage is cut the less elastic and more useless it is. The bandage is to be put together by laying one edge flat on the other and stitching carefully, so as to make it as smooth as possible. I find it more convenient to make it up in long pieces. Then when using it on any given case I can easily cut it off, after having bandaged properly and allowing for the shrinkage which follows washing.

The greatest care has to be observed in washing the flannel. The temperature of the water ought to be the same throughout the washing, not allowing the cloth to become chilled in changing the water. Good soap and soft rain water is best, and it should be washed in changes of quite warm water and soap, until all the spots are washed out. Then wring as dry as possible, not to injure the cloth, and before hanging out to dry take the bandage in the hands and stretch it as wide as possible throughout its whole length. When dried, after having been thus stretched, it preserves nearly all of its original elasticity. This bandage does not interfere with any of the various applications which we may find necessary to make from day to day.
I usually wait a few days after a new patient comes before using the flannel; first, to see if he intends coming on, and is in earnest; and second, to get rid of the worst of the odor and filth with hot water and soap. In this way I lose very few bandages by patients coming a time or two and then not returning.

The patients that I find most helped by this form of bandaging are:—first, those of long standing ulcers with all the tissues swollen and engorged and the old granulations, where there are any, edematous; second, those whose veins are weak and giving way by the long strain on them, and those whose veins have gone a step further and have reached a varicose condition; third, those cases of from three to any number of years standing where the base of the ulcer is very much lower than the surrounding skin, (for such ulcers will never heal until the skin and base of ulcer have gotten again on the same plane), very hard and rather cicatricial; fourth, those cases where the base of the ulcer has become so hypertrophied that it stands entirely above the level of the surrounding skin (unless they are small and nodular, in which case I usually put a piece of zinc cut, so that when placed under the bandage the pressure will be directly upon the nodule).

I find that the more I practice putting on those bandages the more effectual they are. In putting them on I draw them steadily and as tight as the patient can well bear. It is always better to begin with the first turn below the ankle and give the ankle a good firm support. Just above the ankle one should be careful not to draw the bandage too tight, but as you get higher and higher along the belly of the muscles of the calf you can put on considerable force until you get beyond the calf, then very gradually lessen the tension until you are ready to put in the pins. I have learned never to change the tension of the bandage abruptly, for in so doing one aggravates the very conditions that one hopes by its use to remedy.

The bandage is warm in winter, and in summer it admits of free ventilation, and the patient does not complain of the heat after the first day or two. It is elastic, and the patient's muscles have easy play in walking, thus permitting easy and rapid return of venous blood. By using some judgment and care in selecting cases, and by attending to the washing of the bandages oneself, the expense will be found to be inconsiderable. I have bought all wool flannel at Shanghai at from 30 c. to 50 c. per yard.
NON-MALARIAL REMITTENT FEVER AND ITS HÆMATOZOOON.


Since about the middle of 1896 there have occurred in Chefoo a number of cases of a fever hitherto unknown to me, and, I believe, as yet undescribed in medical literature; though the so-called "typho-malarial fever" of sundry writers is akin in many points to certain forms of it. From the Customs Medical Reports (in particular Dr. Daly's Report on Newchwang of 1895) and other sources I gather that the disease has been and still is very widespread; and the noteworthy discrepancy in the names given to what is clearly one and the same disease, tends to corroborate the view above expressed (which is Dr. Daly's).

In all the cases which have come under my observation I have found in profusion a hæmatozoan hitherto undescribed; the clinical history of many of the cases agreed so well with the phases of the life-history of the parasite that the sole argument of any weight against their being associated as effect and cause lay in the fact that the same parasite was found in profusion in the blood of a large proportion of the healthy foreign residents of Chefoo, as well as of others, and of most of the Chinese whom I examined. It is only within the last few weeks that I have found, by cultivating the parasite in various nutritive media, the key to this and other difficulties.

The fever is as protean in every respect, in its severity, duration, symptoms, etc., as is the parasite, and as the former are intimately associated with the numerous and strangely varied phases in the life-history of the latter, much of which still requires elucidation, it seems advisable to begin by describing the parasite and such details of its life-history as have yet been made out. For the micro-photographs which illustrate this paper, and prove that the organisms to be described are not the offspring of a vivid imagination out of clumsy manipulation, etc., as has so often been the case in the history of microscopic investigations, I have to thank Dr. Reid, of Shanghai (Plate II, Fig. 1, Plate IV) and Consul Bristow, of Tientsin (Fig. 2—4, Plate IV).

*Morphology.*

If a drop of blood, preferably mixed with two or three times its volume of 7.5 % salt solution, so that the field be not too crowded, from a person thoroughly infested with these parasites, be examined with a high power, the field will soon be found swarming with some of the organisms depicted in Fig. 4, Plate I. Many of these are so like normal blood corpuscles that it is difficult at first to realise their real character; and it is to this fact no doubt that their having escaped recognition for so long must be attributed. α, Fig. 4, is a copy of a "Muriform" corpuscle taken from Hayem's "On Sang."
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(Fig. 17, page 63); δ, below it, depicts a very common variety of the adult parasite; this will be seen to differ from the corpuscle only in the fact that round its periphery bits of a brilliant black line are to be seen, which are continually changing their position, being now visible only on one side, now on the opposite one, now on three, rarely on all four sides at once; the object may be almost quiescent, or it may be in such active movement as to dismiss any doubt as to its being a living organism; it may turn over, so revealing a structure to be described later. Frequently the parasites are more spinose, or starry, like β, Fig. 4. If one such be carefully focussed down upon from above, a brilliant spot will first become clearly defined, the tip of one of the angular projections; as the focus is lowered this becomes a bright circle (β, 1), and then a double-contoured circle (β, 3), while several brilliant double-contoured writhing lines come also into view; finally (β, 3) the star-shaped body is clearly defined, and the elevations, which in optical section are double-contoured circles, are seen to be in constant change, one sinking down to a mere knob, or a plane surface, while others spring up elsewhere; the brilliant black ring, as in the other specimen, is also now apparent, at least sections of it, between the lateral projections, now on one side, now on others. ε and ζ are also common forms; η depicts one of the latter folded over. λ, 1, 2, 3, depict several phases of a less common form, more usually found in fever cases.

The majority of the organisms present their dorsal aspects; here and there may be found one with its ventral aspect uppermost (Fig. 5, except γ); in this case an opening is to be seen surrounded by a thick flexible lip, or sucker, which may be seen to dilate and contract its edge, sometimes extending beyond that of the creature's body; it is this edge, out of focus, which appears from the dorsal aspect as a brilliant black line. This ventral sucker is usually flattened (ε), but sometimes is shaped much like the corolla of a lily (δ). γ depicts this organ projecting so far from beneath a parasite dorsum up that it can be focussed down on, and its real nature be seen (the body should have been depicted slightly out of focus); all the objects in Fig. 5 are somewhat diagrammatic, in that the edge of the sucker and the body cannot be clearly defined simultaneously.

If the temperature be not too low (e.g., below 50° F.), the organisms may be in very active, some in violent, motion; usually they "jog" gently about, only slowly changing their position in the field; but I have seen specimens darting about with a speed which would have taken them off the field in a flash, were it not too crowded, colliding with more placid ones with force adequate to displace the latter a distance two-three times their own diameter. Often they roll over and over, so affording a chance of studying the ventral sucker in profile.

Sometimes they may be seen with organs such as shown in Fig. 6, projecting; α had a bifid appendage, each arm ending in a bright knob, which
Fig. 1.  
Fig. 2.  
Fig. 3.  
Fig. 4.  
Fig. 5.  
Fig. 6.  
Fig. 7.  
Fig. 8.  
Fig. 9.  
Fig. 10.  

Plate 1.

All magnified about 900 diameters, (Zeiss 1/12 oil immersion, ocular 4) except Fig. 8, which is about 9000 diameters.
turned and twisted in all directions, being fully extended horizontally one moment, and then vertically, so as to be visible only in optical section. $a$ and $a'$ depict successive phases with less than ten seconds between them. More common is the organ shown at $\beta$, Fig. 6, a brilliant central structure, which appears to be a closely coiled tube, extending from end to end of an excessively delicate membrane with a double contoured margin; two roots may sometimes be made out to the central tubular structure.

$a$, Fig. 11, depicts similar structures as seen in a stained permanent preparation; $\beta$, an organ projected by some of the parasites when suddenly acted on by 1% solution of ozonic acid; and $\delta$, a scrap of débris, much like normal elastic fibres, with which stained permanent preparations from these cases are very often crowded, and which I take to be portions of the above described organs.

If the blood specimen be quickly examined as soon as made the parasites may often be seen escaping from their corpuscular shells (Fig. 3); and others still confined, as $\beta$, $\gamma$, Fig. 2. $\gamma$ shows one of the flat leaf-like parasites ($\zeta$, Fig. 4) folded double inside a corpuscle, seen on edge. $\beta$ is a reniform body, in which by careful focussing a double-contoured folded parasite may be seen; if the reniform body rolls over it becomes circular, with a lighter area in its centre ($\beta$), an appearance easily explicable now, but which puzzled me immensely during the months before I realised that I had a new haematozoon under observation. When a healthy person’s blood has become infested, and the parasite is multiplying (a process usually associated with fever, but not always, so far as I know), a glance at a permanent stained blood preparation, slightly magnified, e.g., 90 diameters, will often show areas as thickly crowded with black spots as if peppered over; a higher power resolves each such spot into a red corpuscle, infested with one or more small double-contoured circles, complete ($b$, Fig. 1) or incomplete ($c$); the latter varying from about the size of the former to nearly that of the containing corpuscle; the double contour is formed by brilliant black lines, especially if the object be only lying on the corpuscle, or close to its surface; if deeply buried in it, or close to the under surface, this brilliant blackness is wanting, and more than a casual glance is required to make out the double contour ($a$, Fig. 1).

In a preparation of fresh blood the same objects may be seen only as bright double-contoured bodies; they may be seen to move and alter in shape, (e.g., a crescent strengthening out,) and in so doing the infested corpuscle is often notably changed in shape and position. If a drop of blood be taken from a sufferer with the common mild form of fever, to be presently described, during or soon after one of the daily rises of temperature, many such red corpuscles, as is shown in Fig. 2, $\delta$, may be seen, with a small object deep in its substance, appearing of a bluish tinge in contrast with the reddish
yellow of the corpuscle. If kept under observation, under suitable conditions (sealed preparation, temperature not below 75° F.), for three or four hours, these small objects may be seen rapidly increasing in size, till they become like those shown in Fig. 2, a; each having a well-defined double margin, and striated as shown.

Such a blood preparation may be kept under observation in summer weather, for over a fortnight (nineteen days in one instance) if originally put up with aseptic precautions. The parasites very soon all become free; such normal corpuscles as there may be part with their haemoglobin and become invisible, so that only living parasites are left. From day to day a certain number of these sporulate, and then apparently disintegrate; anyhow they disappear. Before sporulating the parasite in many cases sheds its proboscis; I have only observed this in those parasites, the more common, I believe, whose proboscies are as shown in Fig. 6, β. It then becomes studded with small whitish spherules, which, when accurately focussed, become small angular particles (1, Fig. 7); when the parasite is seen in profile these particles are noted to be collected about one side, where the sharp contour is interrupted by an irregular more or less jagged interval; probably this is where the proboscis has been shed. In other instances, without this stage having been observed, the parasite (star-shaped, crenated, or flat leaf-like forms) becomes a perfectly clear sphere, double-contoured in optical section and of a light-greenish hue; a dark organ next appears in its interior, of varying shape, sometimes as shown at 3, Fig. 7; this may frequently be resolved into a coiled tube (4, Fig. 7), which may be seen writhing; inside this tube appears a string of the whitish spherules above mentioned; as it increases in length it projects from each end of the tube, reaches and penetrates the surface and then extends beyond it; the free part swinging vigorously in all directions until a portion separates, and, the ovules still attached to each other, dances away, usually out of the field. Besides these strings larger buds may be seen on many of the ovulating spheres; each appears to have a dark spot about its centre. When shed they also dance off, but less actively.

In permanent stained blood preparations the flat form of parasite is often found studded with these ovules (6, Fig. 7), while still retaining its normal shape. I have not observed this during life. Fig. 8, Plate I, depicts a couple of large spherical bodies, here joined into a dumb-bell like object, which abound in the blood in the graver varieties of the fever. They belong properly to the second generation.

Fig. 9 shows two phagocytes as seen in a fresh blood preparation from a patient on the day of his death from a pernicious variety of the disease. They contain a number of blue granules and blue-stained spores; the patient having been treated with methylene blue.
Plate II. 900 diameters.

\(\alpha\) = free parasite, flat variety.
\(\beta\) = " " body out of focus, edge of contracted oral sucker nearly in focus.
\(\gamma\) = " " with ventral surface uppermost.
\(\delta\) = infested red corpuscles; contained parasites nearly full-grown.
\(\epsilon\) = ventral surface uppermost.
Plate II is a photograph of a specimen of blood taken from a boy while critically ill with the fever. This film was prepared as usual, fixed in absolute alcohol, and stained with one per cent. watery solution of methyl green. Weak watery solutions cannot penetrate the (probably) chitinous coat of the adult parasites (a, a), which therefore are unstained. Several (γ) show well the oral orifice with the surrounding sucker; (in one case the light falls into this, so it shows up white; in another it leaves the whole sucker interior in dark shadow). β appears to be a parasite out of focus, with the ventral sucker contracted and nearly in focus. Most of the dark bodies (δ) are intra-cellular parasites, whose still soft cuticles have been penetrated by the stain; one (ε) shows very clearly its oral sucker, while the thin layer of environing red corpuscle is quite apparent.

For a long period I regarded these flat parasites (a) as genuine red corpuscles; and as they are often the only kind which persist during the methylene blue treatment to be described later I rejoiced in the belief that the blood had been completely cleared of its parasites. Close observation, however, with good lens and illumination, shows all the before described details, oral orifice, sucker, etc. This form is usually less active than the others; but they may be seen to curl their margins here and there, bend one end over, even in the most sluggish preparations when patiently watched.

The surface of the stained intra-corporeal parasites in this preparation is so highly reflecting that it has prevented the striation of the parasites, visible in the original (vide Plate I, Fig. 2, a), being shown in the photograph.

Second Generation.

If a sterile culture fluid, bouillon or milk, be inoculated with a trace of infected blood, with the customary precautions of course, and the vessel containing it be then incubated for four or five days at about 35° to 40° C, it will then be found swarming with a great variety of organisms, a few only of which I propose to describe. If milk be the fluid used it gradually becomes less and less opaque; after three or four days a clear watery fluid separates from what looks like a mass of white curd. If a speck of the latter, with a drop of the fluid, be examined with a high power (900 diameters), the "curd" will be found to be composed of millions of small actively moving tubular organisms (Plate III, Fig. 2, β), which nearly all float with their long axes vertical, so that only a double-contoured circular object is seen; attached to it, however, is a brilliant speck, now inside, now outside, the said circle; focussed down to, this bright spot appears as a similar double-contoured circular object; occasionally one turns on its side, and reveals the fact that the two circles are merely the gaping ends of a hollow tubular organism.

Projecting from this mass, and mixed up with them, will be found numberless clear spherical bodies, with a sharp brilliant double contour in optical
section (Fig. 2); they increase in size while watched; the smaller ones rapidly equaling those which are big enough to be more or less flattened out by the cover-glass. Scattered here and there will be seen masses of granular matter with similar clear globular bodies projecting from them (Fig. 1, A.) These globular masses similarly increase rapidly in size, and also extend themselves in various directions with a sort of flowing protoplasmic motion, fast enough to be easily visible like the minute-hand of a large clock; fast enough for a marked difference to be visible from minute to minute as indicated in Fig. 1, a, a', and a'', Small spheres may be seen budding from the exterior of the larger ones. As the free spherical bodies increase in size and number they press on each other; at each point of pressure the walls of the two spheres seem to melt together, their cavities are united, and the point of junction is only marked by a constriction. It is thus that the dumb-bell like object shown in Fig. 8, Plate I, is formed. If the preparation be left alone the spheres eventually will all melt into one huge bleb, filling the whole space under the cover-glass. Fig. 3 depicts a fresh blood preparation from a patient acutely ill with the more serious form of fever associated with these parasites. It was sketched immediately after being made, and shows numerous huge blebs occupying a great part of the microscopic field; the corpuscles, etc., being crowded into their interstices.

If a drop of glycerine, plus one-tenth per cent. of magenta, be run into such a preparation, after some time the blebs will take up the stain, and so form a good permanent preparation, demonstrating clearly that they are not merely the air-bubbles for which they have doubtless hitherto be mistaken.

Another organism found in the culture fluids is in shape much like the parasite shown in Plate II, a, a; differing chiefly in size, being 400 to 600 times as big, and in its possession of a long and curiously fashioned "proboscis."

Several other objects of interest are to be found in the culture fluids, but the above mentioned seem to be those of most clinical importance.

**Physiology.**

That the organisms of the first generation are very tenacious of life is shown by their existing for so many days, and ovulating, in an ordinary sealed cover-glass preparation, with no precautions to guard it from the changes of temperature between day and night in the autumn at Chefoo. They are very resistent to every drug which I have tried, in such strength as could be approximated to clinically, except one. They flourish in normal saline solution, to which has been added, carabolic acid, 1 to 1000; quinine bi-sulphate, 1 to 1000; Liq. Arsenicalis, 1 to 10,000; Salicylic Acid, 1 to 10,000; Salicin, 1 to 1000; also various essential oils, eucalyptus, peppermint, etc.; Hydrarg perchlor, 1 to 1000, kills them promptly; but they flourish in the blood of patients who have been for months slightly mercurialized for
Plate III.

Fig. 1. Zeiss Δ ad. 400 Diäneres

Fig. 2. 900 Diäneres

Fig. 2a

Fig. 3 90 Diäneres
syphilis. The only toxic drug which I have found so far is methylene blue; 1 in 400 kills them in a few minutes; 1 in 1000 in a few days. (By this means the parasite character of the structures α in Plate II can be readily demonstrated).

If a pregnant woman's blood be infected the baby's will be so also; this I have found to be the case in one instance.

Cows are liable to be infected; this I infer from the fact that I have found the parasites in enormous numbers in several specimens of Chefoo milk; this fact appears to me adequate to account for the wide prevalence of the infection in Chefoo at present; during the last four months I have never found any non-infected blood in Chefoo, having examined over thirty residents, three at least of whom were free from infection last August.

As I have found these parasites in over 150 cases now, the majority being non-residents in Chefoo (people from all the coast ports, Kansu and other inland provinces, etc.), I believe them to be very widely spread. Their appearance in Chefoo, hitherto free from fevers of local origin (except typhoid) I am inclined to attribute to certain reclamation work, involving the disturbance of a very foul fore-shore close to the Settlement.

Plate IV and Fig. 10, Plate I, represent stages in the life cycle of another new Hæmatozoon, which I have provisionally termed "Medusa Sanguinis Hominis," as the adult forms have a remarkable resemblance to an ordinary jelly-fish. I have only seen it in eight cases, and have had little opportunity to study it. Fig. 2 and 4 show the inferior aspects of two large specimens; the crenulated margin of the swimming bell is well shown by Fig. 2. When alive they swim about and turn over and over with a speed which baffles any attempt at sketching. Fig 3 shows a group of small ones. Fig. 1 what I take to be a reproductive phase; at the extremity of some of the branches are borne small sub-spherical bodies, gynophores I believe; these are shed free into the blood plasma, where they develop into objects such as are shown in Fig. 10, Plate I; 2, 3 and 5 are successive phases of one parasite, sketched as fast as possible; a manubrium, with terminal appendages, is clearly evident. Fig. 4 shows a small free medusa; and Fig. 1 a 3-tentacled object, still inclosed in a shell, which I have several times seen free in fast blood preparations, moving about with great activity. Further details will be found in my Customs' Report for the year ending September 30th, 1896, at which period I attri-

Note.—It may be of use to state (1) that Hayem's fluid (Hydrag. Perchlor ½ part, Sodium Chloride 1 part, Sodium Sulphate 5 parts, Distilled Water 200 parts,) mixed with fresh blood, will fix and preserve all the formed elements without distortion.

To make permanent stained preparations a very useful method is to smear two thin cover-glasses in the usual way; let them dry spontaneously (protected from dust), fix in absolute alcohol for 3 or 5 minutes (or, by exposure to Ozmic Acid vapour for 15 min.), let dry; then place, smeared surface up, in a watch-glass, run on to each 2 or 3 drops of a saturated alcoholic solution of methyl violet (or m. green, or other aniline colour) cover; after 3 or 5 minutes wash in plenty of distilled water till no more colour comes away; dry; and mount dry.

For the Medusa Sang. Hom. it is best to use Chunzynoky's fluid and mount in balsam.
buted to this a clinical import which I now incline to ascribe rather to the other hæmatozoon, with which it has always been associated in my experience.

Pathology.

The pyrexia commonly associated with the first described parasite (in future the parasite) is characterized (1) by extreme irregularity, both in its duration and severity and in the time at which the daily exacerbations, often more than one, occur; and (2) by the fact that this pyrexia is usually the only striking symptom, i.e., the common symptoms of pyrexia, malaise headache, thirst, etc., etc., are present, but nothing else.

In children it is a common event for the temperature to flash up to 104° or 105° for an evening or two, without any initial rigor, fit, or vomiting; the child is hot and tired, and the mother is usually astonished if she happen to take the temperature to find it so high. Next morning it may be normal, flash up again in the evening, and so on for two or three days, when the fever ceases, leaving the child little the worse for it. The same happens in adults, except that the rise is usually less, and may occur at any hour of the day. Very often, however, the fever continues from day to-day, and remits only; (see Chart 1.)

At first the disease may be regarded as malarial remittent; but as quinine proves entirely useless, and the fever persists week after week, it is apt to be reluctantly diagnosed as typhoid fever; the long duration of the fever being, however, the only point in which it resembles typhoid. Sometimes there is more or less acute shooting pain in the limbs, usually in the course of the nerve trunks, not located chiefly in the joint. (When these are associated with fever of a few days' duration only, as mentioned above, it is apt to be regarded as dengue, which, however, is an exclusively tropical disease, is usually accompanied by a distinctive rash; the joint pains are much more severe, etc., etc).

There may be slight bronchial catarrh; sometimes slight intestinal catarrh; constipation is, however, the rule. Spleen not affected. Liver sometimes tender. After persisting for three to four or five weeks, sometimes longer, the fever may gradually cease, and the patient is considered to have had typhoid or typho-malarial fever, according to the views of his adviser.

Sometimes, however, after running this benign course for a while the temperature suddenly attains and persists at a much higher level; serious symptoms speedily supervene, the breathing becomes quick and laboured, the pulse very rapid and small, then coma sets in more or less rapidly, often with twitchings of the face and other muscles, suggestive of cortical irritation, and death ends the scene, invariably I believe; for, considering the condition of the blood it is difficult to imagine how it could be otherwise. Such cases are likely to be classed as pernicious malarial remittent fever. In

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Temperature (Fahrenheit):

- Normal temperature of body: 98°
- Range: 35° to 106°

Temperature, F. (in百余)

Date: May 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25

Day of Dis: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19

Time: MEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEMEME

Remarks: Given during sick parade.

Hospital bed is used.
### CHART NO. 3

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| Remarks     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

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*Note: Data entries indicate specific measurements or observations for each day and time.*
### Chart No. 4

**Female, Age 32.**

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**Temperature Centsigrade:**

- **97°**: Normal
- **98°**: Slight fever
- **99°**: Moderate fever
- **100°**: High fever
- **101°**: Pyrexia
- **102°**: Severe pyrexia
- **103°**: ICU admission

**Note:**

- **Date of admission:** [Day and Month]
- **Discharge date:** [Day and Month]
- **Remarks:**
  - 1st Relapse
  - 2nd Relapse

**Diagnosis:**

- **Diagnosis:** [Diagnosis]
- **Treatment:** [Treatment]
- **Complications:** [Complications]

**Laboratory Results:**

- **Hematocrit:** [Value]
- **White Blood Cells:** [Value]
- **Platelets:** [Value]

**Symptoms:**

- **Symptoms:** [Symptoms]
- **Medications:** [Medications]

**Fevers:**

- **Fevers:** [Fevers]
- **Antipyretics:** [Antipyretics]

**Hypothermia:**

- **Hypothermia:** [Hypothermia]
- **Therapy:** [Therapy]

**Other Observations:**

- **Other Observations:** [Other Observations]
the benign form of the fever each rise of temperature will be found to correspond precisely with the setting free of masses of spores, and only those forms of the parasite which have been described as belonging to the first generation will be found in the blood, at least in any quantity. The onset of dangerous symptoms coincides with the appearance in profusion of the organisms of the second generation, and it is easy to see how the rapidly growing spherical organisms must block the peripheral cerebral vessels.

If the temperature chart be constructed on such a scale as the one here shown, (see Chart No. 3) the irregularity of the fever becomes clearly evident. It takes less than twenty-four hours for a parasite to reach maturity, and soon after the commencement of the case the blood will contain, at any moment, several generations, the sporulation of each of which is marked by a rise of temperature to a height dependent on the number of sporulating parasites. In this case salol was being used, but it proved to be without effect on the parasites, and with very little on the fever, so it was discontinued.

