EXPERIMENTS ON THE HYPERPLASIA OF NERVE CENTERS.

S. R. DETWILER. From the Anatomical Laboratory, Peking Union Medical College

INTRODUCTION.

In correspondence with the well-known atrophy of nerve tracts following destruction of functionally active members in the adult organism, experimental evidence has recently accumulated to show that the removal of peripheral areas in the embryo is accompanied by an incomplete (hypoplastic) development of the nerve centers which normally supply these areas with nerves. This defective development of the nerve centers supposedly results from the lack of peripheral functional demands which normally activate their complete development.

Through the work of Harrison the fact has been established that the initial outgrowth of the nerve fiber from its cell body takes place independently of any functional requirements. Its genesis is thus an intrinsic attribute of the neuroblast.

Cumulative experimental evidence, however, favors the idea that "complete" development of the nerve centers will not take place unless under the influence of the functional activity of the end organ. Roux's general development theory is thus borne out in that the differentiation of the nervous system can be staged into two periods: first, that in which development will proceed independently of function, and second, that in which completion can be attained only under the influence of functional needs.

The extent, however, to which function may effect nervous development is a question concerning which the results of investigations still stand at variance. Moreover, no experiments have hitherto been carried out to test whether or not by overloading the periphery at a given region, the corresponding peripheral neurones can be induced to undergo hypernormal (hyperplastic) development to meet the added functional requirements imposed upon them.
METHODS

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Rev. David Tornwall, Pingliang, Kansu, reports that twenty-one carts loaded with people injured by the recent earthquake in that region were brought to their hospital. 40,000 people are said to have been killed in the province. The Pingliang Hospital will welcome any instruments, medicine, or other surgical supplies that friends can contribute to their very limited equipment.
It was in connection with this latter question that the experiments, which are herewith reported, were carried out. The results show that, although hyperplasia of both sensory and motor nerve centers can be experimentally produced, the factors involved in each case are not the same. Sensory hyperplasia is here shown to result specifically in response to added functional peripheral requirements. There is no clear evidence pointing to a similar response of the motor centers resulting solely from the stimulus of a peripherally increased musculature. From the evidence at hand the development of peripheral motor neurones appears to be under the primary influence of central longitudinal conduction pathways, functional connection with which provides the stimulus necessary for complete development. This conclusion is in close correspondence with the "stimulogenous fibrillation" concept of Bok¹ formulated on purely anatomical grounds, and fits in with Kappers'¹¹ primary idea of neurobiotaxis. Accumulated evidence suggests that augmentation of motor supply in response to increased musculature is accomplished by division of the peripheral axones. This observation also accords with that of Bok (l. c.) in that the final end point of the outgrowing axis cylinder cannot be determined alone by stimulogenous fibrillation, but that its final connection is determined "by stimulative (simultaneous) correlation of the growing axone and its end point" (v. Kappers, l. c., p. 269).

Sensory and motor hyperplasia having been effected in the experiments by unlike methods, they will be considered separately in the text.

SENSORY HYPERPLASIA.

The experimental method employed in the production of sensory hyperplasia consisted in transplanting the anterior limb rudiment of Amblystoma punctatum (a urodele Amphibian) a given number of body segments caudal to its normal position. In this way it was possible to study the effects of the development and function of the limbs so placed upon the differentiation of the sensory neurones supplying the limb.

In several recent papers⁴,⁵ it was pointed out that when limbs are transplanted a distance of from one to three segments caudal to their normal site, they will receive nearly their entire nerve supply from the original limb level of the spinal cord (third, fourth, and fifth segments). Also, that limbs which are transplanted a distance of more than three segments caudal to the normal position receive the bulk of
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their nerve supply from segments of the cord just below the original limb level (sixth, seventh, and eighth segments). The nerves of this latter level typically supply afferent fibers to the body integument and efferent fibers to the muscles of the body wall.

It was found that when a limb was shifted caudally a distance of four or five segments, the nerves normally innervating the area into which the limb was re-implanted developed into a new brachial plexus which supplied the transplanted appendage with nerves of normal intrinsic distribution. Such limbs were not only found to function, but the segmental nerves contributing to their plexus were observed to be larger than those of the contralateral neurones of the same segment which had, however, no connection with a limb.

Microscopical examination of these nerves showed their enlargement to