Chart No. 4 shows how an attack of fever, due to these parasites, which it seems justifiable to assume would have run one of the usual courses, as shown by charts 1 and 2, was cut short by the use of methylene blue, a drug which experiment and experience (in about twenty cases) have led me to consider a semi-specific for this fever. In most of my cases, when the fever has subsided under the influence of methylene blue, it has not returned; in this one there were three relapses of progressively decreasing severity, the third lasting only one day. It is noteworthy that each occurred the day after the use of methylene blue was entirely suspended. The process of cure in this fever is, I believe, the attainment by the human organism of a tolerance for the parasite, which the blood seems never to rid itself of; at least I have never seen it do so. It is, I find, impossible to administer methylene blue in sufficient quantity to totally destroy the parasites, as can be done on the microscope stage; and its use seems to be in its power of depressing the activity of the parasites and destroying many ovules, and so giving the body time to attain tolerance of them; it may be to make its blood plasma more toxic to them.

I usually administer methylene blue in gelatine capsules; gr. 1 to 4 every three or four hours according to the age of the patient and the severity of the symptoms. It may nauseate at first, but is soon easily tolerated. It often causes vesical irritability, which may be allayed by the use of spirits of nutmeg, 5 to 10 minims with each dose. A large proportion of cases require no treatment other than rational diet, rest, etc. If the fever persist methylene blue may be used to cut it short. Salol is of use in relieving the pains in the limbs and scalp sometimes complained of.
As regards the remarkable fact that healthy persons may be found with their blood thoroughly infested with these parasites it is to be remarked that by careful inquiry some departure from the normal health standard is usually to be detected. Several men, whose blood I have found thus infested, have told me that since an attack of "typhoid fever" some years before they "had never been the same since;" they were subject to fits of lassitude, mental depression, etc., before unknown; their mind was not what it had been, etc. Such a blood state is not one to be entirely disregarded; as long as no other cause of ill-health is operative the host may suffer no ill-effects from their presence; but with the co-operation of any such cause they may burst into activity and determine a fatal issue. This danger has recently been forcibly impressed upon me by the case of a six months' old baby who was passing satisfactorily through a mild attack of discrete small-pox; the pustules were drying up, and the small-pox fever subsiding, when the temperature suddenly ran up again to 104° one night, and 108° the next morning, when it died. The blood was a translucent fluid, red-tinted, and under the microscope looked like a bouillon culture of the parasites. In this instance all the members of the family, four, were infected, and the two older children had had flashes of fever, such as have been described last summer.

Medusa Sanguinis Hominis.

Three cases of fever of a very severe type came under my care last autumn, in which besides the first described parasite this other hæmatozoan was present in great profusion. As the chart (see chart 5) shows the fever set in suddenly, rose to a high level and remained there until treatment brought it down. The accompanying symptoms were of the most menacing character. There was delirium soon passing into coma, very marked muscular twitchings, very frequent respirations, etc. Methylene blue in these cases proved quite specific. Within a few hours of its administration no more live medusæ were found in the blood, but plenty of motionless ones, presumably dead.

Two of the three cases recovered satisfactorily; the third, who had also malarial fever of a severe type, (the blood swarming with the pigmented plasmodia of the summer-autumn fever of the Italian observers), died a day or two after I began the use of the blue. It was in this case that I first observed the new hæmatozoa. In two other cases the parasites were few and the fever slight, and methylene blue effected speedy cures.

Recently a missionary colleague kindly sent me a flesh blood preparation from a very anaemic Chinaman, containing several large medusæ; he had no fever at the time, nor any history of any recent attack. He subsequently informed me that they speedily vanished from the blood under ordinary toxic treatment. It is therefore evident that the morbid phenomena associated
Male. Age 8.

CHART No. 5.
with this medusoid organism, its life history and other points, all require much further investigation.

**Diagnosis.**

A microscope is evidently almost essential for the conclusive diagnosis of the various types of fever associated with the first described parasite; though careful consideration of the symptoms, and especially of the temperature chart, may suffice if no microscope be obtainable. High magnifying power is essential for the study of the parasites, but not for their mere recognition. Magnification to the extent of ninety diameters only suffices for this; once the observer is well acquainted with their appearance, with this magnification, on focussing down to a field full of parasites, the field before becoming defined is seen to be full of glittering objects, owing to their high refrangibility; when clearly defined, instead of the normal faintly yellowish red disks, whose faint shading indicates their bi-concave figure, small circles bounded by sharp black lines are seen, and in the centre of each, or more often, close to one side, is a bright spot, such as no normal corpuscle ever shows. Exceptionally their individual movements are lively enough to be detected at a glance.

A drug more toxic to them than methylene blue, and harmless to the host, is a great desideratum, and it is to be hoped that some observers will direct their efforts to this end.
Remarks on the Clinical Value of Ehrlich's Methods of Examination of the Blood.*

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Von Jacksch, in an excellent address delivered at Franzensbad in May, 1890, speaks particularly of practical methods of examination of the blood. He lays stress on the value of the microscopical examination of the fresh blood, a point of considerable importance, which is very often overlooked. He says later: "The microscope, the counting of the cells, the estimation of the hemoglobin are the methods which are feasible to the modern practising physician. Other methods of examination of the blood, which have given valuable results, cannot be used in all cases by the practitioner on account of their inconvenience. Thus the methods of blood-staining practised by Ehrlich possess certainly great value, but their employment is too complicated."

I mean to speak to-night mainly of just these methods of preparing and examining dried specimens of blood for which we are chiefly indebted to Ehrlich; for I feel, in opposition to Von Jacksch, that they are in many ways the most valuable and easily applied methods open to the practising physician. Upon other more familiar and perhaps not less useful, methods, such as the counting of the individual elements and the estimation of the hemoglobin, I shall speak only incidentally. The enormous multiplication in late years of methods of examining and studying the various morphological elements of the blood can be seen by a glance at the article of Mueller in the Centralblatt für Allgemeine Pathologie und Pathologische Anatomic for the 31st of October and the 18th of November, 1892, where there are nearly five pages of references alone. Many of these methods, valuable as they may be, are not practicable to the ordinary practitioner; and I wish particularly to show in what ways the examination of dried specimens may be of real value in everyday work.

The methods of examining cover-glass specimens of blood were introduced by Ehrlich in 1878 and 1879. Following the methods which Koch and others used in staining preparations of bacteria, he found that when an extremely thin layer of blood was spread out upon the cover-glass and allowed to dry immediately, the shape and general characteristics of the blood corpuscles were preserved as well, if not better, than by any known methods. In preparing such a specimen, however, one must exercise considerable care. The slightest moisture from the fingers may be alone sufficient to spoil the specimen of blood. Any impurity on the cover-glass will bring about the same result; therefore the greatest care should be taken in the preparation of the glass; it should be washed in alcohol immediately before use. If this precaution is literally carried out much of the difficulty in making a preparation of blood is already overcome. The cover-glasses should not be handled by the fingers; it is best to use two pairs of forceps, which have the blades filed down to almost a knife edge; one may be a clamp forceps, and the other may be an ordinary dressing forceps, the blades of which have been filed down in order that they may not break the thin cover-glasses. After the cover-glasses have been carefully wiped, so that no visible particle of dust lies upon them, one of
them is touched to the drop of blood flowing from the finger-tip or the lobe of the ear,* and allowed to fall immediately upon the other. If the glasses are clean, the drop of blood spreads out instantly, and the upper glass is drawn off the lower one, care being taken not to change its plane. The thin layer of blood on each glass will then dry almost immediately, particularly if it is held for a moment above a flame, so as to be very slightly heated. Particular stress is laid upon this instantaneous drying by Uskow, who is able by this method to preserve the most minute chromatin network in the nuclei. Well-prepared specimens of this sort show the red corpuscles lying side by side in the field of vision with their natural shape, free from any crenation or other changes which one may observe so soon in the fresh specimen. The presence of crenated corpuscles is a sure sign that the preparation has not been properly made, and that it is unreliable. The specimens thus dried may be kept for almost any length of time. They are, of course, more satisfactory if examined immediately; but I have stained perfectly clear specimens which were three or four years old. It is well to wash the finger or the ear in alcohol and ether before taking blood, but it may be just as satisfactory to wipe away the first several drops of blood, thus washing the part, as it were, in the blood itself.

Before examining the specimens, however, further steps must be taken to "fix" the various elements, particularly the red corpuscles, that the haemoglobin, which is easily soluble in water, may not be dissolved and washed away on applying the stain. This result may be accomplished in several ways. To go into a thorough analysis of the different methods would more than occupy my whole time, and I will merely mention one or two of the most simple and reliable methods.

A very satisfactory method is to drop the cover-glass into a solution of absolute alcohol and ether of equal parts (Nikiforff's method). In a half-hour the specimen will be ready to stain. For quick work a shorter time may suffice.

Absolute alcohol alone for ten to thirty minutes will give fairly good results.

Ehrlich first recommended the use of heat in fixing a specimen of blood, a method which is probably, upon the whole, the most satisfactory of all. He advises the use of a copper plate (mine is about 40 × 10 × ½ centimetres), which is placed over a flame, burning at a fixed height. By finding the boiling point (by adding drops of water), 100° C. may be easily determined. The specimens are placed with the face upon the plate, about three centimetres inside the boiling point, a temperature of between 100° to 120°, and may be left there for a varying time, according to the solution with which the specimen is to be stained. For watery neutral solutions a short time suffices; very acid solutions and those containing glycerine call for a longer heating of the specimen. Ordinary specimens may be heated from one to two hours, though for quick clinical work a much shorter time often suffices. The specimen is now prepared for staining.

Before speaking more exactly of the methods of staining, I want to speak first of the theory on which Ehrlich proceeded in his work. He was first led into applying his method of contrast staining or "color analysis," as he calls it, in the study of the leucocytes. Max Schultze was the first to direct attention to the fact that the leucocyte is not a morphological unity; and
Ehrlich in studying these elements discovered that the granules which they contained, which many had noticed, and Max Schultze in particular had described, might be divided into classes having affinities for certain distinct chemical classes of coloring matters. He found that between these various granulations there existed constant differences: (1) in their relation to dissolving substances—water, acids, alcohol, glycerine, etc.; (2) in their size, form, and degree of refraction; (3) in the way they are influenced by high temperatures; (4) in their distribution in the cell body. He believes that these granules originate in the cell, and are products of a specific secretory property of the protoplasm. He has called them the “specific granulations of the blood.” These granules he has classified mainly according to their affinity for the aniline coloring matters.

He divides the aniline colors into two groups: (1) the acid coloring matters, and (2) the basic coloring matters. The acid coloring matters are those in which the staining principle is an acid; for instance, picrate of ammonium, where the staining principle is the picric acid. Some of the more important acid colors are eosin, martius yellow, the salts of picric acid, auran-tia, indulin, nigrosin, tropseolin O. O., Bordeaux, poncean, and acid fuchsin.

The basic coloring matters are those in which the staining principle is a base, where the acid is an indifferent substance as regards the staining; for instance, fuchsin, Bismarck brown, safranin, methylene blue, methyl violet, methyl green, etc.

Ehrlich, as was said above, has differentiated various distinct classes of granules—seven in all. Of these, however, three only are of practical importance in human blood, and only two, indeed, have any great value. In the first place Ehrlich found, in certain leucocytes in human blood, large granules of a round or ovoid shape, having in the fresh state a peculiar yellowish-green refractive appearance, suggesting fat (the coarsely granular leucocytes of Schultze). These granules had a particular affinity for the acid coloring matters; they were stained by all members of this group, and by this group alone. Owing to their marked affinity for eosin, Ehrlich named these eosinophilic granules.

Again he found a class of granulation which was stained by basic coloring matters alone. This basophilic granulation occurs in a very small proportion of the leucocytes in normal blood, and is as yet of little practical value in blood examination. The cells containing these granules were first called in German “Mastzellen,” a name which they have retained in other languages. This granulation is more common in certain connective-tissue cells in the fixed tissues than in the blood. Here the granules have not been infrequently mistaken for micro-organisms. The basophilic granules of the blood are of an equal size. They are less refractive than the eosinophilic granules, and in the dried specimens they are usually seen surrounding the central clear nucleus in the shape of a ring. They rarely have the morula appearance that the eosinophilic cells often show.

The third granulation, which is by far the commonest one in the human blood, is one which is stained neither by acid nor by basic coloring matters alone, but only by a fluid which contains a mixture of an acid and a basic coloring matter together, the acid color being in excess. This granulation Ehrlich calls neutrophilic. The neutrophilic granules are smaller and more irregularly shaped than either the eosinophilic or basophilic granules. They occur in about three-fourths of the leucocytes in normal blood.

Methods of Staining.

It will be worth while here to mention only a few of the staining methods which have seemed to me most practical; of other methods a full summary may be found in Mueller’s article before referred to.
The basic colors generally stain the nuclei. The best examples of these are perhaps methylene blue and ordinary basic fuchsin. Either employed alone stains the nuclei beautifully, and also any bacteria or protozoa which may be present in the blood. For instance, in staining malarial organisms I have found a simple aqueous solution of methylene blue as satisfactory a stain as any. The basophilic granules (mastzellen) are also stained by this class of coloring matters.

The acid colors stain the red corpuscles and the eosinophilic granules.

A very convenient stain for practical use is as follows:—

| Eosin | . . . 0.5 |
| Alcohol (70 %) | : : : 100.0 |

The prepared cover-glass should be stained for a few minutes in this solution (which has been diluted one-half with water), washed with water, dried in the air or between filter paper, and stained for three-quarters of a minute in a saturated aqueous solution of methylene blue, which should be diluted one-half with water before using. By this method the red corpuscles are stained red, the nuclei blue, the eosinophilic granules a brilliant red, and any bacteria or protozoa blue. Another solution which gives satisfactory results is that of Czinzinski:—

Methylene blue, concentrated aqueous solution | . . . 40 |

One-half per cent. solution of eosin in 70 % alcohol | . . . 20 |

Distilled water | . . . 40 |

The covers may be fixed in absolute alcohol from five minutes to half an hour, and stained from three to six hours in the thermostat at 37° C. This method is particularly recommended by Canon for showing the eosinophilic cells and the mastzellen; it has also been used by the same author to demonstrate the bacilli of influenza in the blood.

To bring out the neutrophilic granules the best solution is that recommended by Ehrlich, the mixture of acid fuchsin, methyl green, and orange G; it brings out most of the more important points in the blood.

This stain is perhaps the most convenient for every-day use, while it has formed the basis for the most valuable classifications of the leukocytes which have been made. The methods of preparation are very numerous (see Muller’s article). Ehrlich advises the following mixture:—

Saturated aqueous solution orange G 125
Saturated solution (in 20 % alcohol)
of acid fuchsin | 80-165 |
Alcohol, absolute | : : : 75 |
Saturated aqueous solution methyl green | 125 |

The methyl green must be added drop by drop while stirring or shaking the solution. The solution must stand some weeks, and the fluid to be used should be taken with a pipette from the middle of the solution.

Later Ehrlich advises a different procedure:—

Sat. aq. sol. orange G | 120-135 |
" , " , " acid fuchsin | 80-165 |
" , " , " methylene green | 125 |
Water | : : : 300 |
Absolute alcohol | : : : 200 |
Glycerine | : : : 100 |

A satisfactory solution may be prepared as follows:—

Sat. aq. sol. acid fuchsin | 2 |
Water | : : : 3 |
Sat. aq. sol. orange G | 6.25 |
" , " , " methyl green | : : : 5 |

To be added drop by drop, while shaking the solution.

Water | : : : 15 |
Alcohol | : : : 10 |
Glycerine | : : : 5 |

The cover-glass which has been heated for from five minutes to two hours at a temperature of 100°-120° C., or has been hardened in alcohol and ether, is stained in this solution for from two to five minutes, washed in water, and dried in the air, or, if the specimen has been heated for an hour or more, between filter paper

*There is, unfortunately, a considerable difference between different preparations of these aniline colors and it is always well to determine the source of the materials one uses. I use generally the colors from the Berliner Gesellschaft für Anilin Fabrikation, which can be obtained from G. Konig, Dorotheen Str. 28, Berliner, N.W. Grubler’s colors are also reliable.
and mounted in oil or balsam. Specimens heated one to two hours * stain better than those which have been heated a short time, but perfectly satisfactory results for ordinary work may be obtained with specimens heated from five to ten minutes.

With this stain the red corpuscles are stained an orange or buff color, the nuclei of the colorless corpuscles green, the neutrophilic granules a violet or lilac color, the eosinophilic granules a deep red. The nuclei of nucleated red corpuscles, when present, are stained an intensely deep green, almost black. With a little practice the differentiation of the eosinophilic and neutrophilic granules is generally easy.

By the employment of various staining reagents—I say reagents because the staining of these granules is a distinct micro-chemical reaction—Ehrlich differentiated the following varieties of leucocytes in normal human blood †:

(1) Lymphocytes, small cells about the size of a red corpuscle, the body of which is filled with a large, round, intensely staining nucleus, while the protoplasm is reduced to a small border surrounding the nucleus.

(2) Voluminous cells, which have a relatively large, oval, or ovoid, faintly staining nucleus, and a relatively extensively developed protoplasm.

(3) Structures of a similar character, which are distinguished from the former only in that the nucleus has certain indentations which often give it the shape of a wallet.

(4) Very numerous, somewhat smaller bodies, which are characterized particularly by the polymorphous shape of the nucleus. This nucleus, Ehrlich says, may, under the influence of reagents, break into several separate fragments; hence the perhaps not entirely fitting name "polynuclear." The protoplasm of these cells is filled with fine neutrophilic granules.

(5) Eosinophilic leucocytes; cells of about the same size as the latter variety, with a single, round, ovoid or polymorphous nucleus, while the protoplasm is filled with eosinophilic granules.

The origin of the lymphocytes, Ehrlich traced to the lymphatic tissue of the body. The large mononuclear elements come apparently from both the bone marrow and the spleen, changing in the blood-current into the polynuclear neutrophilic elements. The eosinophilic leucocytes arise in all probability in the bone marrow.

Uskow has recently studied the colorless corpuscles by the method of contact-staining with great care, and has made a more minute classification. He divides the corpuscles into:—

A. Lymphocytes: the smallest form of corpuscle, consisting of a round nucleus (sometimes having an indentation) surrounded by a thin rim of protoplasm. The protoplasm in the preparation is often separated from the nucleus by a bright, sharp ring. Both protoplasm and nucleus are stained intensely. These he divides into:—

(1) Small lymphocytes, which are the size of red corpuscles, or smaller.

(2) Large lymphocytes, which are somewhat larger, in which the protoplasmic ring about the nucleus is slightly larger and more irregular, sometimes showing rounded projections.

B. Transparent corpuscles: these are distinguished by their richness in protoplasm, which takes no stain whatever, and looks like a vacuum in the faintly stained field of the preparation. The nucleus is homogeneous, round, oval or bean shaped, and lies usually eccentrically; it stains more feebly than the nucleus of the lymphocytes. He divides them into:—
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(3) Small transparent corpuscles, which are about the size of large lymphocytes; these have often a somewhat squarish shape, with sharply-rounded corners.

(4) Large transparent corpuscles, which are three to five times the size of the red corpuscles. The nucleus in the preparation is almost always eccentric.

(5) Giant transparent corpuscles. These are the largest white corpuscles seen in the blood. They have often one or two deep indentations in the nucleus.

C. Transitional forms: corpuscles with protoplasm which stands about midway between that of the lymphocytes and that of the transparent corpuscles in its affinity for coloring matters. The smallest are slightly larger than lymphocytes, and the largest are almost as large as the large transparent forms. The nucleus stains more intensely than the protoplasm, and has almost no light rim about its periphery. These he divides into:

(6) Small transitional forms (giant lymphocytes) which are like small transparent forms with a slight staining of the protoplasm.

(7) Large transitional forms.

(8) Giant transitional forms. These last two forms correspond in every respect to the transparent leucocytes, excepting in their slight ability to take stain.

D. (9) "Multinuclear" neutrophilic leucocytes. These are two or three times as large as red blood corpuscles and are easily distinguished by the deeply-staining irregularly-shaped nucleus. The protoplasm is relatively of considerable extent, as compared with the size of the nucleus. It takes little stain itself, but is filled with small neutrophilic granules. These he divides into:

(a) Those with a thick, rod-like nucleus, which takes a comparatively light stain, while the neutrophilic granules also are less intensely stained than in those with the more irregular nuclei. These, Uskov thinks, are transitional forms between the mononuclear leucocytes and the forms with more markedly polymorphous nuclei.

(b) The leucocytes with a single rod-like nucleus which is bent and twisted upon itself, being rounded at both ends.

(c) The apparently multinuclear leucocytes. Here the nucleus is not really divided, but all the pieces are united by small filaments. They are larger than the other kinds of neutrophilic cells. These neutrophilic cells are of various sizes, from but little above the size of a red corpuscle, to nearly that of the larger transitional forms. The fact that one at times finds very small neutrophilic elements, Uskov suggests may be due to the fact that the change to multinuclear may occur from transition forms before these have reached the giant size, though this, he believes, is not the rule. He describes also multinuclear leucocytes with vacuoles.

(10) Eosinophilic leucocytes.

Uskov believes that the lymphocytes arise from the lymphatic tissues of the body, the large lymphocytes arising mainly from the follicles of the spleen, the smaller from the lymphatic glands. In the bone-marrow, one finds on cover-glass specimens, or on section, scarcely any lymphocytes, but mainly transparent and transitional forms, which are also found in the spleen. In the bone-marrow the transparent forms are in excess, in the spleen the transitional forms. The small transparent forms are found particularly in the marrow. The multinuclear leucocytes may be found in cover-glass specimens from the spleen, marrow and glands, more markedly in the spleen and marrow than in the glands. But on section, Uskov finds multinuclear forms only in the blood-vessels. In the living rabbit, pieces of marrow, spleen, mediastinal glands, and also a piece of the portal vein, which was included between two ligatures, were placed
in Fleming's solution, cut and stained; and nowhere, excepting in the blood, were found multinuclear leucocytes. Hence Uskow concludes that either in the blood or in the tissues, the multinuclear forms arise from the mononuclear. They arise probably, he thinks, from the large transitional corpuscles. The smaller size of the multinuclear element may, he believes, be due to the condensation of the nucleus. In other words, Uskow believes that the small and large lymphocytes and the small transparent leucocytes are the youngest elements in the blood. They, by their growth in protoplasmic richness, their diminution in affinity for coloring matters on the one hand, and their increase in affinity for coloring matters on the other hand, merge into a common, indistinguishable variety, the transitional forms, changing in their further progress into the multinuclear neutrophilic cells. This, he considers the last stage of development, and the multinuclear neutrophilic leucocyte he traces through various degenerative processes to its final dissolution.

Uskow thus classifies the leucocytes:

(a) Young elements.
(1) Small transparent leucocytes.
(2) Small lymphocytes.
(3) Large lymphocytes.
(b) Ripe elements.
(4) Small transitional leucocytes.
(5) Large transitional leucocytes.
(6) Giant transitional leucocytes.
(7) Large transparent leucocytes.
(8) Giant transparent leucocytes.
(c) Over-ripe elements.
(9) Multinuclear leucocytes.
(10) Eosinophilic leucocytes.

This classification seems rational. A careful study of the blood with the triple stain cannot fail to impress one with its objective accuracy.

Tschistowitsch divides the leucocytes into the following classes:

(a) Young elements, after Uskow.
(1) Small lymphocytes.
(2) Large lymphocytes.
(3) Small mononuclear leucocytes. Here he includes leucocytes of the size of a large lymphocyte or somewhat larger, with a round or ovoid nucleus, which stains more feebly than in the lymphocytes, and with a more developed protoplasm, which stains either very feebly (the small transitional forms of Uskow) or not at all (the small transparent forms of Uskow).

(b) Ripe elements which differ from the small mononuclear leucocytes only by their greater dimensions.

(4) Large mononuclear leucocytes.
(5) Mononuclear leucocytes with an indentation in the nucleus. They are distinguished from large mononuclear leucocytes only by the indented form of the nucleus. In this group he includes also those rather unusual multinuclear leucocytes without a trace of granulation, with an uncolored or a very slightly staining protoplasm. These latter, he thinks, are probably a transition form between those with a single indented nucleus and the multinuclear neutrophiles (?).

(c) Over-ripe leucocytes, after Uskow.

(6) Multinuclear neutrophilic leucocytes.

(7) Eosinophilic leucocytes.

This division differs from the last which was advised by Uskow only in that he places the small transparent leucocytes and the small mononuclear leucocytes with but slightly stained protoplasm in the same group, because he could distinguish no essential difference between these two.

These various elements exist in normal blood in certain fairly definite proportions one to another. If we make a differential count according to Ehrlich's classification, we find: lymphocytes, 15 to 25 per cent.; mononuclear and transparent forms, about six per cent.; polynuclear, 70 to 75 per cent.; eosinophiles, one to five per cent.

Taking Uskow's estimates that in a healthy man there should be about
18 per cent. of the young, six per cent. of the ripe, and 75 per cent. of the over-ripe elements, we see that in Uskow's more minute classification the class of young elements corresponds fairly accurately to the lymphocytes in the classification of Ehrlich and his students; the class of ripe elements to the large mononuclear and transitional forms; and the class of the over-ripe elements to the neutrophiles and eosinophiles.

For minute, accurate work the classification of Uskow seems to be unquestionably the best that has yet been made. The modification of Tschistowitsch, in which he includes under the small mononuclear the small transparent forms and the small transitional forms, and classes the other elements as large mononuclear, without distinction, is perhaps more simple and nearly as satisfactory. In ordinary clinical work, however, one can expect to do little more than to count the divisions into:

1. Small mononuclear leucocytes, including the small and large lymphocytes the small transparent forms, and possibly some of the small transitional forms of Uskow.
2. Large mononuclear and transitional (indented) forms.
3. The multinuclear neutrophiles.
4. The eosinophiles.

Most of the counts which I have made in my own work, before I was familiar with Uskow's classification, have been on this basis, and have included under lymphocytes or small mononuclear elements almost exactly those elements which Uskow and Tschistowitsch have included under their young elements; and under the large mononuclear and transitional leucocytes just those forms which he has included under his ripe elements. There is one point in these classifications with regard to which there will always be some differences, depending on the individual who makes the estimations; that is, the point where the small mononuclear elements end and the large begin.

Now what practical information can we gain from the study of dried specimens?

(I) The red corpuscles. The skilled observer can readily detect a diminution in number by the behavior of the drop of blood, and the thickness of the corpuscles on the slide (if he prepare the specimen himself). A marked deficiency in color may be detected by the increased pallor of the middle of the corpuscles; that is, the point of greatest biconcavity is much more marked than in normal blood. Different stains, of course, give different appearances, but one who is familiar with the stain he is using can readily detect these points. Any difference in size or shape (poikilocytosis) of the corpuscles is readily observed.

Nucleated red corpuscles are particularly well seen; there is no method by which they are so readily brought out. Two varieties of these elements are seen in the human blood:

(a) In all acute anæmias of any intensity, and in almost all of the more chronic secondary anæmias, as well as in the so-called essential blood diseases, one finds bodies about as large as an ordinary corpuscle, containing a small, round, intensely staining nucleus, which has a peculiar refraction. This nucleus may be seen in the middle of the corpuscle, towards its edge, protruding from the corpuscle, or again free in the blood current, suggesting very strongly that this is probably the normal manner in which the red corpuscle parts with the nucleus which belongs to it in its youngest stages.

(b) In some grave anæmias, particularly in progressive pernicious anæmia, and the leukæmias, one finds elements much larger than these, containing large, much more palely staining nuclei, the body of the cell taking a stain similar to that of the ordinary red corpuscle. With the proper technique a well-marked nuclear network may be made out in these cells while the nuclei of the smaller
variety show only a diffuse stain. Karyokinetic figures may often be found in the nuclei of these large elements, particularly in some forms of leukæmia. At times one finds these large nucleated red corpuscles where the nucleus has the same intense stain that it takes in the younger forms, but where it is apparently breaking up or is represented only by several small fragments. The process of extrusion of the nucleus in these large forms is more rarely observed. This has led Ehrlich to believe that what he considers the normal process of parting with the nucleus (extrusion) does not take place in some of the more grave anaemias, but that the nucleus becomes fragmented, and absorbed, as it were by the cell itself. Ehrlich, with Rindfleisch, is of the opinion that in the normal process of blood degeneration the extruded nucleus develops about itself a second corpuscle, and, being extruded again, the same process may go on for a considerable time. If one accepts this idea, which is certainly rather hard to believe, it is easy to conceive that the process of absorption of the nucleus would represent a much less satisfactory and active method of blood regeneration.

The smaller variety, that is to say, the normal variety of nucleated red corpuscles Ehrlich calls normoblasts, the larger, megaloblasts or gigantoblasts. The fact that one observes in some of these large nucleated red corpuscles, particularly in some leukæmias, unquestioned signs of karyokinesis is, it seems to me, reasonably good evidence that they are not all, to say the least, degenerate forms, but perhaps in some instances earlier forms of red corpuscles than one ordinarily sees in the blood.

In an anaemia of any particular degree one may also observe red corpuscles which take up, in addition to the acid coloring matters, a certain amount of basic stains, that is, which show, with the eosin-methylene blue stain, a bluish-purple color, while others show throughout their substance small spots and indications of a network of bluish stain. These forms Ehrlich considers degenerative. He believes that the process taking place within them is akin to coagulative necrosis. Gabritschewski is inclined to believe that these elements are rather young than degenerate forms, from the fact that he has found certain nucleated red corpuscles which show this same characteristic stain. Ehrlich, however, remarks that this is only true of the nucleated red corpuscles of the second class, the gigantoblasts, particularly those in which the nucleus is fragmented. He asserts, moreover, that corpuscles with affinity for basic stains may be found in the blood of acute anaemia before regenerative forms appear, while they are found in considerable numbers in the blood of starving animals where there is no sign of regeneration. They are clinically, of course, found in association with what we consider regenerative forms (nucleated red corpuscles). Ehrlich well speaks of "Der haupt Charaktere des anämischen Blutes, das Ineinander- greiften von degenerations und regenerations Formen."

(II) The colorless corpuscles. With stained specimens information can readily be gained with regard to the number and the varieties of the colorless elements. There is no method by which so careful a differential analysis can be made. The occurrence of a leucocytosis can be made out almost as satisfactorily by the practised eye as by counting the corpuscles. Under the term leucocytosis I shall understand, in the sense of Ehrlich, an increase in the total number of leucocytes where the differential count shows only a marked increase in the percentage of the multinuclear neutrophiles at the expense of the small mononuclear leucocytes.

(To be continued.)
THE ETIOLOGY AND CLASSIFICATION OF INFECTIOUS DISEASES.

Surgeon-General Sternberg, in the Westley Carpenter Lecture, delivered before the New York Academy of Medicine, November, 1896, discusses this subject rather fully. We abstract the following paragraphs:—"The additions which have been made to our knowledge relating to the etiology of infectious diseases during the past thirty years are generally recognized as constituting a substantial basis for scientific medicine. We are not yet entirely released from the trammels of unsupported theories and traditions, but the sun of science is already approaching the horizon, and gives light enough to enable us to perceive a broad and attractive landscape, a portion of which is still obscured by shadows which will no doubt soon be dissipated by the advancing source of light and life. Those of us who were graduated prior to the dawning of this new light are best able to appreciate the importance of the recent additions to our knowledge in this fundamental department of medicine. I confess that etiological studies have always had a special attraction for me; and it has seemed to me that a general review of the evidence relating to the infectious diseases might not be out of place on the present occasion. The facts which I shall present will not, of course, have the charm of novelty, since those who constitute my audience are physicians who have no doubt kept pace with the progress of discovery in this field of investigation.

It is hardly necessary to say that by "infectious diseases" we mean those diseases which result from the introduction into the body of some disease-producing agent. And I think we are justified in saying that an essential condition of infection is that the disease-producing agent shall be capable of reproduction in the body of the infected individual; in other words, that it is a living organism. It matters not whether this living organism is large or small; whether it belongs to the animal or vegetable kingdom, whether it is located in the skin, as in scabies; in the muscles, as in trichinosis; in the lymphatics, as in erysipelas; in the solid viscera, as in amebic abscess of the liver; in the intestine, as in cholera; or in the blood, as in relapsing fever: the introduction and multiplication of the living infectious agent constitute infection."

He then proceeds to show that many diseases formerly included among "idiopathic" affections are now properly considered as infectious diseases, and that "an 'idiopathic inflammation' of skin, mucous or serous membrane, or visceral parenchyma is something which modern pathologists find it more and more difficult to believe in." He further calls attention to the fact that while infectious diseases require the presence of a specific pathogenic organism for their development, there must co-exist a susceptibility to the disease on the part of the person invaded, the micro-organism, however, being the chief etiological factor. He then speaks of some of the causes that seem to render persons more susceptible to infection. In speaking of the seasonal prevalence of certain diseases he takes occasion to say: "The seasonal prevalence of certain diseases is due to the fact that the specific infectious agent multiplies external to the bodies of infected individuals when conditions as to temperature, moisture and organic pabulum are favorable for such multiplication. The epidemic prevalence of yellow fever, of cholera and of various forms of intestinal flux during the summer..."
months and the annual epidemic of malarial fevers in regions favorable for the development of the malarial parasite, are no doubt to be accounted for in this way. On the other hand, certain diseases, in which there is no evidence that the specific infectious agent is capable of multiplication outside of the bodies of infected individuals, are most prevalent in winter, because conditions are then more favorable for their communication from individual to individual. This is true of those infectious diseases which are communicated by personal contact ("contagious diseases"), such as small-pox, measles, scarlet fever, whooping-cough, influenza, diphtheria, etc. Evidently conditions which bring those already infected in close personal contact with healthy individuals, at a time when doors and windows are closed to exclude the cold air, will favor the extension of these diseases. In cases a notable increase in the prevalence of diphtheria and scarlet fever has been observed when the public schools were opened in the autumn. The increased prevalence of influenza and diphtheria during the winter and spring is due not only to the influence of exposure to cold as a factor in developing an attack, but also to the intimate association of those already infected with healthy individuals. This occurs in schools, churches, factories and private dwellings, and fully accounts for the rapid epidemic extension of influenza in towns and cities.

It is somewhat remarkable that the extension of this disease from individual to individual by personal contact, is not recognized by the public generally, and is still denied by a considerable number of physicians. As a matter of fact the specific infectious agent has been known since 1892, when it was discovered by Pfeiffer in the purulent bronchial secretions of influenza patients, in which it is found in vast numbers. This secretion is just as much infectious material as is the false membrane of diphtheria or the contents of small-pox pustules—each being able to reproduce its kind when introduced into the body of a susceptible individual. And if an influenza epidemic is developed more quickly than an epidemic of diphtheria or of small-pox, this is chiefly due to the fact that the period of incubation is short, and that no quarantine precautions are taken. The influenza patient receives his friends while confined to his room, with an unconscious disregard of the fact that he is exposing them to an attack of the infectious disease from which he is suffering; and when able to go out he or she may be seen at theatres, teas, balls, dinners and public gatherings of all kinds, naïvely announcing to friends that he is just recovering from a severe attack of the grippe, and from time to time coughing up a little bronchial mucus loaded with influenza bacilli." He combats the idea of a wide contamination of the atmosphere with infection, or that it is carried to any great distance on currents of air. He calls attention to the germicidal action of sunlight, to dilution and desiccation as preventives of the widespread of infection. On the question of transmission he says: "The facts which have been developed with reference to the transmission of cholera and typhoid fever, considered in connection with numerous recorded observations relating to the supposed development of malarial fevers as a result of drinking surface-water, have led some authors to the conclusion that malarial infection, also, commonly results from the introduction of that malarial parasite in this way. Without denying that this may occur I am disposed to believe that much of the evidence which has been advanced in favor of this view is unreliable. In many cases the so-called malarial fevers which have been traced to the use of surface-water from wells, streams, etc., have been of a "continued type" and not controlled by quinine. In the absence of positive evidence of the presence of the malarial parasite in the blood, continued or remittent fevers which resist the specific action of quinine cannot, in our opinion, be pro-
perly classed with the malarial fevers. If not due to infection by the typhoid-bacillus, they are, at least, more nearly allied to typhoid than to the typical malarial fevers."

* * *

"In cholera and typhoid fever the mode of the propagation is no longer a mystery. The researches of bacteriologists have demonstrated the biological characters of the pathogenic bacteria which are concerned in the etiology of those diseases, and the fact that they are found in the alvine discharges of the sick. The channel of infection is now generally recognized by physicians and by sanitarians, and it is unnecessary to attempt at the present time to support by evidence the statement that infection usually occurs from the use of water or food contaminated by the specific germs of the disease in question. But there is another epidemic disease which has many points in common with these two, in which there is no evidence that infection occurs in the same way, and in which apparently it does occur through the respiration of an infected atmosphere. The disease referred to is yellow fever. Even more decidedly than in the case of cholera and typhoid fever the epidemic prevalence of this disease depends upon insanitary local conditions and anelevated temperature, such as is most favorable for the rapid development of micro-organisms. Unfortunately all researches made for the purpose of discovering the deadly germ of this pestilential disease have hitherto been unsavailing. The writer has been led to believe that, as in cholera and in typhoid fevers, the germ is present in the alimentary canal of infected individuals; and that when material containing it is thrown out in localities where the proper pabulum exists for its development, under favorable conditions as to temperature and moisture, it multiplies abundantly, establishing rapidly extending foci of infection. Susceptible persons visiting such localities contract yellow fever, and there is no satisfactory evidence on record showing that infection occurs from the ingestion of water or food contaminated with infectious material.

The inference, therefore, appears to be justified that the disease is contracted by respiring an infected atmosphere. But this inference may eventually turn out to be a mistaken one, although many facts could be given which seem to support it. It will be observed that in this case the supposed infection of the atmosphere is of limited extent, and depends upon a continuous supply of the infectious elements from the telluric foci from which these are believed to be given off. The mode of infection, therefore, would correspond with that which occurs in the malarial fevers when these are contracted by breathing the air from marshy places, and would give no support to the idea that the epidemic prevalence of such diseases as cholera, influenza, etc., may be due to a general contamination of the atmosphere of a town or of a section of country, or that there is any substantial basis for the "pandemic wave-theory" which was advanced by some of the older writers upon epidemiology. There is a way by which pathogenic bacteria may be carried a limited distance through the air, and by which infectious material may be conveyed from house to house, from a privy-vault to the beefsteak upon the kitchen-table or to the milk-jug, which should not be lost sight of in considering channels of infection. This is upon the feet of insects, and especially of house-flies, which, as is well known, frequent all kinds of decomposing animal material and swarm upon the surface of fecal matter deposited upon the surface of the ground or in the shallow pits. There are many facts which support the view that such material affords a suitable nidus for the development of the yellow fever germ, and I am strongly inclined to believe that the ubiquitous house fly is a factor of considerable importance in the propa.
gation of yellow fever, typhoid fever and cholera.

"It has also been suggested that the mosquito may give rise to material infection by introducing the malarial germ through the puncture it makes for the purpose of obtaining the blood of its victim. But I know of no exact observations or experimental evidence in support of this hypothesis. There are, however, some reasons for believing that the mosquito may play a part in the etiology of malaria in the way suggested by Manson, i.e., as the agent by which the parasite is withdrawn from the blood of infected individuals and returned to its normal habitat outside of the body to complete its life history. We have an analogy for this in the part played by the mosquito in withdrawing embryo falcíariae from the blood and returning them to the stagnant pools frequented by the insect.

Manson says, in discussing this hypothesis in his Gulstonian Lectures (1896):

"We can readily understand how the mosquito-bred plasmodium may be swallowed by man in water as so many disease germs are, and we can readily understand how it may be inhaled in dust. Mosquito haunted pools dry up. The plasmodia in the larvae and those that have been scattered about in the water finding themselves strandèd by the drought, and so placed in a condition unfavorable for development, pass into a resting stage, just as they do when by quinine or other means man is rendered temporarily unsuited for their active life. They may, probably do, become encysted, as so many of the protozoa do in similar circumstances. The dried sediment of the pool, blown about by winds and currents of air, is inhaled by man, and so the plasmodium may find its way back again to the host from whom its ancestors had, perhaps, started generations back."

This theory appears plausible; but we find it difficult to believe that man is essential for the completion of the life cycle of the plasmodium, for the most concentrated and deadly malarial emanations may be given off from marshy places which are far removed from the haunts of man. It may be, however, that the mosquito is an essential factor in the development of the plasmodium, and that man, instead of being a necessary intermediate host, only serves occasionally, and in a certain sense accidentally as such. Perhaps other mammals or birds may serve the same purpose. It has frequently occurred to the writer that the malarial plasmodium, like other amoeboid protozoa, may find its normal habitat, external to the bodies of its insects or animal hosts, upon the stems and the leaves of water plants rather than in the water itself. The fact that malarial fevers do not prevail in the vicinity of swamps, when the marsh vegetation is submerged by high water, is in favor of this view; as is also its apparent need of plenty of oxygen, which we infer from its active multiplication in the blood and its parasitic invasion of the red blood corpuscles."

He calls attention to other diseases that are transmitted by insects, notably Texas fever in cattle and the African fly disease transmitted almost entirely by the bite of the tse-tse fly. "The essential factors in the etiology of an infectious disease, therefore, are a susceptible individual and a specific infectious agent capable of reproduction in the body of such individual."

"My discussion of the classification of infectious diseases is undertaken without any expectation of offering at the present time a satisfactory scientific classification, but rather as showing the difficulties attending such an attempt in the present state of knowledge. That a scientific classification of diseases should be based upon etiology is generally admitted, and we have to-day a great advantage over our
predecessors as regards the data for such a classification. Still our knowledge is incomplete in many directions, and we are yet in doubt as to whether certain diseases should be included among the infectious diseases or not. The tendency of modern science has been, however, to add constantly to the list of diseases of this class. It is less than fifteen years since Koch published his discovery of the tubercle-bacillus; the tetanus-bacillus was discovered in 1884, the bacillus of influenza in 1892. To-day we are discussing the propriety of transferring acute rheumatism to the list of infectious diseases. To-morrow we may be able to include cancer in all its varieties.

"This brings us to speak of a classification based upon the mode or channel of infection. From this point of view we may have: (a) Traumatic infections; (b) infection by contact (direct contagion); (c) infection through ingesta; (d) infection through the respiratory tract. Under the heading "infection by contact"; (b) we would have to include venereal diseases and contagious skin diseases. To what extent the eruptive fevers are contagious in this sense it is difficult to say. To transmit small-pox or vaccinia by way of the skin a traumatism is considered necessary—vaccination or inoculation; and it is probable that infection in the eruptive fevers usually occurs through the deposit of infectious material suspended in the air upon the respiratory mucous membrane rather than through the unbroken skin. Scarlet fever and measles may also be transmitted by inoculation, and there is ample evidence that the first mentioned disease may be transmitted through ingesta, especially milk. Typhoid fever, cholera, amoebic dysentery, cholina infantum, trichinosis, etc., are contracted by the introduction into the alimentary tract of the ingesta containing the infectious elements to which they are due. Diphtheria, epidemic in-

fluenza, mumps, whooping-cough, measles and pulmonary tuberculosis are probably contracted through the deposit upon the respiratory mucous membrane of the specific infectious elements to which they are due. Pneumonia, pleurisy, peritonitis, meningitis, bronchitis and supplicative traumatic infections generally are due to micro-organisms which habitually lead a suprophyllic existence upon the surface of the body or upon exposed mucous membranes; they are therefore commonly due to antinfection.

Another method of classification which presents certain advantages is one based upon the nature of the infectious agent. This would give us the following principal groups:

I. Diseases due to infection by vegetable parasites: (a) schizomycetes (bacteria); (b) hyphomycetes (microscopic fungi); (c) blastomycetes (yeasts).

II. Diseases due to infection by animal parasites: (a) protozoa; (b) nematodes; (c) trematodes; (d) cestodes; (e) acari.

Since the discovery of the tubercle-bacillus and the introduction of Koch's method for the isolation and cultivation of bacteria by means of solid culture-media, the progress of our knowledge relating to the bacteria (Group I, a) has been very rapid, and while we have still, no doubt, much to learn about pathogenic bacteria, it is probable that few if any first class discoveries in the etiology of infectious diseases remain for the bacteriologists.

The infectious diseases due to micro-organisms of this class may be classified as follows: (a) General blood infections, including relapsing fever, anthrax, septicaemia of cattle (Rinderseuche), etc.; (b) localized infections, acute or chronic, including erysipelas, diphtheria, influenza, croupous pneumonia, bronchitis (?), gonorrhoea, cystitis, pyelonephritis, endometritis, conjunctivitis, otitis, oozena, pleurisy, peritonitis, pericarditis, meningitis, endocarditis, abscesses, furuncles, adenitis, mastitis,
The China Medical Missionary Journal.

osteomyelitis, enteritis (?). Asiatic cholera, cholera, cholera nostras, cholera infantum, non-amoebic dysentery (?), typhoid fever, tuberculosis, glanders, rhinoscleroma, bubonic plague, chancroid, tetanus, malignant œdema, etc.

The second group (b) of infectious diseases due to vegetable parasites includes: Actinomycosis, mycetoma or Madura foot, the various forms of tinea (trichophyton, imbricata, vesiculosa, favosa), erythrasma, pinta (the spotted skin disease of Mexico) etc.

Recent researches indicate that the blastomycetes (c) may, perhaps, play a more important rôle in animal pathology that has been hitherto suspected. Rasse, in 1895, obtained from a case of chronic pyaemia a yeast which proved to be pathogenic for mice, and during the past two years several investigators (Santilice, Kehane, Curtis Corselli and Frisco, Pianese, Roucali) have obtained pathogenic blastomycetes, by cultivation from malignant tumors. Oidium albicans, which is recognized as the usual cause of aphthous ulcers in the mouth, belongs to this group.

In the second group (II), which includes infectious diseases due to animal parasites, especial interest attaches to the subgroup a—protozoa. The diseases which have been shown with a great degree of probability to belong to this group are the malarial fevers, amebic dysentery, the surra cattle disease of India, the tse-tse "fly disease" of Africa and the "Texas fever" of American cattle. But these, I anticipate, are only the first discoveries in a very promising but difficult field of investigation. The presence of a vitiated amoeboid micro-organism in the mucus secretion coughed up by children suffering from whooping cough has recently been reported by Deichler (1886) and by Kourlow (1886).

Finally, we may base our classification upon the special tissues or organs involved in the infectious process. From this point of view we have:

I. General blood infections (septicaemia), including malarial infection, relapsing fever, streptococcus infection, etc., in man; and anthrax, swine plague, cattle plague (Rinderpest), Texas fever of cattle, etc., in the domestic animals.

II. Localized infections: (a) Of the integument and subcutaneous connective tissue, including scabies, the dermatophyti, erysipelas, furuncles, etc.; (b) of mucous membranes, including diphtheria, influenza, glanders, bronchitis, rhinitis, conjunctivitis, otitis, gonorrhoea, cystitis, enteritis (?), cholera Asiatica, cholera nostras, etc.; (c) of serous membranes, including pleuritis, pericarditis, peritonitis, meningitis and synovitis; (d) of glands, including typhoid fever, bubonic plague, parotitis, mastitis, adenitis, etc.; (e) of the lungs, including pulmonary tuberculosis, croupous pneumonia, etc.

It is evident that under several of the subdivisions the diseases mentioned would require a sub-heading to designate definitely the nature of the infectious process. Thus we would have, for example, to specify whether a peritonitis was tubercular or due to streptococcus infection or to some other known micro-organism; an adenitis might be due to syphilitic or tubercular infection or to one of the pus cocci; a conjunctivitis to gonococcus infection or to some other pathogenic micro-organism, etc.

It will be noted that, both in our classification based upon the nature of the infectious agent and in that based upon the special tissues or organs involved in the infectious process we have not included the eruptive fevers. It is hardly necessary to say that this omission is due to the fact that we have as yet no positive knowledge to guide us in placing these infectious diseases in the systems of classification suggested, which are, therefore, necessarily incomplete.—American Journal Medical Science.
ANTIPYRINE IN INFLUENZA.

Unless there are any contraindications to its employment, such as old age, vascular derangement, etc., antipyrin still remains one of the most pleasant and rapid remedies for obtaining relief from the symptoms of influenza. Much depends on how it is exhibited; the most common mistake being to give too large doses and at too long intervals. By using the following formula relief is speedily secured, and any depressing effects of the drug are protected against:

B Antipyrinae, gr. v.
Soda Biocarb., gr. v.
Spirit Ammon., Aq. spat., m. x.
Elixir Simp., dr. ss.
Tinct. Opii., m. ij.
Aq. Anethii ad. oz. ss.

M. S.—One tablespoonful every half-hour for three doses, then every two hours, every three hours, and afterwards every four hours if still required.

This is a digestible form, and not depressing. The combination of a small dose of laudanum rapidly removes the depressing symptoms, and appears to prevent nervous prostration afterwards.

ANTISEPSIS OF THE MOUTH AND THROAT.

Rosenbach's directions cannot be improved upon. "The less solid food taken the greater should be the care with the mouth. It should be rinsed out several times a day with Luke-warm water, containing a little common salt and Tincture of Myrrh or Eau-de-cologne. With bleeding of the gums or bad teeth powdered Boric Acid may be twice daily rubbed between the lips and gums. False teeth should be removed when no solid food is taken. In patients with partial loss of consciousness the mouth should be examined frequently for small sores, which, if present, should be powdered with a little boric acid; and cracks at the corners of the lips heal quickly if dried with a clean towel and treated with boric acid or vaseline."

In ulcerative stomatitis and noma nothing answers better than the frequent application of solution of Mercurio Perchlorid (1 in 1000).

Among other antiseptic mouth washes may be mentioned solutions of Sodium Hypo-pomphile (3 grs. to the ounce), Borax and Carbo Acid (3—5% applied with a brush). Liq. Sodii Chloridatæ (oz. i. to the pint of water) is efficient, but very unpleasant to taste. One of the most useful medicines for internal use in all forms of septic inflammation of the mouth and throat is the following:

B Liq. Hydrarg. Perchlorid, dr. i.
Potass. Iodid, gr. ii.
Tinct. Myrrhae, m. i.
Aq. Distillat ad. oz. i.

Dose—1 to 4 teaspoonfuls every two to four hours, in small sips.

In the application of antiseptic solutions to the mouth and throat all mucus should be previously removed as far as possible by rinsing or swallowing with lime water, or other weak alkaline wash.

ANÆMIA PERNICIOSA.

Stengel advises that under no circumstances should arsenic be pushed so far as to produce diarrhoea or other gastro-intestinal symptoms, as the loss of ground from an attack of diarrhoea may be more than counterbalance the gain secured by weeks of judicious treatment. The tolerance of the drug is sometimes remarkable, but there is little need of increasing the dose beyond 15 drops, even when it is well borne.

The patient should always at first be confined to bed, and should be required to use the bed-pan and urinal. The diet should be nutritious and easily assimilable. Meats should not be given too freely, on account of the diminished secretion of hydrochloric acid; nor, on the other hand, should
sugars or starchy food be allowed in large quantity, from their tendency to fermentation. Symptomatic treatment is generally required to aid digestion and to allay gastric irritation. For the former purpose hydrochloric acid is often essential, and should always be tried where gastric fulness and fermentation are complained of. Where vomiting is severe small doses of bismuth subnitrate (5 grains) with cocaine (\( \frac{1}{2} \) to \( \frac{3}{4} \) grain) act more happily than any other remedies; and it has seemed that arsenic could be administered more freely and continuously with than without these adjuvants. They are best administered some time before the meal.

Lavage may prove of great advantage in controlling obstinate vomiting and in improving digestive power. In cases where gastric atony seems prominent and the patient’s appetite is poor, butters may be given with advantage before meals.

Intestinal lavage has been less frequently practiced, and has not as yet yielded definite results. The use of intestinal anti-epics, such as salol, euphrasia and carbolic acid has been highly lauded, but the results are thus far uncertain. Free use of purgatives is distinctly less advisable than in chlorosis, excepting in the cases of parasitic pellagous anemia. Enemata or suppositories will generally be sufficient for the purpose of securing action of the bowel, and beyond this we should not attempt to go.

Sooner or later in parasitic anemia there comes a time when remedies seem altogether powerless.

At this stage measures directed to assist the circulation are even more essential than arsenic, and of these not the least powerful is systematic massage. A still more advanced case would call for injections of water or of blood. The safest and perhaps the best method would be the hypodermic injection of normal salt solution in large quantities (2 pints to 2 quarts). The transfusion of blood itself has been practiced by a number of investigators, and some, as Bra-kenridge, report remarkable improvement following the operations. It is doubtful, however, if blood-serum or blood has any great advantage over salt-water, and certainly the danger of fibrin-ferment intoxication and other accidents would militate against their use.

During convalescence iron is a valuable adjunct to arsenic. In the earlier stages of the disease, however, it is not only of no value, but often disagrees decidedly.

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A STUDY OF THE PARASITES OF MALARIA.

By Geo. W. Burleigh, M.D.

The fact that malarial diseases show themselves in so many varied clinical features, renders important the publication of all cases that are studied in the light of modern methods. It is now a recognized fact that malaria in all its varied forms is always an infection of blood by an organism known as the *Plasmodium malariae*.

In November of 1880 A. Laveran, a French army surgeon, announced to the medical world the discovery of the parasites in the blood of malarial patients. Since that time there have been many conflicting statements written on the etiology of malaria, especially so in regard to the classification of the different parasites. While we cannot accept all that has been written by Laveran, who gave a most vivid and elaborate description of his observations, we find much in his early writings, which is invaluable to those who would follow the development of a line of study which has now progressed to such perfection, that all who have had the necessary training and material are unanimous in the statement that these bodies are always in the blood of patients suffering from malarial fever.

While we do well to read all that has been written on this subject it is far more valuable to those who wish to know for themselves, to follow the good advice of Prof. Dock, of the University of Michigan,
to a junior medical student, who was anxious to make a study of malaria. In reply to the question as to what was the best and most modern work on the subject he was told to procure a microscope, 1-12 oil immersion, cover-slips and slides, and a patient suffering with malaria, and to make a thorough study of his blood and associate his results with the symptoms of the patient.

We refer the reader to such standard works as "The Parasites of Malarial Fevers," New Sydenham Society, London, and "The Malarial Fevers of Baltimore," the John Hopkins Press, Baltimore, for a full discussion of the subject.

It was Laveran who first discovered a sure means of diagnosing malarial fever, and it is to him we owe our thanks for his long-continued research covering a space of some five years while busily engaged in the duties of a military surgeon at Constantinople, Algiers. We also owe much to the young Roman school for their earnest researches by the use of stained preparations.

Klebs-Tommasi-Crudeli bacillus malariae had become an established fact among the greater number of investigators. About this time Marchiafava and his pupil, Celli, were busily engaged in a serious research on the same subject, but, like Laveran, they worked under difficulties. Laveran worked with a small magnifying power (400-500 diameters), while Marchiafava up to 1883 used a lens belonging to the dry system. From this date to 1884 he made his observations on dried specimens with a 1-12 oil immersion lens, Zeiss.

In 1884 he began the study of malaria in freshly drawn blood. Since then he has continuously progressed in his researches, placing before the medical profession most valuable information.

It was Marchiafava and Celli who first advocated the theory that the reproduction of the malarial parasites depends upon the segmental bodies, and thus for the first time we have a clear and minute description of the development of these organisms.

To Golgi belongs the credit of differentiating between the different types of fever by the different organisms found in the blood. In 1886 he also clearly established the fact that synchronous with the paroxysm we have associated the stage of sporulation. Since that time there has been a comparatively large number of investigators in different parts of the world.

Among those who have contributed most valuable information with reference to the diagnostic value of the organisms, and who have also given us a better classification of the parasites, may be mentioned (in order of the their appearance in print) Sternberg, Oeser, Danilewsky, Councillman, Chezninski, James, Manrel, Plehnn, Dock, Quincke, Von Jaksch, Bignami, Mannaberg, Thayer, and Hewesont.

Species of Parasites and Fever Types.

On this point there are two distinct views held:—

The one party, Laveran being its champion, claims that the malarial parasite is an individual species and that the different types are brought about by polymorphism.

The other party, which may be known as the Italian party, holds that the unpigmented ameboid organism grows and develops through successive stages till the organism has reached maturity, and then, closely following this stage, sporulation takes place.

The flagellated and crescentic parasitic varieties, they hold to be sterile forms, and have nothing to do with the rise or fall of the temperature.

The following illustrates in brief the position held by the Italian school:—

Type of Fever:—Can be ascertained by the species of parasite found in the blood.

Quartan.—Only and alone by one generation of the quartan parasite.—(Golgi.)
Tertian.—1. By one generation of the tertian parasite. (Golgi.) Light form of tertian fever.

2. By one generation of the malignant tertian parasite. (Marchiafava and Bignami.)

Quotidian.—1. By one generation of quotidian parasites. (Marchiafava and Celli.)

2. By two generations of tertian parasites (with a 24-hour interval.)

3. By three generations of quartan parasites (with a 24-hour interval.)

Continuous Fever.—1. By several generations of quotidian parasites.

2. By several generations of quartan and tertian parasites (very rarely from malignant tertian parasites.)

Irregular Fever.—1. By several generations of quotidian parasites.

2. By several generations of quartan and tertian parasites which do not stand in a 24-hour interval to one another.

3. By the presence of several species (for example, tertian parasites and quotidian parasites of one or more generations); also by mixed infections.

Methods of Procedure.

Time.—The examination of blood should be made with reference to the temperature curves, as the plasmodia are most plentiful and have reached their maximum size at the time the temperature begins to rise. If the blood be examined three or four hours after the temperature begins to rise, some of the most brilliant forms can be seen.

Material.—A microscope with a 1-12 oil immersion and a No. 3 or No. 4 eye-piece, No. 1 extra thin ¾ x ¾ cover-slips, slides and forceps for handling the slips. The cover-slips should be prepared after one of these methods:

First, allow them to remain in strong sulphuric acid for two hours. Wash in flowing water till free from acid, then place in glacial acetic acid for one hour. Wash in water as before, and place in alcohol 95 per cent. They may now be wiped with a cloth free from lint, and put in a dirt-proof box.

The slides may be washed in alcohol and dried as above.

After having thoroughly cleansed the tip of the finger, the blood is withdrawn by a prick of the lancet. The first drop is smeared over the finger, thus forming a coat of serum. The drop should be very small. Then lightly bring the drop of blood in contact with the center of the slip, which is quickly transferred to the previously prepared slide and allowed to spread out, and then take at once to the microscope.

In order to secure good, dry preparations, the drop of blood should also be small. Holding in your left hand a clean cover-slip with a pair of Ehrlich's forceps, secure the blood and touch it with the edge of a cover-slip held in the right hand by a pair of forceps, and quickly but firmly draw it over the cover-slip held in the left hand. Practice and care are needed, so that each corpuscle on the cover-slip in the left hand will lay flat, presenting its full surface to the observer. Allow the slip to dry thoroughly.

After properly fixing the specimen in a solution composed of three parts of ether to one of absolute alcohol, the specimen is ready for staining.

First, stain in Eosin, 1 per cent solution in 60 per cent alcohol, for 45 seconds, wash, and dry between filter papers. Counter-stain in Löffler's alkaline methyl blue for three minutes. Wash and dry thoroughly, and then examine in water, and if properly stained, mount in Canada balsam. The plasmodia will be stained blue and the pigment of the plasmodia, Van Dyke's brown. The red blood corpuscles will appear red.

REMARKS ON MILK DIET IN THE SEVERE INTESTINAL DISEASES ACQUIRED IN THE EAST.

By GEORGE THIN, M.D.

During a long experience of the management of certain climatic disorders of the intestine by exclusive milk diet, my attention has been much directed towards
minimizing the difficulties inseparable from the treatment. Many persons have a strong dislike to milk, and I am often met by the statement that the patient "has never been able to take milk in his life." One sufferer from a severe form of psilosis prefaced her statement of her case by telling me: "It is no use prescribing milk for me. I can neither take it nor digest it. All the medical men whom I have consulted have soon satisfied themselves that this is correct, and have been obliged to give me something else." For cases like that one, I have found the use of aerated milk of inestimable value. So far, I have only twice failed to succeed in getting a patient to go on exclusive milk diet. In one case, which was neither severe nor well marked, the diarrhoea did not rapidly yield, and the treatment was abandoned after a short trial; and another patient, who was doing extremely well, gave it up for, I am afraid, no better reason than caprice, with disastrous results.

Another; and sometimes a serious difficulty in connection with milk diet, is the quantity of fluid which the patient must swallow. Many patients, especially when convalescing, take as much as six to eight pints daily, and even more, without any difficulty, but there are others in whom the necessary quantity of milk suited to the case produces a constant feeling of distension, accompanied by troublesome flatulence. There are also cases in which the patient is very ill and his life in great danger, in which it is impossible to get him to swallow sufficient milk to sustain life. During the past summer I had a case of this kind under my care. A man who had been for two years suffering from chronic diarrhoea acquired in Bombay, complicated with fistula, and an unhealthy condition of the mucous membrane of the rectum, on which Mr. Herbert Allingham found it necessary to operate, fell into a low typhoid condition. The difficulty of getting him to swallow sufficient milk was so great, and his repugnance to it apparently so invincible, that the treatment was abandoned for three days, during which time an endeavor was made to support him on beef-juice. His condition became rapidly worse; there was incessant diarrhoea, the motions being passed involuntarily; the tongue was hard, dry and cracked; the teeth covered with sordes, and the pulse quick and thready. We considered the chances of recovery to be very small; he seemed, indeed, to be rapidly sinking, but I was satisfied that if he were to be saved at all it could only be by milk, and accordingly, exclusive milk treatment was resumed. He could swallow only such small quantities at a time that it was found impossible to get him to take more than two and one-half pints in twenty-four hours. The typhoid condition and incessant diarrhoea continued, without improvement, for forty-eight hours, and it became evident that unless more milk could be assimilated it was hopeless to look for recovery.

I then directed part of the milk to be evaporated to one-half its bulk, and by giving him this evaporated milk he was able to take at once the equivalent of three and one-half pints in twenty-four hours, which proved sufficient to arrest the threatened collapse. Gradually, after a time, his condition began to improve, and he eventually consumed in natural and evaporated milk the equivalent of nine pints daily. He made a perfect recovery, and in five months was shooting grouse in Scotland.

I afterwards prescribed evaporated milk with excellent results in another serious case of wasting from long-standing chronic diarrhoea acquired in India. The patient, who had found it extremely difficult to swallow more than three pints of fluid a day, was able, by taking a certain proportion of his milk evaporated, to consume the equivalent of five pints, gradually lost his diarrhoea, and was able to digest solid food and gained strength proportionately. Other patients
The China Medical Missionary Journal.

not in the same immediate danger, have been allowed the option of taking part of their milk evaporated, and some of them have thriven on the concession. Others have had no difficulty in taking, and have preferred to take the milk in its natural state.

The two severe cases alluded to above were examples of the chronic intestinal catarrh (not dysentery) which is common in India, and which is often described under the name of "tropical diarrhoea." At the present time I have under my care a typical case of psilosis (vulgo "sprue") of long standing, which is steadily progressing toward recovery by the help of evaporated milk. By using part of the milk prepared in this way the patient is now able to take sufficient nourishment to enable the diseased bowel to recover. He has been under medical treatment more or less continuously for a number of years, but I gather from what he tells me that his occasional attempts to get well by milk diet were abandoned, because he could not take sufficient milk to maintain the required minimum of strength. This induced him to supplement his diet by other articles of "invalid" food, and these invariably after a time brought on a relapse.

To evaporate milk properly for patients like these is a matter of some care. A simple apparatus has been made for me, consisting of a small regulating spirit lamp, with a wire stand for holding an enamelled pan containing the milk at a convenient height from the flame. The heat may be increased or diminished at will by the regulator on the lamp. The milk should be heated rapidly, but must not be allowed to reach the boiling point; and in this pan ten ounces can be reduced to five in half an hour. It must be stirred continuously after it gets warm and until it has become cold to prevent a skin forming. If the cream is allowed to come to the top the milk takes longer to evaporate, and the taste is not so good. When the evaporation is properly effected the cream remains mixed in the milk as usual, but, of course, rises on standing. The milk should, therefore, be stirred before being drunk. Evaporated in this way it has a richer taste and looks richer than ordinary milk, but is not unpalatable. It gets sour more quickly than fresh milk. The process consumes a good deal of time and requires constant attention.

Whilst writing about the treatment by milk I may make a few remarks in connection with one of the diseases for which it is the remedy. There is a note in the Times of India, of September 12th, which states "that Surgeon Captain Dyson has traced the disease known at Darjeeling as hill diarrhoea, and in the Straits and China, by the peculiar name of 'sprue,' is due to the presence in the water of small particles of mica." Psilosis or sprue, has been often written about as identical with hill diarrhoea of India, and I am not sure that, under the influence of Indian medical literature, I have not myself done so at one time.

The affections known by these names have a feature in common, namely, the passing of frequent motions of a light yellow color, which after all is the usual color of motions which are rapidly driven along the small and large intestine. I had, however, at one time a patient suffering from typical psilosis whom I sent to spend a month with her brother, an army surgeon of long experience in India. When he brought her back to me he said: "The disease from which my sister is suffering is new to me. I have not observed it in the parts of India in which I have served, and it is not 'hill diarrhoea,' of which I have seen hundreds of cases." Typical psilosis occurs in Ceylon, and I have seen well-marked examples in patients who have returned from that island. I have not met with evidence to show that it occurs at all commonly in Bombay or Calcutta. Cases of severe wasting diarrhoea from these parts of India about which I have been asked to give an opinion, have so far been none of them cases of psilosis. Typical examples of the two distinct affections—the common
chronic diarrhoea of India and psilosis of the tongue and small intestine—are related in a paper presented by me to the Royal Medical and Chirurgical Society and published in the 75th volume of the Transactions (1892).

As regards the presence of mica in the drinking water as a cause of this disease, I should regard the theory as improbable. I am not familiar with the distribution of mica in the world, but to prove it to be the cause of psilosis it would have to be found not only in Ceylon, but in the drinking water in the Straits Settlements, Hong-kong, the whole China coast, and at least several widely distant parts in the interior of China, in Java and in the Philippine Islands, in all of which places psilosis is very common. In the Encyclopædia Britannica I find it stated that mica is found in Finland, New York, Canada, Shetland, Sutherland, Rossire, Inverness, Skye, Fifeshire, and Greenland, from all of which parts no case of psilosis has yet been reported. The only place where psilosis is common and in which the presence of mica is noted is Ceylon. Besides, there are facts connected with the clinical features of this disease which cannot be reconciled with the mica theory. Patients who have been for a long time quite well are subject to relapses from chill and error of diet, although they have returned to England, where no case of this disease has ever been known to arise. Nay, more, the disease may show itself in an unmistakable form for the first time after a patient has returned to England, An extraordinary instance of this occurred in the case of a patient who consulted me last summer. A lady who had returned from China seventeen years before developed unmistakable symptoms of psilosis, which had existed for nearly two years to a slight extent before its nature was detected. The development of all the characteristic symptoms to a degree of considerable severity led to the disease being diagnosed, and under the treatment appropriate to the cure of psilosis she has made a good recovery. Although she has not enjoyed robust health after her return from China, suffering particularly from anaemia, she had never had symptoms of "sprue" until two years ago.

The proximate cause of psilosis is not known, but the probability that it consists in some organic ferment, very possibly a bacterium, is strong, and I think it likely that the curative action of milk diet is not due to any special therapeutic virtue of milk, but to the fact that it does not contain the pabulum in which this ferment can live. It is impossible otherwise to account for the fact that not only do the soothing foods which are so useful in other forms of diarrhoea not cure this form, but they will often bring on at once a severe relapse. I have often known arrowroot bring back diarrhoea and sore mouth after the patient had not had either symptom for several weeks. The same thing applies, in my experience, to beef-tea and bread, and severe and persistent relapses were produced in two patients by a raw new-laid egg. It seems to me impossible to account for these facts, otherwise than by assuming that in the egg, beef-tea, arrowroot, and I may add, wheaten bread, a ferment can multiply with a rapidity that cannot be attributed to any inorganic substance.—Brit. Med. Jour.

**SERUMTHERAPY.**

The following is an account of some of the work done in Serumtherapy during the past year:—

Sufficient time has now elapsed and a sufficiently large number of cases of diphtheria have been treated by antitoxin to put us in a better position to judge of the value of the treatment in this disease. Reports from so many different sources speak with so great unanimity with regard to the reduction in the death-rate and mitigation in the symptoms of diphtheria, that there is no room for doubt as to the superiority of this method of treatment.
over those formerly in vogue. This reduction in the death-rate is too great and too uniform in the most widely separated countries to be accounted for by a supposed milder type of diphtheria in the last few years, or by the fact that, as Dr. Purjesz points out,* the general interest taken in the antitoxin treatment by the lay public and the public has led to a large number of mild cases being brought to the hospitals for treatment that would otherwise never have come to them. The statistics may also have been somewhat too favourable for the serum, as compared with the previous treatment, on account of the fact that the now common bacteriological examination often shows the presence of the diphtheria bacillus in cases that would have formerly been regarded as tonsillitis, and that these mild cases are injected with antitoxin. But this would not affect more than a small proportion of the cases. At the same time, antitoxin does not cure all cases of diphtheria, nor would it be reasonable to expect it to do so.

The report of the American Pediatric Society † is based upon the collective returns from 613 physicians, of whom over 600 pronounce themselves strongly in favour of the serum treatment. 3,384 cases are reported: the doubtful cases which died are included in, those which recovered are excluded from, the report. On account of the widely separated localities from which the records came, no local peculiarities can account for the favourable results. No new cases of sudden death immediately after the injection have occurred. In nineteen cases only, injected reasonably early, the serum did not appear to have a favourable influence; of these, in nine the diagnosis was doubtful, three were malignant, four complicated with measles, and

in two the serum was of doubtful value. In three the patients were made worse, but in only one of these could the result be fairly attributed to the injection. The general percentage mortality was 12.3; in cases injected during the first three days, 7.3; excluding cases moribund at the time of injection or dying within twenty-four hours, it was 8.8 and 4.8 in the two groups respectively; in cases injected on or after the fourth day it was 27. Of the laryngeal cases, many severe, one half recovered without operation. In intubated cases the mortality was 25.9 per cent, a reduction of more than 50 per cent. on any other method of treatment. Broncho-pneumonia occurred in 5.9 per cent. In contrast to two or three instances in which the serum is believed to have acted unfavourably on the heart are a large number in which the heart's action was distinctly improved. There is little, if any, evidence to show that nephritis occurred in any case as the result of the injections. Paralytic sequelae occurred in 9.7 per cent., the effect of the serum being less marked upon the nervous system than on any other part of the body. Injection should be made as early as possible on the clinical diagnosis, not waiting for the bacteriological confirmation; but however late the first observation is made an injection should be given, unless the progress of the case is satisfactory. In severe cases, or in laryngeal diphtheria in children over two years, an initial dose of 1,500 to 2,000 units is sufficient, to be repeated if there is no improvement in from eighteen to twenty-four hours: a third dose at a like interval may be necessary. For severe cases in children under two years and in mild cases an initial dose of 1,000 units is usually enough: it is to be repeated if necessary.

The Metropolitan Asylums Board have issued a statistical report* on the antitoxin treatment in six fever hospitals

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† Pediatrics, 1896, ii. 97; abstract in Am. J. M. Sc., 1896, cxii. 214.

in 1895, as compared with cases treated in 1894, in which no antitoxin was used, and the mortality was exceptionally low. The general percentage mortality rate is decreased 7.1 in favour of 1895, and in cases in the first five years of life 13.2. The mortality when the treatment was begun on the first and second days of the disease is 4.6 and 14.8 per cent. respectively in 1895, as against 22.5 and 14.8 per cent. in 1894. The mortality in laryngeal cases is reduced from 70.4 per cent. in 1894 to 49.3 per cent. in 1895. The complications of the disease were apparently not influenced by antitoxin. The cases were 2,182 in number, and the authors lay particular stress on the importance of beginning the treatment as early as possible. They point out: (1) A great reduction in mortality in cases coming under treatment on the first or second day of the disease. (2) A general mortality below that of any other year. (3) A particularly remarkable lowering of mortality in laryngeal cases. (4) A uniform improvement in tracheotomy results. (5) A beneficial effect upon the clinical course of the disease.

Further points brought out in other reports are: the great importance of early treatment, some showing recovery of all injected cases on the first day of the disease; the early disappearance of the membrane by the seventh day in over 80 per cent. of cases; the subsidence of severe laryngeal symptoms and the smaller number of cases requiring tracheotomy: the Berlin report states that the mortality decreases as the age of the patient increases: other statistics show a striking decrease in the mortality in cases under five years of age.

Dr. Funck, of Brussels, on the basis of the collection of a number of statistics, states: (1) Serum treatment diminishes the mortality of diphtheria. (2) Serum treatment often checks the further extension of the diphtheritic process, and avoids tracheotomy. (3) Sepsis, severe affections of the heart, kidneys, and nervous system are lessened. (4) The serum is absolutely harmless.

In a discussion at the New York Academy of Medicine* Dr. W. H. Thomson gave the following statistics of the antitoxin treatment of diphtheria, drawn from a paper by Professor W. H. Welch in the Johns Hopkins Hospital Bulletin for July-August, 1895, and from a summary of the statistics of the treatment, brought up to May, 1896, by Dr. A. R. Guerard. Hospital reports are selected partly because they would not give the most favourable results, and therefore are less affected by the arguments brought forward by the opponents of the treatment. The reports are drawn from 85 hospitals in all the European countries, the United States, Australia and Japan, giving a total of 9,993 cases with 1,820 deaths, or a mortality of 18.3 per cent. "In 53 of these hospital reports there are given statistics of 7,277 cases with a mortality of 20 per cent. under serum treatment in which definite comparisons are made with the mortality previous to the use of antitoxin of 44.3 per cent.; thus justifying the contention that so far as hospital practice goes antitoxin has caused a reduction of fully 50 per cent. in the general death rate." Further statistics from reports of 3,760 cases treated with antitoxin in private practice give 296 deaths, or 7.8 per cent.

A report from the Imperial Health Office in Berlin† for the second quarter, 1895, states that in 2,130 cases treated, excluding cases moribund on admission to hospital, the death-rate was 13.3 per cent. In the first quarter of the year the rate was 16.7 per cent. The injection was practised on the first two days of the illness in 752 patients, of whom only 48 died, a mortality of 6.4 per cent.; a much smaller death-rate

† Lancet, 1896, i. 331.
than in the first quarter, due to the greater strength of the serum used. Injections performed on the third day gave a percentage mortality of 10; on the fourth day 17.3; on the fifth day, 23.5; from the sixth to the tenth day, 28.3; from the eleventh to the nineteenth day, 17.6. 841 patients suffered from laryngeal diphtheria, of whom 588 were operated on and 176 died; a mortality of 29.9 per cent. Secondary effects noted were, skin eruptions, pains in the joints, and suppuration at the site of injection.

In Glasgow,* in the years 1890-94, the percentage death rate from diphtheria was respectively 39.8, 38.8, 37.2, 40.5, and in 1894, 35.5. In 1895, out of 179 cases 137 were treated with antitoxin, four being moribund on admission and thirty-eight so mild as to give rise to no anxiety. Thus the severe cases only were treated by antitoxin. In seventy-six cases only one injection of from 10 to 20 c. c. was necessary; in the others additional ones were given. Of the total 170 cases twenty-five, or 14 per cent., died. That the fall in fatality is not due to a natural decline in severity of the disease in Glasgow is shown by the fact that the mortality in home-treated cases in 1895 was higher (24 per cent.) than in 1894 and 1893, 23 per cent. and 22 per cent respectively. Of tracheotomy cases the fatality rate was in 1893, 76.2 per cent.; in 1894, 86.9 per cent.; and in 1895, only 34.5 per cent.

Dr. Virmiseel reports* from the Coblentz Hospital 150 cases treated by antitoxin, of whom 9 died, or 12.7 per cent.; of 22 injected on the first day of the disease, all recovered; the death-rate for those injected up to the third day was 31.6 per cent.; after the third day, 68.4 per cent. Of 79 tracheotomy cases previous to the serum treatment 48 died, or a mortality of 61.4 per cent.; of 64 tracheotomy cases treated with serum 15 died, or a mortality of 23.4 per cent. Of the whole number treated one-third were only brought to the hospital and injected on the fifth day of the disease; and of the 18 deaths 6 patients were brought in a dying condition to the hospital. The author emphasizes the great importance of early treatment.

Dr. Karl Fürth gives† the following experience at Freiburg:

<table>
<thead>
<tr>
<th>Date</th>
<th>Without serum treatment</th>
<th>Percentage of deaths</th>
<th>Tracheotomy cases</th>
<th>Percentage of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>June, 1892—June, 1893</td>
<td>95</td>
<td>58.9</td>
<td>41.0</td>
<td>74.3</td>
</tr>
<tr>
<td>June, 1893—June, 1894</td>
<td>145</td>
<td>38.6</td>
<td>32.4</td>
<td>67.1</td>
</tr>
<tr>
<td>June, 1894—June, 1895</td>
<td>144</td>
<td>19.4</td>
<td>34.7</td>
<td>50</td>
</tr>
</tbody>
</table>

With serum treatment.

June, 1895—June, 1896 | 150 | 15.3 | 23.3 | 42.8 |

Whilst in the earlier periods the death-rate for children under two years was 60—100 per cent. Of 19 cases under two years treated by serum only 3 died, although 8 required tracheotomy. In the later cases a larger dose of serum was employed—1690 units; in several cases 4000 units were administered within twenty-four hours. Of 46 cases treated ed on the first or second day of the disease, all recovered.

A later communication‡ from the Caroline Children's Hospital in Vienna states that of 633 cases treated before serum 292 died, or 46.1 per cent.; of 260 treated with serum 34 died, or 13 per cent.

† Ibid., 669.
Cases in which the throat or the larynx was affected and not operated on ...

Cases operated on for Group ...

1,000 units were injected on admission; if after 24—36 hours no tendency to heal or signs of spreading were observed a second injection was given. In 69 cases localised to the throat there was only 1 death. In 10 out of 28 cases of laryngeal group symptoms of stenosis declined shortly after admission; 1 died of heart-failure, 2 of pneumonia, six and ten hours after admission respectively; in 15 cases tracheotomy was performed, of which 6 died. Three cases of diphtheria showed signs of septic infection. They terminated fatally, the injection of serum having no influence on them. The membrane disappeared on or before the fourth day in 23 cases, on or before the sixth day in 29, on the seventh day in 8, later than the seventh day in 8. There was albuminuria in 28 cases; symptoms of heart-failure observed in 5. An urticaria-like rash was observed in 9 cases; scarlatiniform or erythematous in 7.

The importance of early treatment is also brought out in a series of 352 cases reported by Dr. Aaser.* The mortality in cases treated on the first day of the disease was nil; in those treated on the second day it was .9 per cent; on the third day, 11.6; after the seventh day, 50. The death rate in cases in which tracheotomy or intubation was necessary was 29.2 per cent. The author thinks that erythema as a consequence of the injection is less frequent if the serum is filtered through a Chamberland filter.

As to the immunising power of the serum, the Coblenz Hospital Report † states that in four out of 150 cases treated a second attack occurred within twelve months of the first; and at the Caroline Hospital in Vienna relapses were noticed in several cases in a few days—2 to 18—after the first attack treated by antitoxin, and one patient had three distinct attacks in seven weeks. Kassowitz states* that neither a severe attack of diphtheria nor the injection of a large number of "immunising units" of serum brings in man insusceptibility to the diphtheria poison. After larger or smaller immunising doses of serum the attacks of diphtheria are as frequent as without them; the "immunised" person may suffer from an attack of diphtheria as soon as a few weeks or months afterwards, and the attack may be a severe one and end fatally in spite of serum-treatment. Rubens says† that a single injection of 200 units of Behring's serum should protect against diphtheria for several months. In the case, however, of a child affected with severe diphtheria, a brother aged 5 years, and a sister aged 7, were injected with 200 units as a protective measure. Four weeks later the brother passed through a typical attack of the disease, though not so severe as the first case.

With regard to any ill-effects that may result from the antitoxin injections, it is obviously difficult to say what effects are due to the serum and what to the disease, or in fatal cases to know whether death is actually due to serum. Prof. Kolisko,

† Loc. cit.

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No. of Cases. Deaths. Percentage mortality-

<table>
<thead>
<tr>
<th>Before serum treatment</th>
<th>331</th>
<th>83</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>With serum</td>
<td>159</td>
<td>11</td>
<td>6.9</td>
</tr>
<tr>
<td>Before serum + serum</td>
<td>302</td>
<td>209</td>
<td>69.2</td>
</tr>
<tr>
<td>With serum</td>
<td>41</td>
<td>23</td>
<td>56</td>
</tr>
</tbody>
</table>

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† Deutsche med. Wochenchr., 1895, No. 46; abstract in Centralbl. f. innere Med., 1896, xvii. 925.
of Vienna,* who had made 1000 autopsies on fatal cases of diphtheria before the serum treatment was introduced, considers, as a result of his post-mortem examinations on fatal cases treated by antitoxin, that the serum favourably influences the diphtheritic process; that as a consequence of it, where a sufficient dose has been given and an interval of not less than twenty-four hours has elapsed before death, the membrane is more easily separated, is looser, or pultaceous, whether in the pharynx, larynx, or bronchi, and that the anatomical changes in the organs are the same as those under the ordinary treatment. Perhaps more definite information can be gained from the use of the serum as a preventive measure, and the unfortunate results that have occurred in such cases show that Behring's original statement that the injection of his serum was as harmless as one of normal saline solution was too absolute. There is the much debated case of Prof. Langerhans's little boy, who died suddenly after a dose of antitoxin injected as a precautionary measure, the immediate cause of death not being satisfactorily accounted for. Other cases are given by Dr. Joseph Winters.† A healthy boy of 5 years was injected with a preventive dose of Behring's serum, and death occurred in five minutes (Halderman). A woman injected similarly with 600 units suffered from the most severe collapse for six hours. A boy aged 2 with spastic spinal paralysis, suffered from diarrhea for four days after a preventive injection of 600 units, and died from collapse on the tenth day (Johannessen). A girl, in good health, aged 3, after an injection of 3 c. u., had a temperature of 104°, followed by albuminuria, hematuria, and a petechial rash, and died on the twentieth day (Alfoldi). In a girl aged 6, with slight angina, proved not to be diphtheritic, after a single injection the temperature rose to 105° on the sixth day, a scarlatiniform eruption appeared for the following four days, and death occurred in convulsions (Moizard and Boucharl). In some other cases severe symptoms followed preventive inoculations. Pistor* injected a girl aged 7, who suffered from tonsillitis in which diphtheria bacilli were absent, with 900 units of a serum, with the result that she suffered from a very protracted and variable illness, attended with fever with many remissions and exacerbations, and accompanied by exanthemata, the last of which appeared three months after the injection. These unfortunate results would appear to necessitate caution in the use of antitoxin as a preventive measure.

Dr. A. Seibert and F. Schwyzter,† however, as a result of experiments in the laboratory state: (1) That antitoxin serum does not seem capable of causing threatening symptoms or speedy death, even when brought quickly into the blood-stream in very large doses; (2) The carabolic acid used as a preservative must be in so weak solution as to be unable to cause the characteristic carabolic convulsions; (3) Even very small quantities of air, if injected, will cause severe disturbance and ultimate cessation of breathing, and to this cause the authors attribute the sudden deaths reported.

Dr. Winters‡ spoke unfavourably of the antitoxin treatment. He believes that in certain individuals there is a special susceptibility to antitoxin, grave symptoms or death resulting from a relatively small dose. The predominating symptoms are referable to the nervous centres, kidneys, heart, lungs, and the temperature. One feature of these symptoms, especially the pulmonary, is their late appearance. He brought forward forty-one fatal cases of

‡ Loc. cit.
diphtheria from the Willard Parker Hospital, in which antitoxin treatment was begun early in the disease, and had, in his opinion, an unfavourable influence. It is but right to add that in the same discussion Dr. Braunnan, also of the Willard Parker Hospital, combated Dr. Winters's statements, stating that no special form of pneumonia had been observed, nor any post-mortem changes in fatal cases that could be attributed to antitoxin.

Dr. J. S. Billings, Jr.,* found in moderate and severe cases of diphtheria the blood corpuscles reduced in number, and only slowly regenerated. Leucocytosis occurs, except in very mild and in very severe cases, the increase in number of leucocytes being generally in proportion to the severity of the case. The percentage of haemoglobin varies with the number of red corpuscles. In cases treated with antitoxin the decrease in the number of red corpuscles and in the amount of haemoglobin is less than in cases not so treated. The leucocytosis is not affected. In healthy persons the injection of antitoxin causes in about half the cases a very moderate reduction in the number of red corpuscles and of haemoglobin, and no change in the leucocytes. No peculiar characteristic changes in the morphology of the corpuscles were made out.

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The diphtheria antitoxin has also been tried in scarlet fever, thus: J. Noir† injected 10 c. c. diphtheria serum into a child of 8 years on the third day of an attack of scarlet fever, with severe croupous inflammation of the fauces. The throat quickly improved; desquamation began on the third day after the injection. The chief point of the case lies in the absence of albumen in the urine, and as this occurred in a case of scarlet fever, the author infers that the serum may be used without any fear of irritating the kidneys. Dr. Szegő* treated a case of scarlet fever sore throat of the gravest kind with Behring's serum. Amelioration took place in twenty-four hours, followed by a rapid cure. Bacteriological examination showed the presence of staphylococci and streptococci, but not of Löffler's bacillus. The author invokes Metschnikoff's theory, increased phagocytosis, due to the stimulating effect of the antitoxin, to explain his case.

* Injections of anti-streptococcus serum have been employed in scarlet fever, in erysipelas, puerperal fever, and acute septicemia. This treatment must be considered as still on its trial, as it has not yet been employed in a sufficient number of cases to pronounce on its positive value. According to T. J. Bokenhain,† "Antistreptococcus serum is serum obtained from the blood of an ass which has received during several months repeated and increasing injections of living virulent streptococci. It will be seen at once, therefore, that the principle involved differs in important respects from that involved in the preparation of antidyphtheria serum. In this last it is the toxins, formed by diphtheria bacilli in bouillon cultures, which are employed to set up immunity in animals furnishing the serum. Antistreptococcus serum . . . may be expected to possess antimycotic rather than antitoxic properties."

Dr. Alexandre Marmorsk, seeing the invariable presence in scarlet fever of complications due to infection by streptococci, has treated the disease with anti-streptococcic serum. From October 16th to December 31st, 1893, 103 children suffering from scarlet fever entered the Hôpital Trousseau. Seven of these cases were not treated by the serum, because they were in the desquamative stage. Of the remaining ninety-six cases a bacteriological examination showed in all the presence of the streptococcus, either

† Progrès méd., 1895, 3e Sér. ii. 145; abstract in Centralbl f. innere Med., 1896, xvii. 880.
‡ Deutsche med. Wochenschr., 1895, No. 51; abstract in Rev. de Thérap. méd-chir., 1896, lxiii. 10.
† Brit. M. J., 1896, ii. 4.
alone or associated with other microbes. In seventeen other cases Löffler's bacillus was also found. Four of these last cases, which were admitted with symptoms of diphtheria, died in spite of treatment by both the streptococcic and antitoxic serums. All the children received on admission an injection of 10 c. c. of antistreptococcic serum, which was doubled if the general condition was serious. Treatment was confined to serum injections and antiseptic washes for the throat. The injections were repeated daily until the temperature fell. If swollen glands or albuminuria appeared the injections were resumed, and continued until the condition had returned to the normal. In ordinary cases 10 c. c. to 30 c. c. were injected; in more serious ones 40, 60, 70 c. c., and in one child of 4, with scarlatinal rheumatism, who recovered completely, 90 c. c.* The most striking effect was on the swollen glands; in nineteen cases with this complication, resolution occurred in all without suppuration. In four children who were admitted with suppurative otitis, the serum promptly stopped the purulent discharge. The advantages claimed for this treatment are—the prevention of grave complications, the rapid disappearance of false membranes, relief of delirium, improvement of the general condition, and a fall of temperature if fever be caused by complications due to streptococci. The fever caused by the scarlet fever virus pursues its ordinary course, as does the eruption, supporting the view that the disease is not caused by the streptococci.† A later report says that Marmorek has treated 411 patients with a mortality of 3.4 per cent.

Boginsky‡ said he had used the serum of Marmorek in fifty-seven cases, from which none must be deducted as the treatment was not fully carried out. In twenty-seven cases a fall of fever followed the injection, though, as this is sometimes observed in cases not so treated, it cannot be directly attributed to the serum. The sore throat and enlarged glands yielded in from three to five days, inunctions of iodine ointment being also used for the latter. In sixteen cases the serum treatment was entirely ineffectual. Some cases died from intensity of scarlet fever poison, in spite of the injection of maximum doses of the serum. In other less serious cases, suppuration of the cervical glands occurred. There remain five cases in which single injections were employed merely to combat complications, and with good results. The total mortality during the serum treatment was 14 per cent., instead of 22—24 per cent. in the previous period, too small a difference on which to base a favourable conclusion.

Dr. Dubois of Lille * also finds that injection of the serum causes an abrupt fall of the temperature if the fever be due to the streptococci and not to scarlet fever poison. A dose of 10 c. c. is sufficient. The throat cleans rapidly, glandular swelling and otitis are relieved, and he considers that albuminuria may be prevented by use of the serum from the first.

M. Josias † has used two kinds of anti-streptococcic serum; one prepared from the sheep, the other from the horse. In the first series 49 children were injected with an average dose of about a dram without accident, save some urticarial eruptions. In the second series 96 children received from two to eighteen drachms, resulting in various complications, among which were streptococcic abscesses, lympha-gitis, and polymorphous eruptions. With sheep-serum the mortality was 2.06 per cent.; with horse-serum, 5.31 per cent.; with ordinary treatment as before serum it was 5.61 per cent. There were no serious results.

‡ Med. Week, 1896, iv. 143.
He considers that the serum apparently acts upon streptococci, which do not cause suppuration.

* * * *

On the other hand, Dr. Variot* found in ten cases of children affected with membranous tonsillitis, in whom he injected 10—20 c. c. of the serum, the results so grave that he has abandoned its use. The temperature was raised two or three degrees for some hours, the children became prostrate with dry tongue, and an abscess formed in the abdominal wall even when the injections were made with due antiseptic precautions.

M. Comby also states† that the mortality of this disease treated by Marmorek's serum was 8 per cent., whilst in the same pavilion the previous mortality was 5 per cent. Not only did the anti-streptococccic serum fail to lower the mortality, but it did not prevent the complications due to the streptococci.

Prof. Petruschky‡ states that his repeated experiments of Marmorek's anti-streptococcic treatment do not confirm the statements given by the latter, and that there is yet no certain proof of the possibility of a serum-treatment against streptococcic infection. No protective influence could be obtained against "Marmorek's streptococcus" nor against two equally virulent organisms cultivated by Petruschky, either with Marmorek's serum or with that prepared by Niemann of Lyons after the method of Marmorek. He also, as the result of experiments on animals, advises against the practical application of the serum.

† J. des Praticiens, 1896, No. 20; abstract in Am. J. M. Sc., 1896, exii. 216.

M. Delèarde, * of the Institut Pasteur de Lille, on the use of Marmorek's anti-streptococcic serum in erysipelas, says, first, that it is non-toxic, and has been used in new-born infants without any harm; it may be used in large doses. In erysipelas, as soon as the diagnosis is made, 10 c. c. of the serum are to be injected into the sub-cutaneous cellular tissue of the flank: benign cases are generally cured by one dose; if not, a second dose is injected after an interval of twenty-four hours. The temperature and the pulse are the guides to the need for repeating the dose. The effects of the serum show themselves from the fifth to the twelfth hour in a fall of temperature and pulse-rate, relief of headache, disappearance of albumen from the urine, and in improvement of the local signs. Occasionally, twelve hours after injection, a little pain, redness, and sometimes oedema, appear at the site of puncture, but as a rule these pass away without any trouble. Two or three hours after the injection there is a rise of temperature, which rapidly falls again. Desquamation begins early and is in large shreds. As said above, when the case is mild and injections are begun early, a single one is sufficient; if it is further advanced the fever yields more slowly, and cases of am bulant erysipelas usually need repeated injections.

At the Vienna Medical Society, Prof. Chrobak† described three cases in which anti-streptococcic serum was employed. The first case was one of erysipelas in a lying-in woman, who recovered in three days. In the second case symptoms of sepsis came on in a woman after operation for myomata; 30 c.c. of serum were injected within two days, after which her condition improved. In the third case, one of puerperal fever, 25 c. c. were injected in three days: the fever and rigors continued until

* Nord. méd., 1896, iii. 17; abstract in Rev. de Thérap. méd.-chir., 1896, lxiii. 332.
† Lancet, 1896, i. 75.
after the last injection; but on the next day the fever rapidly decreased. Prof. Chrobak has not formed a definite opinion as to the value of the injections, but believes them to be harmless.

M. Bolognesi* criticises the results obtained by Chantemesse in the serum-treatment of erysipelas. He points out that many cases are remarkably mild, and that the mortality varies with the time of the year and the form of the affection present. He gives an account of 1,000 cases at the Hôpital d’Aubervilliers, in which the total mortality was 3.5 per cent. In cases under different forms of treatment, but with no very bad ones, the mortality was .9 to 1.2 per cent. These last may be compared with those of M. Chantemesse, in which the mortality was 1.7 per cent. in those treated by sérum efficace, and was 1.03 per cent. in those treated by sérum très efficace. The general result of the serum-treatment of erysipelas gives a mortality of 2.59 per cent., and may be compared with the general mortality of the disease varying from 2—4 per cent. He considers that the serum-treatment, to be properly tested, must be tried on acute, severe cases, the mild ones being rejected.

* Anti-streptococcic serum has been used in puerperal fever.† Dr. Ledain † has recently reported a case in which the condition on the ninth day after delivery was as follows: Temperature 104°, pulse 148, small, compressible, tympanites and tenderness of abdomen, febric diarrhoea, dryness of tongue, and quiet delirium. 5 c. c. of anti-streptococcic serum, obtained from the Institut Pasteur, were injected. Next day the temperature had fallen to 101.3°, the pulse to 120. Six injections of 5 c. c. each time were made daily for five days, then an interval of a day was left and the last injection given. On the day following the third injection the temperature was 104°, the pulse 130, and there was some redness and swelling at the site of the first injection; the next day this had disappeared, and the patient made an uninterrupted and complete recovery.

Dr. McKerron* reports three cases of puerperal fever thus treated. The worst case died, the others recovered. In the former four injections of 10 c. c. were given; in the two latter, three and two injections respectively: the injections were made into the arm, and in one of the successful cases tenderness at the site of injection and an erythematous rash over the limb were noted; no other symptoms due to the injections were observed. The author thinks that the good effects of the serum were shown in improvement of the pulse and subjective condition of the patients.

* Messrs. Ballance and Abbott report a case of acute hemorrhagic septicemia treated by anti-streptococcus serum. The patient, a medical man, pricked his thumb whilst making a post-mortem examination on a case of suppurative peritonitis. Pain and swelling of the thumb began the same evening. The day after the temperature was 103° F.; there was a scarlet septic erythema over the whole body, the pulse was rapid and soft, and there was drowsiness, with shooting pains in the arm. Next day the condition was worse, the temperature being 104.7°, the pulse 150, with rapid respiration and increased drowsiness. 3.5 c. c. of anti-streptococcus serum (Burroughs, Wellcome & Co.) were injected every four hours; after eight injections, 7 c. c. were used; twenty-eight injections were made in all. The patient gradually recovered, the temperature reaching the normal on the twelfth and thirteenth days. The effect of the serum was shown in that (1) the mind became clear in spite of high fever; (2)

* Progrès méd., 1896, 3e Sér. iii. 106.
† See Bristol M. -Chir. J., 1895, xiii. 139.
‡ Progrès méd., 1896, 3e Sér. iii. 227.

† Ibid., 2.
frontal headache ceased; (3) the tongue began to clean; (4) the pulse became slower and stronger and the respiration slower; (5) the skin became moist; (6) the wounds healed without suppuration.

Two cases of blood-poisoning, in which the symptoms were severe, were treated by injections of anti-streptococccic serum by Messrs. A. H. and A. R. Cook† with good results; in the second case the effect of the serum is doubtful, as the injections were not made until three weeks after the local infection.

Another case of recovery from acute septicaemia after injections of anti-streptococccic serum is reported.† Mr. L. Strangeways Hounsell relates the case of a boy in whom a tooth was removed for alveolar abscess, and who was taken shortly afterwards with severe symptoms of septicaemia. His temperature was 104.5°, the pulse 156; at first delirious, he shortly afterwards became unconscious, with loss of control over micturition and defaecation. He was treated with injections of anti-streptococccic serum, with remarkable results; very soon after the injections the boy got better, and ultimately completely recovered.

Dr. W. H. Weaver§ has used anti-streptococcus serum in the treatment of three advanced cases of pulmonary phthisis, with the result of reducing the pyrexia and the amount of expectoration.—J. Michell Clarke in Bristol Med. and Surg. Jour.

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THE USE OF COLD IN FEVERS.

H. A. Hare in a clinical lecture strongly advocates the application of cold in the reduction of fever. The author agrees that none of the organs of the body are strained in the effort at eliminating foreign materials, nor are their functions perverted by the presence in them of powerful remedies.

On the contrary, the proper application of cold, associated with active rubbing of the skin to bring the blood to the surface, improves the circulation all over the body, increases nervous and circulatory activity, produces an elasticity of the blood-vessels which is destroyed by the use of drugs, and increases the action of the kidneys,—the organs which eliminate from the body most of the impurities. Although it would seem inconsistent to state that fever is a protective process and that the use of cold for its reduction should be advocated, in reality it is not so. There is a great difference between stopping oxidation processes by the use of drugs and abstracting heat from the body by the use of cold. When cold is used heat-production probably goes on with even greater rapidity, at least, after a brief time. By the bathing the bodily temperature is prevented from rising to the point at which the fever would be dangerous in itself, while at the same time the poisons produced by the disease are more rapidly burned up by the increased rapidity of oxidation. In other words, the application of cold simply increases the draught and so burus up the refuse more rapidly than before.

These conclusions are not merely theoretical ones. Careful experiments by Liebermeister and other investigators in this line prove that in many instances leukocytosis is markedly increased by the use of cold, and it is a well-known fact that by its use internal and external congestions are avoided, which, if they came on in full force, would seriously imperil the patient's life.

The manner in which the cold should be used in the reduction of fever is of the utmost importance. Some observers claim that fever, particularly typhoid fever, must always be reduced by actually placing the patient in the bath-tub, the water of which is at a temperature varying from 70° to 80°, or even lower; but it has always seemed to me that equally good and, in all probability, better results could be obtained if the use

† Ibid., 647.
‡ Clin. J., 1896, ix. 46.
of cold were fitted to the case, just as the dose of digitalis or any other drug is fitted to the case. No one would think at the present day of asserting that every case of heart disease requiring digitalis as a cardiac tonic should receive exactly twenty drops of the tincture three times a day, but the common assertion would be that the dose of digitalis should vary with the necessities of the case. If, therefore, by means of careful sponging, or the use of water with friction, at temperature of 85° or 90°, you can reduce a patient's temperature within a short time to 100° or 101°, surely this method is sufficient for the case. On the other hand, if colder water is required, it must be used, and the time of its application prolonged in direct proportion to the degree with which the fever resists treatment. And, finally, if repeated sponging with ice-water or with water at 60° or 70° fails to reduce the temperature, then it will be necessary to place the patient in a bath and perhaps to keep him there, rubbing him all the time until his fever is properly reduced. There is no such thing in medicine in connection with the use of drugs as recommending one definite dose for every case of any disease, and there is no such thing as a correct recommendation of one temperature or one method of the application of cold to every case of a given disease. To be successful practitioners you must make your "punishment fit the crime," or, in other words, you must make your remedy and your dose fit your case just as the tailor makes a garment fit each man.

As regards the comparative value of antipyretic drugs and cold sponging or bathing in the treatment of non-infectious fevers, such as are represented by sunstroke, clinical experience has proved that under these circumstances the antipyretic drugs possess little value, and that we must always rely chiefly upon cold bathing for the relief of patients suffering from thermic fever.— Therapeutic Gazette, October 15, 1896.

FORMALIN—A NEW DISINFECTANT.

The following from the July number of Modern Medicine and Bacteriological Review introduces our readers to a new, and, if reports are correct, highly valuable germicide:—

Numerous carefully conducted experiments have demonstrated the great value of the formalin as a disinfectant. Formalin has a very peculiar odor, but this quickly disappears from articles disinfected. It may be used in gaseous form, or in solution. A solution of formalin effectually prevents the growth of the most dangerous pathogenic microbes, such as the bacilli of anthrax, of typhoid fever, diptheria, cholera, and such pus-forming germs as the staphylococcus pyogenes aureus. In a 1 per cent. solution, formalin will kill nearly all pathogenic microbes in thirty minutes. A 3 per cent. solution kills all pathogenic microbes except those of anthrax in one minute. The bacillus of anthrax requires three minutes. A 3 per cent. solution of formalin containing a small per cent. of alcohol renders the hands completely sterile. Clothing, furniture, etc., may be completely disinfected in ten minutes, without injury, by spraying with a 10 per cent. solution of formalin. Fecal matters may be almost immediately disinfected by a 1 per cent. solution. A weak solution of formalin is an excellent preservative of tissues. It is useful therapeutically as an application to the bowels, by which a sloughing is produced, causing a speedy separation of the dead from the living tissues.

A NOTABLE STATEMENT—VACCINATION.

At the Jenner centenary held at Berlin a little while ago, Virchow said that we live in an era of reverence for the great benefactors of mankind. Of the number of these, as regarded the number of human beings saved, Jenner stood at the head. As an ethnologist he was impelled to mention an ethnological fact in the history of pro-
tective vaccination: "All peoples that had not been reached by vaccination, or that had not accepted it, had disappeared from the face of the earth, destroyed by smallpox."—Sanitary Inspector, July, 1896.

FLIES AS CARRIERS OF GERMS.

As far back as 1886, Hoffman demonstrated the presence of tubercle bacilli in the bodies of flies captured in a room occupied by a consumptive. The droppings of the flies were full of the bacilli, which were shown by experiment to the fully virulent.

Six years later, Dr. A. Coppen-Jones, of Switzerland, by employing cultures of chromogenic bacteria, proved that infection can be, and actually is, carried, not only in the bodies of flies, but also by their feet. In one experiment pieces of a culture of the bacilli prodigious were mixed in a mortar with some highly tuberculous sputum in such a way that stained preparations showed these two varieties of microbes to be present in about equal numbers. Flies were allowed to light on the sputum, and, after they had flown about for a time, were permitted to walk across the surface of sterilized potatoes. In forty-eight hours numerous colonies of the bacillus prodigious made their appearance.

From this result we can reasonably conclude that flies are a constant source of infection. More especially is this the case in those warm countries where germ growth and decomposition are favored, and where no means whatever are employed to exclude flies from living rooms.—Exchange.

VALUE OF SUNSHINE.

While we may well prize that shade which offers protection against the oppressive heats of summer, we must keep in mind the great value of an abundance of sunlight in and directly around our dwelling houses. Sunshine is not only a tonic and a purifier, but is a disinfectant—an efficient germicide. It not only builds up animal and vegetable cells, but, when it comes in contact with them, it tears down and destroys those unicellular organisms of darkness, the disease-producing bacteria.—Sanitary Inspector, July, 1896.

ONIONS AS A NERVINE.

Onions are almost the best nervine known. No medicine is so useful in cases of nervous prostration, and there is nothing else that will so quickly relieve and tone up a worn-out system. Onions are useful in all cases of coughs, colds and influenza; in consumption, insomnia, hydrophobia, scurvy, gravel, kidney and liver complaints. Eaten every other day they soon have a clearing and whitening effect upon the complexion.—N. Y. Medical Times.

INFLUENCE OF TEA AND COFFEE UPON DIGESTION.

Schultz reports, in a recent number of the Zeitschrift Physiol. Chem., 1895, a series of experiments made for the purpose of determining the influence of tea and coffee upon digestion. The results are as follows:—

1. Under the conditions of the experiment, there was ninety-four per cent. of albuminous digestion when neither tea nor coffee was added to the digesting mixture.
2. On the addition of tea, the amount of digestion was only sixty-six per cent.—nearly one-third less.
3. When coffee was added, the amount digested was still less, being only about sixty-one per cent. That the simple dilution of the fluids was not the cause was shown by the fact that when distilled water was added, there was practically no change in the amount of digestive work done.

A NEW OPERATION FOR THE RADICAL CURE OF INGUINAL HERNIA.

George Sully Vaughan (Journal of the American Medical Association, July 25, 1896) describes his operation for hernia. The cord is placed deep next the perito-
nearer on Another tendon. from canal as ends interior 54 The China Medical Missionary Journal. Kangaroo tendon is advised to be used throughout the operation.—University Medical Magazine, Nov., 1896.

MORPHINE AN ANTIDOTE TO POTASSIUM CYANIDE.

Six grains of morphine were injected under the skin of the back of a dog, when after a short period of excitation he slept. At the end of an hour, the animal being still alive, in order to hasten death, a subcutaneous injection of ten cubic centimeters of a 3.3-per-cent. solution of potassium cyanide was administered, which produced a most surprising effect; the creature awoke and became very lively, this condition persisting for some time, when he was seized with convulsions. He died an hour and a half after the injection of the cyanide. The evidence goes to show that cyanide of potassium neutralizes the effects of morphine, and that morphine retards the toxic action of cyanide.

Subsequently a series of experiments were made on mice. After establishing the minimum fatal dose of morphine, and also of cyanide, animals were subjected to injections of the latter, and subsequently to injections of morphine, when it was found that those that had received fatal doses of opium alkaloid could be saved by means of potassium cyanide, and vice versa. Thus the two drugs appear to be mutually antitodal.

The theory enunciated regarding the mechanism of neutralization is, that through the influence of the iron in the blood, the latter being an alkaline medium, there are formed Prussian blue and oxide of morphine.—Münchener Medizinische Wochenschrift.

AN EASY AND READY METHOD OF CIRCUMCISION.

John W. Ross, surgeon of the United States Navy (retired), says in the Medical Record, Aug. 31, 1895: "Retract the foreskin; insert the glans penis up to the corona into the open mouth of a glass test-tube,
draw the foreskin well forward over the end of the tube, tie a strong, small silk cord very tightly around the foreskin, immediately in front of the flange of the tube; amputate the foreskin one-eighth of an inch in front of the constricting cord by a circular sweep of the knife; unite the mucous and cutaneous edges of the stump of the prepuce by eight or ten fine interrupted sutures; cut the constricting cord, remove the tube, cover the cut edges well with powdered iodoform; encircle the anterior half of the penis with a roller bandage of iodoform gauze, allowing the meatus to project slightly for facility of urination without soiling or removing the dressing, and keep the patient in bed, with penis elevated, from twenty-four to forty-eight hours."

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RABIES IN CATS.

It is not well known that cats, as well as dogs, are subject to rabies. At the Pasteur Institute, in Paris, one in twenty of all the cases treated are due to the bites of rabid cats.

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THE THERAPEUTIC VALUE OF HYDROBROMATE OF SCOPOLAMINE IN PLASTIC IRITIS.

In the American Journal of the Medical Sciences for November, 1896, Oliver concludes an article on this subject as follows:

Hydrobromate of scopolamine is of the greatest value in the local treatment of the various forms of plastic iritis. Its primary reparative action and quieting power, as compared with those of similar doses of sulphate of atropine, in the treatment of plastic iritis, are generally much more prompt, even when the latter drug is used in doses equal to quadruple or quintuple the strength of the former. Its healing and soothing effects do not seem to be so lasting, even when the drug is used in four or five times the strength of the atropine.

For quick and active measures, which are so eminently necessary in incipient cases of plastic iritis, and during the early stages of inflammatory reaction, the scopolamine salt is to be preferred to the atropine; but where prolonged use of such drugs is necessary, as in many cases of the chronic form of the disease with subacute exacerbations, the alternate employment of scopolamine and atropine seems empirically to be the best method of local administration that has been devised.

As clinically employed, the best salt of the alkaloid seems to be the hydrobromate; the best method of instillation, dropping the solution upon the upper corneal border while the lower punctum is everted and the corresponding canalculus is pressed upon; and the most efficient amount to be used at one sitting, two drops of a one-tenth of one per cent. strength (1:500), repeated, if necessary, as often as three times during the course of an hour, and preceded, when desired, as in some instances where there are much irritation and pain, by two drops of a two-per-cent. solution of hydrobromate of cocaine a few minutes before each instillation of the scopolamine.

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OIL-OF-CADE COLLIODION.

Gaucher presents a new collodion composed of acetone collodion, ⅔; oil of cade, ⅓—La France Médicale, November 20, 1890.

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MORPHINE-ETHER NARCOSIS.

Riedel (Berl. klin. Woch., September 28, 1896), alluding to the fact there are more sequelae (such as bronchitis, etc.) after ether than after chloroform narcosis, states that in the former cardiac paralysis and sudden arrest of the respiration do not occur. To guard against the danger of bronchitis, the sensibility of the bronchial mucous membrane should be diminished in order to lessen secretion. For this purpose the author gives an injection of morphine before the administration of ether. He has come to use this method more and more widely. Before the fourteenth year, however, the morphine is omitted. From 13 to 18 years of age 0.005 grammes (¼ grain)
is given, and to older persons 0.01 grammé (½ grain). This amount may not be sufficient in drunkards. Half an hour after the injection the ether is administered cautiously, only 3 or 4 grammes (45 to 60 grains) being poured on the inner side of Julliard's mask. The mask is not pressed on the face at once; so that time is allowed for the patient to get used to the ether, and thus there is no tendency to cough. The mask has a cover of oiled paper, and a few drops of ether are from time to time poured through the opening in it. If the operation only takes an hour the effects of the morphia will last, and very little ether is necessary, but in longer operations much more ether may be required. Sleep is prolonged after the operation for a considerable time. The author has never observed bronchitis in children after ether. He has employed this method of anaesthesia for operation on all parts of the body during the past three years. If it were not for bronchitis ether would be an ideal anaesthetic. Even fifty years after the discovery of chloroform a safer anaesthetic than chloroform is wanted. At present he observes that we must be satisfied with ether, which he looks upon as the best available anaesthetic. In only one case was death directly attributable to the ether, and the patient was here the subject of emphysema. There have been isolated cases of pneumonia, mostly in elderly and cachectic persons, and not to be put down to the ether. Ether exercises an irritant action upon the bronchi, and Riedel believes that the greater part of its dangerous properties may be avoided by the above-described mode of administration.—

*British Medical Journal*, November 14, 1896.

**CURE OF INGUINAL AND CRURAL HERNIA BY TENDINOUS AUTOPLASTY.**

Poullet performed a genuine deep-seated tendinous autoplasty, using a portion of one of the tendons of the thigh. This tendon is separated below from its muscular insertions and remains adherent to its upper, osseous insertion. A long portion of the crural triceps is used in inguinal hernia, and the first adductor or long portion in crural hernia. The peritoneum is not opened. Two incisions are made: one parallel to the arcade, to reach the sac; the other vertical, upon the course of the right anterior muscle of the thigh, to dissect a tendinous strip. This is passed below the sartorius muscle near the first incision. A large needle is used to draw it through the walls of the canal, and the extremity of the tendinous band is fixed to the thickness of the pyramidal and rectus muscles by two metallic points, including the skin. Suture of the two cutaneous wounds is then practiced.—*Marseille Medical*, November 15, 1896.

**BENZONAPHTHOL AND SALICYLATE OF BISMUTH IN SUMMER DIARRHEA.**

Solomon Solis-Cohen states that he has never met with a better mixture for disinfecting the digestive tube than one composed of equal parts of benzonaphthol and salicylate of bismuth, with or without the addition of Dover's powder. A child six months old may take three grains (0.20 grammé) of the two former ingredients,—i.e., ½ grains (0.10 grammé) of each. It is important to suspend the milk diet during the active treatment. *Barley-water* in small quantities may be substituted. The use of the various flours, which readily ferment in summer, and which contain toxins, should also be discontinued. Another error which must be avoided is the administration of astringents: kino or tannic acid. The physicians prescribing the latter remedies assist the disease rather than the patient. (Revue de Thérapeutique, November 1, 1896.)

**CARBOLIC ACID IN INFLUENZA OF CHILDREN.**

S. H. Dessau, of New York, recommends the internal administration of carbolic acid
in cases of a mild irregular type of influenza. Finding that cases of this kind did not recover so rapidly as he expected under the ordinary sudorific and expectorant treatment, he tried carbolic acid, and after an experience of 300 cases he pronounces it very efficacious. In the cases referred to there was a dry cough, worse at night, with signs of slight bronchial catarrh, alternating sometimes after chills with coryza and diarrhoea. The annoying cough was often relieved in two or three days, always within a week. The dose given was a teaspoonful of a 1-per-cent. solution for a child of 5 years, and it was administered every two hours until decided improvement was noticed, and afterward at longer intervals. Only in one case did nephritis occur, and Dessau was inclined to attribute it to the influenza, and not to the carbolic acid. (Medical Record, September 12, 1896.)

**SULPHONAL IN THE TREATMENT OF THE NIGHT-SWEATS OF PHthisis.**

F. Combarele, of Lille, has found, after a series of clinical observations, made with the assistance of Descheemaeker, that sulphonal administered in doses of from 15 to 30 grains (1 to 2 grammes) is efficacious in combating the night-sweats of tuberculous patients, while exercising at the same time its usual hypnotic effect. This antihydrotic action, however, is only produced in the cases in which the preliminary lesions are not very far advanced, and fails in subjects having large cavities in the lungs. The medicine should be given just before retiring. If it is administered with the evening meal, as is frequently done when sulphonal is given as an hypnotic, the night-sweats are in no way benefited. This is probably due to the fact that the antisyphoric action of the sulphonal is rapidly exhausted. The author found that patients become accustomed to sulphonal when it has been administered more than fifteen days. (Journal d'Accouchements, Nov. 1, 1896.)

**BACILLUS OF MEASLES.**

J. Czajkowski (Centralblatt für Bakteriologie Parisitenkunde, 1896, XVIII, Nos. 17 and 18) states that he believes he has found the bacillus which produces measles. He examined the blood of fifty-six patients having this disease, thirty-seven specimens being examined microscopically, and cultures made in nineteen cases.

The bacilli, like those described by Pielicke and Cannon, were thin rods varying in length from 0.5 up to the diameter of a red-blood corpuscle; they are extracellular.

They are stained irregularly by all aniline dyes.

Cultures grow on various media, but not upon gelatin or agar. Blood added to the media increases their development. In solid media the cultures first show on the third or fourth day in the form of dewdrop colonies. A media composed of sterilized serum from the abdominal cavity seems best suited to their culture, and in this the colonies form a heavy sediment, varying from a white to a yellowish-gray color. They thrive best at blood temperature.

Rabbits are immune; mice die of septicemia from a subcutaneous injection in three or four days. The bacilli were recovered from the blood, liver, and spleen in pure cultures.

**A METHOD WHEREBY RUSTING OF INSTRUMENTS DURING STERILIZATION IS PREVENTED.**

Levai (Wiener Klin. Rundschau, 1896, No. 31), after an experimental investigation as to the rusting of instruments, finds that the process is due to carbonic acid contained in water, and that it is not absolutely prevented by the addition of carbonate of soda, as recommended by Schimmelbusch. He states that rusting can be greatly lessened by first boiling the water before placing instruments in it, since thus the greater part of the carbonic acid is expelled. The most efficient means
he finds is to add to the boiled water 0.25 per cent. of sodium hydrate, pure, containing no sulphur. During the operation the instrument should lie in the solution thus prepared. Sharp knives placed in this solution do not lose their edge in the faintest degree.

TREATMENT WITH SERUM FROM CONVALESCENTS.

Weisbecker has observed (Therap. Wochenschrift, June 28) that if serum taken from patients recovering from measles be injected into others during the stage of incubation, the incipient disease is much modified, and cases of measles and pneumonia sometimes arrested. He urges others to make experiments of this nature in scarlet fever, measles, etc.

EPITHELIAL SOWING.

F. von Mangoldt, of Dresden (La Semaine Medicale), has reported a new method of skin-grafting to which he has given the name of “epithelial sowing.”

The epithelium is obtained by scraping a healthy cutaneous surface. For this purpose the external or internal surface of the arm is considered preferable. The chosen spot is carefully shaved and disinfected, and then with a sharp, sterilized razor, held perpendicularly to the skin, the epidermis is scraped away until the papillary layer is reached. In this way a magma is obtained, composed of epithelial cells and extravasated blood, which is spread upon the surface to be treated, and thoroughly pressed in with a spatula. In case of a fresh wound, the sowing is very simple; but in case of an infected wound, it is necessary to remove the granulations and thoroughly disinfect.

In order to make sure that the epithelial elements adhere closely to the wound, it is advised to scarify it with a small and very sharp bistoury before spreading the scrapings upon it. The spot from which the epithelium has been taken is dusted with dermatol, covered with sterilized gauze, and bandaged. The grafted area is covered with strips of protective plaster, over which an aseptic dressing is placed.

The transplanted area during the days immediately following the operation looks as if covered with a pseudo-membrane; it loses its primitive brick-red color, and becomes yellowish-gray, a change due to coagulation of fibrin. At the fifth or seventh day the fibrin begins to disappear, and the color changes to blush-rose, the first sign of the proliferation of the epidermic elements. Towards the middle or end of the third week the surface is completely covered with epithelium. After the fifth day the dressing is changed every two days, and the wound gently irrigated with a warm, sterile, normal salt solution. After the tenth day the surface is dusted with boric acid.

PERSIAN CURE FOR DYSENTERY.

Surgeon-Major T. S. Avetoon, of the British army in India, communicates to the London Lancet a prescription from a medical work in the Persian language, which he says he has used successfully, with a slight modification, in about thirty cases of dysentery, during a little over two years. The dose is a dram of cinnamon bark reduced to a fine powder and made into a ball with a few drops of water, and is repeated morning and evening until a cure is effected. He says that his patients have often been cured with one or two doses, and his worst cases with five. The powerful antiseptic and germ-killing property of cinnamon will be recalled in this connection.

RECENT AIDS IN THE DIAGNOSIS OF TYPHOID FEVER.

By Charles Lyman Green, M.D., in the Medical Record, November, 1896.

He first refers to the difficulties which heretofore have existed in many cases of typhoid in making an early diagnosis; then mentions the principal clinical signs of the
disease, none of which are pathognomonic, but are only important in their grouping.

He then gives his modification of Ehrlich's diazo reaction, which he has found to yield more accurate results.

The formulae are as follows:—

Solution A.—Hydrochloric acid, 50; distilled water, 1,000; sulfanilic acid, q.s. ad sat. This solution should be most thoroughly saturated, allowed to stand some days before being used, and shaken up from time to time.

Solution B.—Five-tenths solution of sodium nitrite in distilled water. Should be kept in a cool place, and black bottle, and renewed every week or ten days.

Solution C.—(Test solution).—One part of solution B ; one hundred parts of solution A. This solution should be freshly made for each day's testing.

Method of applying Test.

Equal parts of the solution C and the suspected urine are thoroughly shaken up together in test tube, and from one to two cubic centimetres of ammonium hydrate allowed to flow gently down upon the surface. If the reaction be present, a beautiful crimson or carmine band appears at the junction of the ammonia with the mixture. Upon shaking, a pink tinge is imparted to the foam.

This test appears very simple, and no one would suppose that any serious blunders would arise in the hands of competent men. We find, nevertheless, one of the greatest living authorities upon clinical diagnosis reporting it as valueless, and omitting all mention of ammonia in his description of the test. The same error occurred in the work of a very celebrated clinician, who found it in normal urines. Another elaborate report winds up with a reference to the yellow color of the ring. Another used a five-per-cent solution of sodium nitrite, and could not get rid of the reaction. He found it in everything. Still another used sodium nitrate. His results were naturally deplorable, and he cruelly condemned the test. Such, sometimes, is the boasted accuracy of scientific medicine.

As I test this typhoid urine, you will notice that the color is not yellow, nor orange, but red. It must be red, or there is no reaction. Now, here is the urine of pneumonia and advanced tuberculosis. The color is orange. In the first specimen, shaking produces a pink foam; in the second no pink is to be seen. The following rules are all important:—

1. The urine must be fresh and filtered.
2. The urine must be acid.
3. The true color is red, and when the urine is shaken the foam should be slightly tinged with pink.
4. The test solution C is to be freshly prepared each time and accurately measured. A medicine dropper and a marked test tube will insure this.
5. The sodium-nitrite solution must be accurately made, and renewed at intervals of a week or ten days, and be not stronger than 0.5 per cent.
6. The color band should be held against a white back-ground, the light falling upon it from behind the observer. It must not be held against the light.
7. The exact method of procedure must be conscientiously carried out.
8. The test is to be made during the height of infection.

The urines of 315 cases comprising over fifty diseases were tested. In 64 cases of typhoid it was present in 61, in no one of the 3 cases of supposed typhoid was the case typical. It was present in 2 out of 16 cases of pulmonary tuberculosis, in both cases sepsis was prominent, 3 of 4 cases of septicaemia showed it, 2 in 4 of carcinoma, and 1 in 11 of pneumonia, a severe and double case; in no other instances in the fifty diseases was it present.

He then demonstrated the method proposed by Widal to diagnose typhoid, by adding to a pure culture of Eberth's bacillus a drop of blood from a supposed typhoid. The
method is simple, and has so far proven to be reliable.

THE DIAGNOSTIC VALUE OF THE SERUM OF TYPHOID-FEVER PATIENTS.

Mr. Herbert E. Durham, F.R.C.S., contributes an article on this subject to the *Lancet* for December 19th in which he states that both Dr. Widal and Dr. Grünbaum have recently and independently directed attention to the possible use of the serum of patients suffering from typhoid fever in a new method of diagnosis of the fever by means of the clumping or agglutinative effect upon living typhoid bacilli. These researches, he says, naturally followed upon the investigations published by Professor Gruber and himself. Their observations have been made with the view of seeing whether the serum of individuals, healthy or suffering from other diseases, was endowed with an agglutinative power upon the typhoid bacillus. His own observations, which were begun independently early last summer, were undertaken on other lines—namely, to see whether a positive reaction could be obtained in all cases of undoubted typhoid fever. It is clear that if positive evidence is not obtainable in all instances the diagnosis cannot be absolutely fixed in cases of doubt. Dr. Grünbaum, says Mr. Durham, has shown that in conditions other than typhoid fever the blood serum has no positive effect upon the typhoid bacillus when it is sufficiently diluted; Dr. Widal's observations agree in so far as he has apparently used dilutions only of about one in ten. The author states that this is in accordance with his own extended observations upon animals immunized against various kinds of microbes, in which it appears that in high dilutions (from one to five per cent.) positive reaction is only obtained with the same microbes or kinds very closely allied to those used in immunizing the animal from which the serum was obtained. His observations upon typhoid fever in man show that positive results are not invariably ob-

tainable, consequently some cases will remain doubtful even with this addition to the means of diagnosis. All the author's cases were clinically typical cases of typhoid fever, and, he says, they therefore stand or fall together. The acuteness or mildness of the attack and the occurrence of relapses do not appear to be factors which necessarily conduct to the amount or presence of typhoid "agglutinins" in the serum. Further, a doubtful case was examined (if typhoid fever, the case was tested in the third week during pyrexia—temperature 104.5 F.), but no definite reaction was obtained.

The reaction is not always obtainable either during the original attack or during relapses, or after them. However, the study of the serums of immunized animals (rabbits, etc.) shows that they have little or no clumping action shortly after the first immunizing inoculation, and the typhoid fever patient or convalescent is really only "immunized to a very slight degree"—a degree, however, which is generally sufficient to protect him from further attacks.

A note upon the method may be added, continues the author, since Dr. Widal suggests such heroic measures as removing the blood by means of a hypodermic syringe thrust into a vein of the arm. Ample blood may be obtained from the lobule of the ear without giving pain to the patient; moreover, without contamination with microbes. The lobule of the ear is well cleaned with lysol solution (two per cent.), dried, and a small incision made with an ordinary clean bleeding lancet; a fine sterile pipette is applied to the exuding drop of blood. When sufficient blood is obtained (from 0.2 to 0.3 of a cubic centimetre is enough, but more is easily withdrawn if necessary) it is blown out into a sterile test tube which is held horizontally so that the blood does not flow to the bottom. The test tube is laid down flat until the blood is thoroughly and firmly clotted; it is then placed upright and the clear serum trickles down to the bottom of the tube; this requires several hours. Clear
serum can be obtained more rapidly by allowing the tube to lie horizontally for about half an hour, and then placing it in a centrifuge, which is driven quite slowly for five or ten minutes; if the rotations are too rapid a certain number of red corpuscles are carried out with the serum, but even then clear serum is obtainable as the corpuscles are driven to the bottom. A dilution containing from five to six per cent. of serum is best adapted for testing; this is most conveniently done by taking up from twenty-five to thirty cubic centimetres by means of a graduated capillary pipette and adding 0.5 of a cubic centimetre of the broth emulsion of bacilli in a small test tube. Measuring may also be done by means of drops, though of course less accurately. The specimens should be examined microscopically in hanging drops after from ten to thirty minutes for the detection of clumps. In general the naked-eye reaction is not so well marked as in the case of highly immunized animals. A sample of the emulsion should always be kept as a control, without the addition of serum. Only young (from twenty-four to thirty hours) and vigorous cultures, preferably on agar, should be used; old and weak cultures often give some clump formation without the addition of serum. Lastly, the emulsion should not contain too many bacilli; a small loopful (from two to three milligrammes) is quite sufficient for each cubic centimetre.

Mr. Durham thinks that in recent cases of typhoid fever an absolute diagnosis cannot always be obtained by means of the serum test, but this means of diagnosis should not therefore be discarded, or should it be allowed to fall into discredit by overrating its real value.

Prof. Vaughan—Typhoid Fever and Consumption.

Prof. Victor C. Vaughan, Dean of the Medical Department of the Michigan University, July 28th delivered to the summer school students at Ann Arbor a lecture upon the prevention of disease. Speaking principally of typhoid fever and consumption he said that 3,000 persons die annually of consumption in the State of Michigan, and that 50,000 die of typhoid fever in the United States every year! He deprecated the fact since "both diseases were easily prevented."

As a preventive measure he said that in Hamburg and Berlin the spuata of consumptives was required to be disinfected by law. As a result of these precautions the mortality from those diseases has decreased greatly. He thinks the medical profession is at least one hundred years in advance of politicians and of those in charge of municipal affairs; that in time cities or districts charged with the duty of protecting the health of the people will be held responsible by the courts for outbreaks of typhoid fever. The Bulletin has been trying to enforce this truth for some time. He gave two simple and easily practiced rules for the prevention of both these diseases. They are well worthy of a faithful and universal trial. He says, "to prevent typhoid fever boil your water;" "to prevent consumption use a cheap paper cuspidor and burn it twice a day."

Both these measures are inexpensive and within the reach of all. Paper cuspidors can be obtained of the druggists at a very trifling expense and should be used by all persons having consumption, pneumonia or diphtheria, and should be promptly burned—using one not longer than half a day—including the night.

This advice coming from one so eminent as a physician, and from one with such extensive observation and such careful and varied experimentation should be heeded by all and be cheerfully and sedulously practiced.—Iowa Board of Health Bulletin.

INTERNAL BATHS IN TYPHOID FEVER.

H. Duchenne recommends the following procedure: (1) allowing the patient to drink all he wants (upon this point every-
one appears to agree) of inert liquids, such as ptisans, slightly-acidulated drinks, water slightly colored with red wine, and weak grog; (2) giving a daily tepid enema (from ½ to 1 quart—litre). For the suggestive effect 10 grains (0.65 gramme) of sulphate of quinine in two doses are given, and a small quantity of weak carbolized water (2.50 per cent.) is placed in the injection.

The results are as follow: Rapid diminution of the diarrhoea; lowering of the fever, which rarely exceeds 39° C. (102.3° F.) after the fourth and fifth day of treatment; convalescence at the end of twenty-one days, on an average. Diet: milk; no bouillon, which is a poison, unless very fresh, when the kidneys are affected; no feculent substances, or soups made without meat. From 2 to 4 quarts of milk; 2 or 3 weak grogs; no astringents, not excepting wine (Bull. Gén. de Thérapeutique, October 23, 1896.)
Editorial.

Dr. Hodge has said so many nice things about us in his valedictory, that we fear that those unacquainted with us will be expecting from us a higher degree of excellence in the editor's chair than we may be able to attain. We appreciate the compliment paid us by the Association in our election to this post. We feel our inability to worthily succeed such men as Mathews and Hodge. The Journal has steadily increased in interest and usefulness from the first, and it has never been better than at the end of 1896. How shall we be able to maintain this increasing excellence? We can only re-echo our predecessor's words and bespeak for ourselves the cordial support of the members of the Association, "without which the best editor in the world cannot conduct a magazine." We have wondered somewhat why we were chosen to this post, and can find no reason, except possibly, that it was because we had written so little for the Journal in the past. Rather than take one of the faithful contributors, the Association has prompted one of the faithless to a recognition of his duty, and has put upon him the work that he in the past has failed to do. Brethren, I repent in sack-cloth and ashes. Learn of me to write regularly for the Journal. If you don't we will have a number of department editorships created and will put the greatest sinners among you into them.

We are glad for the valuable suggestions made by Dr. Hodge. We hope that they may be put into practice and thus make the way of the editor easier and the Journal more generally useful to all classes of medical missionaries. First among them is the one in regard to having department editors to take charge of the compiling of "Medical and Surgical Progress" in the domains of medicine, surgery, dermatology, and the like, and also one who will have charge of the pages devoted to the Evangelistic side of our medical work. Our idea in this would be not so much scissors and paste work as a general review of progress in each department in the form of a report or digest. This could be long or short as the department editor might desire, or the circumstances...
would warrant. The report would need to cover all of the important items of progress, and in a manner sufficiently minute as to detail as to be most useful to the reader. For the present year we would be glad to have volunteers for this work. We hope to bring the matter up in some manner so as to have regular editors for these departments chosen at next election.

We feel that the Notes and Queries can be made most practical if members of the Association will take an interest in the matter. It will take but a few minutes to jot down notes in regard to anything unusual one may have noticed in diagnosis, the result of treatment, local peculiarities, Chinese medicines, or any other subject that would be of general interest. These can be made to cover a wide range of subjects.

The time has come when the advisability of issuing the Journal monthly should be seriously considered. We are now putting out a Journal of over one hundred pages. Could we not increase its general usefulness by issuing it monthly and reduce its size to forty or forty-eight pages? Would not the general interest in the Journal on the part of the medical profession of the east be increased? And while retaining its character as a medical missionary journal, could we not make it of use to all medical men practicing in China, Japan, and Corea? We think so, and would suggest this for the consideration of the members of the Association.

Finally, we desire to urge the members to send in items in regard to their evangelistic work. The Double Cross and other home missionary papers receive articles and letters from our field that would be most interesting reading to our brethren. The primary purpose of our work is preaching the Gospel of the Lord Jesus Christ. Believing as we do, that in this Gospel not only do we find the only hope of salvation for the soul, but also the solution of the world’s unrest, social misery, and political wrong, we are always glad to know of each other’s success in bringing the people to its acceptance. Tell us of your progress and allow us to rejoice with you. Send us a copy of what you send to the home papers, and if we have not space to print it entire, we will abstract it for the benefit of our readers.

We commend the President’s Address to the careful perusal of our readers. The suggestions made therein are of great interest to every member of the Association, and indeed, to every medical missionary in the east. We desire to emphasize the recommendations there made.
Editorial.  65

Under the pressure of our own individual work we are apt to forget that we have a helpful influence to exert toward the spread of rational ideas of medical practice throughout this rapidly opening field. We stand as the representatives of rational methods for the relief of human suffering; as the harbingers of a Gospel of cleanliness and hygiene; as the apostles of scientific living; as the pioneers in the teaching of scientific medicine to this great nation. Therefore it behooves us to take a broad view of our opportunities and responsibilities and act in such a manner as will do credit to the noble profession we represent, and fairly exemplify our Christian civilization.

The day is not far distant when thoroughly educated Chinese physicians will be taking a high place in the profession, as Kitasato, Aoyama, and other Japanese have already done. Then our hospitals and dispensaries will be largely manned by native physicians. What sort of physicians will they be? In regard to those who are to be the shining lights of the profession we need not trouble ourselves. They can receive our help and co-operation, but with or without these they will care for themselves. The sort of training the rank and file of the profession shall receive is, however, a question of the greatest moment to us at the present time. This is the day of beginnings, and beginnings are always important events. Shall we commence with a standard of training that will produce men that will be a credit to the profession? or shall we rest satisfied with a smattering of knowledge that will only fit our students to become second-rate hospital assistants, or medicine peddlers for the manufacturing pharmacists? We say, by all means the former. Are there no text-books? Prepare them. Is there no vocabulary? Make one. Is there no periodical literature? Prepare it. Is there no demand for this sort of literature? Neither is there for Bible. We must create the demand by demonstrating the utility and necessity of such literature. But all of these things will necessitate harmony of action and mutual co-operation on our part. And we must be willing to sacrifice a little of our time and thought to the general good. Indeed we must go farther than this, and be willing to make mutual concession of opinion.

It is to be hoped that we as an Association will come up to our responsibility on all of these questions. Else we will awaken some of these days to a realization of the fact that our "occupation is gone." China is indeed moving,—floundering, may possibly just now be a better term,—like a man just awakened out of sleep, the power of co-ordination is weak, but when new life begins to thrill through her veins,
she will take her place on the great arena of the world's activities and demonstrate what indomitable patience can do for a people when it is coupled with a progressive spirit.

Since the last issue of the JOURNAL three prominent members of the Association have gone home on furlough, viz:—Dr. Boone to America, and Drs. Douthwaite and Hodge to England. The return of Dr. Boone was necessitated by the severe illness referred to in the December number of the JOURNAL. We trust that the change home will fully recover his health and strength, and that he will be able to return to his work in due time. Dr. Douthwaite goes to take his children to the home land and to rest himself for a while, and Dr. Hodge goes on a well earned furlough. Drs. Parry and Judd take Dr. Douthwaite's work at Chefoo, while Dr. Morley relieves Dr. Hodge at Hankow.

Errata.—In Dr. A. P. Peck's letter in the September, 1896 number, Dr. Whitney's initials should read "W. C.," not "U. C." Also, toward the close of the letter, for "curvations," read "curvatures."

We are much saddened to hear of the death from diphtheria of two children of Dr. and Mrs. Watson of Ching-cheu-fu. We have not heard the particulars, but understand that they were attacked with a severe form of the disease and quickly succumbed. Their third child was also attacked, but recovered. Our heartfelt sympathy goes out to our brother and sister in their bereavement. Only those who have looked for the last time on the faces of their little ones as they have been laid away know how much has gone out of the life of the sorrowing parents. Still their memory remains to us as a bitter-sweet boon; and when we think that they wait for us in God's Kingdom in all their child-like innocence and purity, we even rejoice that though separated from us it has been granted to them to enter into the larger life. May the God of all comfort console and keep the bereaved ones.

We offer no apology for reprinting Dr. Thayer's article on Blood Examination. There is probably no better or more concise an article written upon this subject. The clinical and diagnostic value of blood
examination is of rapidly growing importance. The day is fast approaching when the examination of the blood will be as much a matter of routine in fevers as the use of the clinical thermometer and noting the pulse has been in the past. As a basis for a practical knowledge of this work this article is invaluable.

A proposition to extend the privileges of the Association to medical missionaries resident in Japan, Korea, and the Straits Settlements is in order. We are sure that our co-workers in those countries would be glad to join in with us; and such an arrangement would serve to keep up the esprit de corps between all of the medical missionaries of Eastern Asia. If some one will formulate and move the proposition, we will be pleased to second it.

ANATOMICAL TERMS.

The question of medical nomenclature will be greatly advanced if two short sets of terms, which may be regarded as the basal terms of medical science, are once fixed upon. These are the names of the elements and the names of the bones. Other terms are of course very important, but in any case these must first be cleared out of the way, as they must constantly be used in forming others. Osteologic terminology, as worked out by Osgood and others, has been much improved upon by Whitney in the last edition of the vocabulary accompanying the Jn the last edition of the vocabulary accompanying the 全體圖微, but there still remains much to be desired in this direction. In our opinion the following changes are advisable.

It would be well to adopt the new nomenclature for the vertebrae, viz., the cervic, or 稺脊骨, the thoracic, or 胸脊骨, the lumbar, or 腰脊骨, the sacral, or 臀脊骨, and the coccygeal, or 龈脊骨. 稺 being a more specific term is a better one than 頸. The latter refers to the neck as seen from the front, and is of wider application than 頸, being used for the constricted part of any object. It is of frequent use in anatomy in such terms as the neck of a bone, the neck of the bladder, the neck of the uterus, etc.

背 should be discarded for the same reason that we are discarding "dorsal" in English text-books. 背脊骨 would indicate the vertebrae which, together with the ribs and sternum, go to make up the bony thorax, or 胸瓣. 鉤, "an iron hook," is a miserable term for the sacrum, and inasmuch as there is a name in Chinese for this bone there
is no reason why we should not use it. 耳 is the proper book term. The coccyx is also called the 髋骨, or 頸骨 alone, and this is the term that should be used, unless we are searching for Darwin's missing link, in which event we should continue the term at present in use. The term for the occipital is properly written 結, not 頸. The best term for the temporal is 頸, or 頸骨, and this latter is the one in use by the Japanese. 耳骨 properly refers to the ossicles of the middle ear. The division of this bone into squamous, petrous and mastoid portions, as given in the old books, should be discarded, and the morphologic divisions of squamous, 頚段, petrous, 石段, and tympanic, 鼓段, substituted. The mastoid, instead of the external ear as given by most of the old books, is really the base of the petrous pyramid. For this reason it might be called the 石底, or, if regarded simply as a process of the temporal it could be called the 頸凸. 馬乳 shows the ridiculous side of attempting to translate into colloquial Chinese a scientific term derived from a dead language. "Mastoid" sounds all right in English, and we will guarantee that not one person in a hundred thinks of its derivation when using it. But "horse teat" is quite another affair, and no doubt the Chinese greatly wonder why we should use such a term and apply it to a little prominence on the side of the skull. The best term for the mandible is 頭, and this will fit in well with terms for the surrounding organs and tissues. For the clavicle the proper and only term is 臍, and so it should be designated, (see Kang Hsi). For the carpal bones 臍 is sufficient without the 手. The tarsals should be called 髋. This is also true of the metacarpals; 腕 alone being used for these, and 臍 for the metatarsals, as 指 and 趾 are used for the manal and pedal phalanges respectively. 骷骨, or 骷似骨, is the best term for the cuboid, while the tarsal cuneiform should be called 椎骨; or 椎似骨, and designated as 内, 中, 外. 臍骨 is no more suitable for the femur than is 臍骨 for the humerus. There are a numbers of terms that might be used, among which 臍 seems to be the best approved by Kang Hsi. But the trouble with this term is that it covers too much; really the whole of the region from the lumbar vertebrae to the knee. 臍 is a much more specific term, and is probably the best of all. The innominate bone is rightly called by Whitney the 臍. If he had dropped the 臍 for the ilium, and used 臍, and if he had added the "bone" radical to his term for the ischium, (髋), he would have had an ideal set of terms for this bone. To reduce the number of terms as much as possible, and to bring all into conformity with a plan, the acetabulum should be called 臍孟, instead of 臍目. For the fibula we have the choice of two excellent terms. 臍 is the calf,
and is the bone of the 腓. Or, 腓 is the calf, and the bone could be called the 腓骨. The gastrocnemius muscle should be called the 腓肌, or 腓腸肌, and the soleus the 副腓肌, or 副腓腸肌. We prefer the 腓 in both cases. The Chinese have a distinct term for the patella, namely 腓. It is explained in Kang Hsi as 腓蓋骨, and gives us one character instead of two for use in compound terms.

A few other important terms require notice, and first of all that for gland. 核, at present in use, means a nut or kernel, and in common phraseology is used for enlarged cervical glands, (生核). With this meaning it was originally written 核. But this expresses a pathologic condition rather than a normal one, and this term is used for too many purposes, being made to stand for these, for glands in general, for the cell nucleus, and for the cerebral nuclei. For these last two purposes it is a good term, and should be restricted to this use. It certainly does not well express the idea of a gland, especially when we come to include the monotubular glands of the stomach and intestines. Nor can it readily be applied to such large organs as the mammary gland or pancreas. The Japanese term is a most excellent one. Whether they coined it, or where they got it, we do not know. It is 腺. Made up of “flesh” and “fountain” it gives the idea of a fountain in the body, which, whether we speak of secretory or excretory glands, expresses the true function of these organs, and we favor its adoption in place of 核.

While speaking of glands the pancreas naturally comes in for consideration. “Sweet-bread,” of which the present Chinese term is a translation; pancreas, “all flesh;” these surely are unfortunate names for an organ of so much importance. The Germans only have a term that adequately expresses the function of this organ, viz., “Bauchspeicheldrüse,” or abdominal salivary gland. If we translate this term we will have 腹淋巴腺. Or, if we consider that the chief digestive ferments are manufactured in this gland, and if we call a ferment 酵, we may call this organ the 酵腺. We prefer, however, the German term; calling the parotid 腺腺, the submaxillary 腺腺, and the sublingual 舌腺.

Another term that certainly needs changing is that for albumin. 蛋白 is only one form of albumin, and although we may speak of serum-albumin as 血汁蛋白, it is a cumbrous expedient, and when we come to distinguish egg-albumin as 蛋蛋白, or 蛋白蛋白, or 蛋清蛋白, or 蛋黄蛋白, the terms become ridiculous. 蛋 is a good
term, but has a specific use of the greatest importance in Histology, Embryology, and Physiology as the true and only term for semen. Hence it *cannot* be used for albumin. But there is a character with the same sound, similarly constructed, not in common use, the meaning of which as given in Kang Hsi is "the essence of lean meat,"—and this is its *only* meaning,—which in our opinion would answer admirably. It is 珠. With this single character for albumin, terms for the compound albumins can easily be constructed.

For cell 珠 is not a *good* term. It is better used as a distinctive character for the blood corpuscles. 輪 is used for condyle, and the white corpuscle is not a 輪, but a 珠. Therefore 珠 is much the best term for corpuscle. It is also used for any small prominence on the surface of a bone. For cell we prefer the Japanese term, 細胞. This term will apply where 珠 does not.

筋 is required to do too much work. It is used for tendon, for cord, for ligament, for fascia and for nerve. It is not a *good* term for this last named purpose. As its composition shows, it refers rather to the binding together with sinews or ligaments, and has only been applied by the Chinese to nerves from a misapprehension of their function. If we regard the nervous impulse as something akin to electricity we certainly will not desire to use so dead a term as 筋, but will want something with the idea of "conveying." A careful study of the character 經 will impress anyone with its admirable fitness for this purpose. The idea of "running lengthwise," of "passing through," and of its being applied to the vessels of communication in the body, prove it an excellent term for nerve. It is so used by the Japanese. Some may object to it on account of its being so commonly used for other purposes. Certainly, this objection cannot stand as against 筋. Such a term as 線 is inadmissible. But if 經 cannot be adopted, then 系 is the next best, and a perfectly unobjectionable term.

Some slight changes in the present terms for artery and vein are desirable. The Chinese do not distinguish between these, calling both 腫. To use 腫 for artery and 迴 for vein, does not distinguish the latter as a blood vessel and uses 腫, a term that should be restricted to glandular and other ducts. It seems desirable to use 腫 for both artery and vein and then to prefix some adjective to distinguish between them. The Japanese use 動脈 and 靜脈, and these are very good terms. 迴 腫 may be used for vein if it is thought desirable, but as 迴 is also used for "recurrent" it might be better to leave it for this purpose alone.
Evangelistic.

We extract the following from correspondence to the Independent in regard to a conference lately held in Toronto: "Dr. Virgil C. Hart, Superintendent of Canadian Missions in West China, who is about to depart for his distant mission field, gave a farewell address. To few men does it fall to twice re-establish a Chinese mission. Yet this was the experience of Dr. Hart; first, as Superintendent of a Methodist Episcopal Mission in China, and last year as Superintendent of the Canadian Mission at Chentu, in the province of Sze-chuen. All the missions at Chentu were destroyed during the Chinese war, but have been re-established with ampler hospital and preaching accommodation, and with brighter auspices than ever. Dr. Hart purposes founding a printing press for the diffusion of Christian literature, the only one in a population of fifty millions of people."

Also, the following in regard to famine relief in India will be appreciated by some of our brethren in the north: "Such a howling, unreasoning and disorderly crowd as one gets into, when he tries by himself to distribute a little relief, he prays never to see again. Then when the famine is over and their wants are supplied, some of the survivors prefer the roving habits they have formed to a regular life in home or school. You may clothe and feed them, and they will walk off with the clothes you give them and choose to get their food by stealing in the bazaar to having it regularly in school or elsewhere."

In a letter in regard to the outlook in Japan the correspondent says: "The Buddhists do not seem so bitter in their opposition as in the past. They are beginning to find out that opposition does not weaken or destroy Christianity. Only about a month ago (just before my return), quite a large meeting was held in Tokio, composed of Buddhists and a few of the Christian teachers and preachers. The evangelical ("orthodox") ministers, as a rule, did not approve of such a gathering. They thought no good would come of it. During the meeting one of the Buddhist speakers (a priest, I think), uttered words something as follows: "Christianity is a fixture in Japan; it has come to stay. It is to be one of the religious and moral forces in the land. Therefore, my advice is that we cease to antagonize each other. Let us, as far as possible, live in harmony and work together for the best interests of the people." The shades of Buddha! What a change of front.

This is one of the old schemes of the Buddhists. What they cannot overcome or control they will make friends with, hoping thus to hold the ground already gained, or, finally, to absorb so much of Christianity into their own system as to make it a useless and powerless organization. The latter is the way they finally gained a permanent footing in Japan in the
olden time. She took on so much of the ancient faiths of Japan as to make them harmless competitors, if not practically useless. The absorbent power and eclecticism of Buddhism in the past has been very great. It is to be seen what success she will have, if she really attempts to court Christianity and absorb some of its elements. It is proposed to hold such meetings twice a year. I think the proposition comes from the Buddhists."

The following shows some of the vexations occasioned by the opposition of a "Christian" governor of the island races in Micronesia: "This governor last year ordered the "Star" to stay away from Ponape, and the missionaries "to mind their own business." At this time it was reported from the Spanish ship that "the governor had a sore head," which may, in part, account for the message. After this, however, he visited at the mission stations on Kusaie, and was much pleased with our work. This may be the cause of his change of attitude toward the "Morning Star." He sent word to the other islands that the "Star" was to come to Ponape, and when the invitation was accepted, he was most cordial in his welcome. He allowed the natives to go on board freely, and those on the ship could visit any part of the island, save two localities, Jokoite, near the colony, and in the Metalinin tribe. This is good, so far as it goes; but this governor returns to Spain very soon, and his successor may also have a "sore head." It seems to be chronic in these Spanish governors.

In the Gilbert Group the work has been greatly hindered by a wave of heathenism which swept through the group. The over-sympathetic British Commissioner was sorry for the natives in that they had so little pleasure, and granted permission to dance twice a year. In justice to him it is but fair to say he had some of the natives give him a "specimen dance." It is needless to say they left out the objectionable features; he could see no harm in that, so granted the permission, which started the ball rolling. It swept from island to island, carrying sin and famine in its train. In the midst of it this commissioner left. Another man has taken his place, and is devoting his energies to undoing the work of his predecessor. He is reported as "finding flogging a good antidote for dancing." We are hoping his influence may be felt throughout the group."

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**THE SALVATION ARMY.**

By William James Baker.

Who are these in quaint array,
Marching down the staring street,
Through the dust, 'mid trade's harsh bray,
While the mocking rabble bawls?

Voice of voices thus they greet:
esus calls!
Throbbing drum and piercing brass
   Rhythmic mark their plaintive psalm;
Flags, queer mottoes, on they pass,
Bravely beck'ning sin's weak thralls;
   Magdalene may find her balm:
   Jesus calls!

Is this worship, this grotesque
   Praying while the cymbals crash?
See, the preacher, quite burlesque,
Pious orgies oft instals;
   Can it be beneath such clash
   Jesus calls?

Doth our God command we shall
   Seek Him, learned, gloved and nice,
Chant a polished ritual?
   With all baits the Devil trawls;
   Deem'st thou but by smooth device
   Jesus calls?

Lo! He weary walks this earth,
   Doubting where to lay his head;
Is he sought by men of birth?
   Nay! to him the leper crawls;
   That the poor have Gospel bread,
   Jesus calls!

Where the Church of Christ erewhile
   Drew her garments daintily,
In the slums, in garrets vile,
   And where open vice appals,
   These the Master served—their plea,
   Jesus calls!

Tho Religion Folly's cap
   Here be wearing, cease debate!
For this Army fronts Hell's gap.
Echo of the ages falls
   On their hearts compassionate:
   Jesus calls!

Grant delusion here may be,
   And thou, scorner, hast the light:
Christ, who hung on Calvary—
Still they force high heaven's fair wall
   Who, while marching through earth's night,
   Heed Thy call.

—The Independent.
OPIUM SMOKING IN INDIA.

Mr. W. S. Caine, who is at present on a visit to the temperance societies throughout India and Burmah, writes from Gwalior, under date December 14th, to the Alliance News:—“I was glad to find that in the slums of Bombay and other large cities in India, where four or five years ago a hundred debased wretches could be counted in single opium dens, helplessly drunk on poisonous drugs prepared for them by a Christian government, this horrid vice has now completely disappeared. For the first time, in the annual statement of the moral progress and condition of India, the government is able to state that during last year 'no shops were licensed for the sale of chandu and madak, or of opium prepared for smoking.' Licenses are now only issued for ordinary opium.”—The Christian.

DAILY CARES.

Bring your cares to God by prayer in the morning; spread them before Him, and make it appear by the composure and cheerfulness of your spirits that you have left them with Him. Daily prayers are the best remedy for daily cares.—Matthew Henry.

CHRIST'S YOKE.

Christ's yoke is easy, and His commandments are not grievous—not because He lowers the standard of duty, but because He alters the motives which enjoin it, and gives the power to do them. Christ's yoke is padded with love, and His burden is light, because, as St. Bernard says, it carries the man who carries it.—Dr. Maclaren.

"YOUR NEW RELIGION."

Dr. Mary J. Hill writes as to the Medical Mission in Chi-ning-chow, China:—We have had a large attendance at the hospital. Our rooms for the women are very small and too few to accommodate all the patients wishing to remain with us. It is very hard for us to say we cannot keep them when they come so far and are so anxious to remain for treatment. I feel that these women are sent to us not merely for the benefit we give them physically, and I long to have them remain and hear about the Great Physician, who has led them to us. There is a wide field in Chi-ning-chow for work among the women, and I hope we shall prove true to the charge given us, and do the work only as God would have us. We had some very
Evangelistic.

serious cases last season, that cost us many anxious thoughts and fervent prayers that we might be guided aright in our treatment, and that the friends of the patients might be led to look more favourably on us and the doctrine. A woman from whose face we removed a large growth said one morning, 'Are you glad this lump has gone?' and when we said 'Yes,' she replied, 'Well, I do not understand how it is you are glad, and yet you are strangers. How is it you are so interested in me? It must be your 'new religion.'"—The Christian.

WHY ARE THERE FEW CONVERSIONS?

Many are trying to account for the few conversions and the little interest shown in religion. The cause is put down to many reasons, such as worldliness in Christians, want of obedience, of faith, of prayer, of humility; but we seldom hear the most likely reason—want of Love. This may be more plainly seen if we consider the following texts:—

John xiii. 34, 35.—A new commandment give I unto you that ye love one another; as I have loved you, that ye also love one another. By this shall all men know that ye are My disciples, if ye have love one to another.

1 Peter i. 22 (last clause). . . See that ye love one another with pure heart fervently.

John xv. 12, 17.—This is my commandment, that ye love one another as I have loved you. These things I command you, that ye love one another.

1 Peter iv. 8 (first clause) R. V.—Above all things have fervent love among yourselves.

Rom. xiii. 8-10.—Owe no man anything, but to love one another: for he that loveth another hath fulfilled the law. Thou shalt love thy neighbour as thyself. Love worketh no ill to his neighbour: therefore love is the fulfilling of the law.—The Christian.

MEDICAL MISSIONS.

I take the following notes from the November Quarterly Paper of the Edinburgh Medical Missionary Society. When the victorious French troops entered Antananarivo it was thought that the disturbed state of Madagascar would soon be settled. But the whole country, with the exception of the capital and a few garrisoned towns, was in a state of ferment and lawlessness. Two of Madagascar's most devoted missionaries, with their little girl, have been cruelly murdered, and others have had to fly from their stations to save precious life. The flourishing Norwegian Mission Station at Antsirabe, with its medical mission hospital
and leper village, have been utterly destroyed. Hundreds of churches have been burnt or razed to the ground, and teachers, evangelists and pastors hounded from place to place. The medical missionary hospital at Antananarivo is one of the best equipped mission hospitals in the world, though not by any means the largest. It was built chiefly by the Friends' Foreign Mission Association, and is maintained by that mission and the London Missionary Society. On September 30th, 1895, the Capital was attacked, and for some time the hospital was in considerable danger. One shell burst just in front of the hospital, but no one was injured. When the surrender of the town took place the hospital staff were very busy in attending to the wounded, and there the French and Malagasy were first gathered and reconciled under one roof. The French doctors praised the well-trained native nurses highly. Soon after General Duchesne's return to Paris, the French government granted Miss Byam, the lady superintendent, a medal of honour in acknowledgment of her devotion and help.—Bristol Med. and Surg. Journal.

Satan would have us try to-day to bear to-morrow's burden with only to-day's grace, and would dismay us with anticipations of troubles which loom in the distance, leading us to disobey the directions, "Take no thought for the morrow," "Be careful for nothing;" but what a privilege it is to be permitted to rest upon the assurance, "I will go before thee; thou shalt not be without a guide," and "He that followeth Me shall not walk in darkness."—Hudson Taylor.

In writing of the evangelistic efforts in connection with the Tung-cho hospital and dispensary, Dr. J. H. Ingram says that he has often thought that the want of clocks in China will certainly be the means by which God will save many souls. One of the most satisfactory results has been the opportunity for work among the women who came to the dispensary. They frequently arrive very early, as they have no means of telling the time at home, and they are usually so anxious for treatment that they err on the safe side and appear an hour or two before dispensing time. One of the Bible women talks with the earlycomers while they are waiting for the doors to open, and seed is sown in the waiting-room from day to day which sometimes bears visible fruit.—The Missionary Review of the World.

The Chinese physician, Dr. George Mark, who was in attendance upon Li Hung-chang on his journey around the world, is a member of the Second Presbyterian Church in Canton. Dr. Henry baptized him and recommended
him to the government school in Hongkong, where he was found, when Viceroy Li instituted a search for young Chinese who were qualified to take a medical course in English at the Tientsin school, which Li established. Young Mark was chosen, and did himself great credit, and has been under the patronage of the viceroy ever since. He has the confidence of the Canton Christians. His wife, also a member of the Second Church, is the daughter of a Bible woman now dead.—*Church at Home and Abroad.*

Ambassador Chang, who has been sent to England to convey the congratulations of the Emperor and Empress-Dowager to Her Majesty Queen Victoria on the occasion of her jubilee, has taken with him as physician in ordinary Dr. Tsao Yung-kuei, of the Methodist Episcopal Mission, and Professor of Anatomy in Peking University. We congratulate Dr. Tsao, and are pleased to see in this a recognition at once of the value of Western medical science and of our Christian schools on the part of officials high in imperial favor.

The report of the London Mission Hospital at Tientsin arrived too late to be included in the review of hospital reports for this number of the Journal. But we think it most fitting to include some excerpts from it in this place, especially since the greater part of the report is devoted to the evangelistic side of the work. After paying tribute to the memory of Drs. Mackenzie and Roberts, the writer says:—

"We regard every one who thus comes, as sent, not only to receive healing of his bodily ailment, but also to hear the glad message of salvation through Christ Jesus, the Saviour. We claim them all for the Master's Kingdom, especially the in-patients; there is, however, absolute freedom of conscience, and be they willing to listen or be they not, we do our best for them.

* * * *

During the year there have been thirty-three baptisms, i.e., twenty-nine in-patients and four out-patients. It is a great joy to have the preaching to the out-patients bearing fruit, and this is in a great measure due to Mr. Chen Yueh-nan, the hospital evangelist.

Before the out-patients are seen, there is always a short religious service, in which the hospital assistants take part. We first have a little prayer-meeting in the consulting-room, and then a text is chosen, and this we make the text for the day: the Gospel in which that particular text may be is the one we sell to the out-patients on that day. We encourage the men to buy a Gospel at the price of six cash, and then the assistants go round and turn
up the text for them. In this way we find that they value the book, and we thus hope to introduce the Gospel into many distant homes where we cannot win the people by personal testimony. During the year we have sold about 7,000 copies of the Gospels, beside a number of other religious pamphlets, calendars, etc. The British and Foreign Bible Society and the National Bible Society of Scotland keep us supplied with Gospels, free of charge, and we here beg to thank them very much for this kindness. Old Fan, who has charge of the book-selling, was seriously ill for a time, but he is now at work again with his usual untiring devotion.

For the in-patients the day begins with morning-prayers, lasting somewhere about one hour; and we make this our one opportunity for teaching them the fundamental truths and facts of Christianity. The assistants, too, teach them every afternoon in the wards. Most cannot read, so we adopt the Chinese fashion and make them repeat aloud and in unison what is being taught, and this fixes the attention of all. They also learn off by heart a few favourite texts, such as John iii. 16, as also some short hymns and the Catechism. Deeply do we realise that nothing but the Holy Spirit's presence and power and touch can bring a human soul from death to life. As we write these lines there is quite a revival in the wards. It is a joy to report that in one of the large wards every patient and attendant has been baptized, while in the other large ward about half have been baptized. Several wish to be; two very nice men seem to have really believed, but are afraid to take this step of confession, and there are a few who are still shutting their hearts to this glorious message of salvation, and for them we shall all pray. Why should one be lost with a Saviour ready and willing to save all that believe in Him?"

The following touching incident is recounted, which shows how Christ-like this work is: "One day my attention was called to a poor lad crouching on the steps of the hospital entrance. He begged hard to be admitted, so we got him carried to one of the wards. An examination showed that he was dying of tubercular disease, and quite beyond hope of recovery. It was touching to see his face of delight as he found himself on a comfortable bed. He was a beggar, but had seen better days. Leaving his home in Shantung he found his way to Peking, and there got employment and managed to save five taels, which he intended to take home as a present to his mother. Sickness overtook him and then he tried to go home. He got as far as Tientsin, and for a short time attempted to make a living as a water carrier; but he eventually got tubercular swelling in his knee-joint and that made work impossible, and then he became a beggar. He was an intelligent lad and listened most attentively to the Christian teaching. Latterly he was the occupant of the Bowden Children's Cot. At last it became apparent that a
great change had been wrought in him. One evening, while conducting a religious service in this ward, we were asking those who wished to believe in Jesus to hold up their hands. I had counted nineteen and was looking round, when my eye caught poor Chang's hand sticking out from his bed cover; he made the twenty. Again and again he was asked if he believed in Jesus and had repented his sins, and he always answered in the affirmative. One morning we noticed that he was sinking. I said to him, "Chang, your time on earth is very short, you will soon be in Heaven, where there is no sickness and no sorrow." Then I said to him "Are you afraid to die?" He said "No." "Do you believe in Jesus as your Saviour?" "Yes," he said. We all knelt at his bedside in prayer, and as I prayed he repeatedly broke in with the exclamation, "Jesus K‘o Lien Woa" (Jesus have mercy upon me). I then gave him a beautiful white chrysanthemum, and he looked at it with much pleasure as he took it in his hand. During the night he died. Next morning I found him lying there dead with a smile on his face, and one could not help thinking of poor Lazarus."
Correspondence.

Christian Hospital,
Nanking, March 30th, 1897.

To the Editor:

For the past year or two I have made a practice of taking most of the sick beggars and tramps I meet on the road side to my hospital, even though I feel sure there is very little or no prospect of life. I tell them, "You can come and die under a roof." If they die I send for the Ti-pao, who sees to the burial. In this way, although in the past year perhaps thirty or more have died, I think at least one-half have lived. One of these poor fellows is now a bright active Christian, and others have learned the truth. It is surely better than the way Dives treated Lazarus, but yet rather unsatisfactory, as it merely palliates a little and does not reach the root of the matter. These poor men go out on the streets again to tramp and beg, and may afterwards die at the door of Dives. Can we not get rid of Dives, or stop his plundering of the poor? Some think that God made men rich and poor, so that there may be charity; but I think this a mistake. So-called charity reminds me of the story of the traveller in the wilds, who had no food for three days, and not desiring to kill his faithful dog, cut off its tail and made some soup. The poor dog eyed it wistfully, and out of charity the master threw the dog a bone of his own tail.

Why should there be so many in the condition of Lazarus, and why should there be such a struggle for existence and many so anxious for the morrow that life is a burden and suicide so terribly prevalent? Jesus said, "Take no thought for your life, what ye shall eat, or what ye shall drink; nor yet for your body what ye shall put on . . . . Behold the fowls of the air; for they sow not, neither do they reap nor gather into barns; yet your heavenly Father feedeth them. Are ye not much better than they? And why take ye thought for raiment? Consider the lilies of the field, how they grow; they toil not, neither do they spin; and yet I say unto you that even Solomon in all his glory was not arrayed like one of these . . . . Therefore take no thought, saying, What shall we eat? or Wherewithal shall we be clothed? . . . . But seek ye first the kingdom of God and His righteousness; and all these things shall be added unto you."

Because the kingdom of God and His righteousness is neglected we have this atheistic struggle for existence and anxiety about this life. Let us consider the birds and lilies and see if we cannot from them learn the righteousness of God that will do away with much poverty. Let us have justice and righteousness to all men first and then charity to supply the lack. Jesus spoke of
Correspondence.

wild flowers and birds, not flowers in a pot or birds in a cage; that is, birds and flowers in God's care and not in man's keeping. God does not forget to find his birds, or to water and nourish His plants. Man often does. The Chinese say, "Man is not as well off as birds," and why not? A bird is free. He bathes in God's sunshine and light, drinks of God's rain and streams and lives on God's free earth. All of his environment is free to his use. Some men are slaves and serfs, and thus like birds in cages, or flowers in pots, must depend on other men and cannot get at their proper God-given environment. Others have free sun-light, air, and rain, but the most important part of their environment, the earth, is held by others. If a wild bird only could alight, roost and pick his food by the goodwill of another, he could be impoverished by that other and robbed by rent till he would be as a slave, and we would have ragged and hungry birds. Men robbed of their birth-right, ("The earth hath he given to the children of men"), are driven into dependence on other men, and so lose the privilege of relying on God. Could we make it possible for all the poor and unemployed to get at free land much of poverty would be relieved. Mayor Pingree has for ever demonstrated this in Detroit. But the plan of taking the rent of land for taxes and common uses will make land grabbing an impossibility, and land will be thrown into the hands of the user. If God made the earth and gave it to (all) the children of men, and not to favorites, then the earth belongs to all men living and yet to be born, and so all men are the only landlord. Thus land rent belongs to all men, and this land rent is God's foreordained fund for the uses of society; and God's providence is seen in the fact that when society needs a large common fund, land values—rents—are high, and vice versa in the country. Then, thank God, the unholy "survival of the fittest" theory is exploded, and God has provided for all men every good and perfect gift in earth, air and sunshine, and no one should be naked or hungry, as man has thousands of ways of extracting supplies from the great store-house that birds cannot know. Let us rejoice in the fact that when God's righteousness and justice exist on earth, the prayer, "Give us this day our daily bread," will be answered, the genus Dives will be as scarce on earth as in heaven, and Lazarus will cease to be a beggar. Of course, as yet, altruism, which is a Christian feeling, does not exist. Sick soldiers are not as valuable as the general's horse, which would be cared for, but are turned adrift to rot and die, and the poor and unemployed die like dogs on the roadside. We can at present only get all the money we can from Dives to feed and heal Lazarus, and preach our Heavenly Father and His love to all His creatures, and by and bye China may learn to stay the plunderings of living officialdom and dead officialdom (idolatry), land grabbing, usury, pawn broking and the like, and get more directly from His own hand the blessings of God.

W. E. Macklin.
Reviews.

化學評論. Steele's Popular Chemistry.
Translated by Jno. C. Ferguson, B.A., and Li Sing-yuan.

The original of this book is too well-known to require any notice at this time. It is intended as a popular account of the main facts and principles of chemistry, adapted to the general reader as well as for use in schools. The translators have had both these purposes in mind in the preparation of the present work. Among general readers we would expect it to have a large circulation on account of its plain style, rendering it easier of comprehension than works more technical in character. For medical students it will be found useful as an elementary text-book, and if combined with a work on qualitative analysis, will be found sufficient as a text-book on general chemistry. It will be especially useful to those training hospital or dispensary assistants, where the teachers' time and apparatus are limited. A list, in English and Chinese, of the necessary chemicals and apparatus will be found in the first part of the book, with the address of dealers of whom they may be ordered.

The Chinese style is Easy Wên-li, and while not so difficult as to trouble the ordinary student, yet it is of sufficiently high character to gain the respect of the literary classes. The terms used are largely an adaptation of those used by Fryer and Kerr. Where the translators have seen fit to deviate from these lists and choose terms of their own, it has usually been a change for the better. This is well illustrated in the term used for "affinity," 親和力. Of the old terms, 擁力 expresses simple adhesion, while 親 expresses a quality of the soul, and it seems irreverent to apply it to a force existing between atoms of matter, especially as it does not well express the idea. It is unfortunate that the Committee on Nomenclature had not completed their work on Chemical Terms, so that the authorized list might have been used in this work.

The make-up of the book is spoken of as "a new attempt at book-making." It is gotten up in the style of Japanese text-books, bound in cloth, and printed on white, foreign paper; and with clear type, and illustrations equal to those in the original work, it presents an attractive appearance, and as a text-book will certainly last longer and be more convenient than those in the ordinary Chinese style. The price is not out of the way when quantity of matter, style, durability, and general usefulness are taken into account. The original work retails for about three times the cost of this. Another commendable feature is that of the English terms being printed at the side of, or below, the Chinese term in the body of the work, instead of in a glossary at the end. The analytical chart at the close of the book is worthy of special mention, as being the most concise and simple scheme yet translated. Altogether, the book receives our hearty commendation for the purpose for which it was designed.

Annual of the Universal Medical Sciences. 1895. Edited by Ch. E. Sajous, M.D., and seventy associate editors. In five volumes. Published by the F. A. Davis Co., Philadelphia, New York and Chicago.

Any attempt to give, in a short review, an idea of the vast amount of work which has been put into these volumes, or of the
exhaustive completeness of the result, would end in failure. It is a work which every man wishing to keep abreast of his times should have on his shelves, and although it will be most useful to those who have access to large medical libraries belonging to public bodies, where they can hunt up the original paper referred to, yet in all the most important subjects so complete a summary is given of the matter under discussion that, even without such original articles at hand, the Annual is of the greatest value. This is especially true in the portious devoted to surgery and gynaecology. In all places the illustrations of the incisions for new operations and of new instruments are exceedingly good and helpful. Vol. II. contains an interesting section on "Inebriety, Morphinism and Kindred Diseases" by Norman Kerr, which will give many useful suggestions as to lines of enquiry to those out here, who are investigating the opium habit. Enteric and malarial fevers are the two fevers that most of us chiefly come in contact with, and in Vol. II. they are treated of. A very full account of all the newest suggestions for treating enteric fever occupies seven pages and contains all a man can want. Under malaria we see the following: "All malarial manifestations are accompanied by melanaemia, which presents itself exclusively in malarial diseases. The sign is therefore pathognomonic, and every suspected case should be examined. A drop of malarial blood shows the masses of black pigment in the plasma. The number and sizes of the pigment-masses are proportional to the degree of malarial poisoning." Yet two difficulties obtrude themselves: (1) that one meets with cases of mixed infection, and (2) the question as to whether the blood of patients living in a malarious country does not constantly, apart from any feverish attack, contain such masses. The finding of the parasite, on the contrary, is certain evidence.

S. R. H.


We have examined this work with great interest, because it is not long since we reviewed a work by Drs. Hansen and Loof, relating to leprosy as seen in Norway and Sweden. Dr. Impey, who was lately the Medical Superintendent of the Robben Island Leper and Lunatic Asylums, Cape Colony, deals with the incidence of the disease in South African States, where the conditions of climate are so very different, yet we note that the general results of leprosy are very similar in both these parts of the world. This condition of things corroborates a statement made by Dr. Impey (p. 27), that "no external influences, climatic, telluric, or meteorological, have any appreciable effect on the spread of leprosy."

The authors of both works agree that, practically, leprosy exists in two forms—the tubercular and the anaesthetic, and that there are mixed cases. Dr. Impey, in addition, describes a form, "syphilitic leprosy": five very characteristic plates are given in illustration, and we find that two such dreadfully disfiguring diseases do not neutralise each other; nay, rather they intensify each other's attack upon the system by combining in a terrible partnership. Altogether Dr. Impey gives us thirty-seven splendidly-executed plates, illustrating the disease in its various stages and forms, and adds a map of Cape Colony, showing the geographical distribution of the disease.

This work is a valuable contribution to science. It shows that leprosy knows no distinction of sex, although more cases occur amongst males; but they are more exposed to predisposing conditions. Then we have strong evidence that it is not infectious, and that hereditariness counts for very little. Thus in Robben Island there were 266 leper parents, who had had 951 children, of whom only 23, or about 2.43 per cent., became leprosy. Of 520
The China Medical Missionary Journal.

Lepers in the Asylum, 475 were born of healthy parents; and of the remaining 45 cases, in 25 the father was alone affected, in 16 the mother, and both parents in 4 only. Leprosy may attack all ages—from 3 to 80 years—the average being about 29. About 2,000 cases were estimated to exist in the South African States. Chapters XIX. and XX. deal with isolation, according to the present system, and suggest some desirable modifications. The regulations framed by government for private isolation are given in the last chapter.

—Bristol Medico-Chirurgical Journal.
Seven pages are devoted to statistics and list of subscribers and four pages are devoted to the work under several heads, such as personal items, referring to changes in the medical staff and hospital management, out-patient department, in-patient department, operations, evangelistic, Samaritan Fund.

The hospitals seem to be very fortunate in having so large a staff of medical men connected with them, among others a dental surgeon, who is reported to have treated 351 patients during the year.

The total number of visits made by out-patients to the hospital during the year was 16,012, and the number of in-patients was 568.

The number of individual cases in the out-patient department was slightly above the average for the past ten years, while the number of in-patients was some less. Eighty-four operations were performed under anaesthesia. Sixty-four effected a complete cure, sixteen gave improvement and four resulted in death.

In the evangelistic work “daily exposition of Scripture is conducted in the out-patient room in connection with every consultation, and in each of the wards there are morning and evening prayers with Scripture reading and exposition, while conversational work is systematically carried on among both in-patients and out-patients. This department of the work is under the supervision of the Rev. T. W. Pearce.”

The Samaritan Fund, made up of gifts from friends of the work, amounted to $76.14 during the year. It is used by Mrs. Stevens, the matron, to meet the cases of need that so often appeal to those in charge of hospitals. Such a fund is an excellent idea. The matron is in a position

HOSPITAL REPORTS.

To the missionary physician who finds his hands full, not only with medical matters but with duties growing out of the evangelistic side of his work as well, the writing of a report comes as a task not easy to perform satisfactorily. If he has made notes during the year for his report, and has plenty of material in hand, he is nevertheless troubled with the question, Who will he write for? Shall it be for his professional brethren, and will he give detailed accounts of his cases and operations, or will he write for the people of the Church which he represents and report the missionary aspect of his work? Many endeavor to combine both and this makes the task a difficult one. No report can faithfully show all the work done or fully picture the interesting features and incidents of a mission hospital. That a large amount of work, benefiting thousands, is being done every day in the various mission hospitals of China, is evident, but some of the best work, that which is most like the work of the Great Physician who went about healing the sick and binding up the broken hearted, can never be reported and will never enter into the statistics of hospitals and societies.

Three hospital reports have come to hand this quarter. The report of the Alice Memorial and Nethersole Hospitals in connection with the London Missionary Society at Hongkong, is an interesting report, although it is not extensive and does not report cases or incidents of the evangelistic work. Five pages are devoted to lists of managing committees, physicians and surgeons connected with the hospital, abstract of Constitution and Connection of the two hospitals and plans of buildings.

Reports.

Reports.
to do a great deal of good with such a fund.

"No charge is made for medicines, bedding, clothing during residence, attendance, etc., and only a small proportion of the patients are able to pay for their food."

The expenses of the year amounted to $8,344.77. The income for the year was $9,138.59. The list of contributors to the hospitals is interesting, because of its cosmopolitan character. If they are not from every nation under heaven, at least the world is well represented. What but a hospital could so unite the sympathy and philanthropy of mankind. John C. Thomson, M.A., M.D., is superintendent of both hospitals.

From the report of the Tung-kun Medical Missionary Hospital in connection with the Rhenish Missionary Society we learn that building operations conducted during the past year, so interfered with the work that the physician in charge thought it scarcely worth while to issue a report, and the report came out more to conform to the custom previously followed. The report, however, shows a large amount of work done by Dr. Kuhne during the year, and quite justifies its issue. Several new buildings have been added, increasing the capacity, convenience and sanitary advantages of the hospital.

Cholera and the plague had been their neighbors during the year; eleven deaths from the plague having occurred in a house near the hospital at the time of writing the report. Out-patients were seen during eight months of the year on one hundred and ten consultation days, and these made 12,870 visits to the dispensary, or an average of one hundred and twenty-seven for each day. There were sixty cases of leprosy and seven hundred and twenty-two of malarial fever, the greater number of which were of the quartan type.

The in-patient department was open only six months, but during that time two hundred and eight patients were cared for, seventy-five of whom were women. There were four hundred and fifty-four operations performed, five being for vesical calculus and fourteen for cataract. There are interesting notes concerning the assistants and students, and in regard to the evangelistic work, which we are glad to see is well looked after by Rev. W. Deitrich and two Chinese preachers. Too many hospitals are inadequately supplied with evangelistic helpers. The report contains several interesting incidents of the work, showing the sad and tragic side of this quiet and sturdy people. A list of contributors is added, which shows that the hospital has a generous support from both Chinese and foreigners, while the work seems to be conducted on very economical lines. John E. Kuhne, M.B., C.M., is in charge of the hospital.

The An-ting Hospital in connection with the Peking Mission of the American Presbyterian Church, is under the direction of Robt. J. Coltman, M.D. The report for 1896 is very brief, but notes an increasing confidence on the part of the Chinese in foreign medicine and the foreign physician. The dispensary is open daily, and the attendance during the year has been very large, being a total of 23,618. May, August and October show the largest daily attendance at the dispensary. There hundred and ninety-seven visits were made by the physician in charge to patients in their homes. He also delivered a course of lectures on the Practice of Medicine to the students of the Tung Wen Kwan, and for a time acted as physician to the Vicerey Li Hung-chang.

The number of in-patients was only eighty-six, which would seem to be a small number for so large an out-patient clientele. The ward accommodations of the hospital are probably limited.

Morning and evening prayers are conducted in the hospital, and daily preaching to the out-patients in the waiting room. There are brief notes on a few cases and a
list of surgical operations which number five hundred and thirty-nine.

It is interesting to note that there is no report of malarial troubles among the natives, although the Doctor himself was ill for six weeks with remittent fever of a severe type, and several other missionaries are said to "have suffered with malaria, dysentery and other minor complaints." This would indicate that malaria does not enter largely into the troubles met among the natives.

ROBERT C. BEEBE, M.D.
BIRTHS.
At Liao-yang, Manchuria, on 24th Dec., 1896, the wife of Rev. J. M. Grieve, M.A., M.B., C.M., of a son.
At I-chow Fu, Shantung, on 13th Feb., the wife of C. F. Johnson, M.D., of a son.
At Chang-poo, Amoy, on 4th March, the wife of Muir Sandeman, M.A., M.B., C.M., of a daughter.

DEATHS.
At Chemulpo, Korea, on 3rd Jan., of septicemia, F. B. Malcolm, M.D., formerly of the American Baptist Mission, Sz-chuen, and latterly in charge of the work of the S. P. G. at Chemulpo.
At Maquoketa, Iowa, U. S. A., on 16th Oct., 1896, of diphtheria, James J. Gre, M.D., for several years connected with the M. E. Mission at Foochow, most of the time being stationed at Ku-cheng.

ARRIVALS.
At Shanghai, on 2nd March, Rev. F. A. Keller, B.A., M.D., from North America, for China Inland Mission.
At Shanghai, on 13th March, Miss Maud Kellam, M.D., for Canadian Methodist Mission, Szchuen.
At Shanghai, on 27th March, G. W. Guinness, B.A., M.B., B.C., and W. L. Pruen, L.R.C.P. (returned), for China Inland Mission.
At Shanghai, on 11th April, E. R. Jesserson, M.D., and family, from Germany, (returned), for Methodist Episcopal Mission, Chinkiang.

DEPARTURES.
From Shanghai, Jan. 9th, R. Swallow, M.D., Ningpo, for England.
From Shanghai, Feb. 17th, Miss J. M. Donahue, M.D., Foochow, for U. S. A.
From Shanghai, Feb. 26th, H. W. Boone, M.D., and family, Shanghai, for U. S. A.
From Shanghai, Feb. 27th, Mary Gale, M.D., Shanghai, for U. S. A.
From Shanghai, March 18th, A. W. Douthwaite, M.D., Chefoo, for England.
From Shanghai, April 10th, Sydney R. Hodge, M.R.C.S., L.R.C.P., and family, Hankow, for England.

Official Notices.

The following persons have been duly elected members of the Medical Missionary Association:—

Charles Edgar Reed, M.D., Jefferson Medical Col., Philadelphia.
Ida Khan, M.D., Michigan University, U. S. A.
Mary Stone, M.D., Michigan University, U. S. A.
Ethel N. Tribe, M.D., London.
Luella M. Masters, M.D., Syracuse University, N.Y., U. S. A.

Will the members of the Association please send in their votes on the proposed alterations in the Constitution at once to the Secretary, Dr. R. C. Beebe, Nanking. Voting papers will be found in the December number of the Journal.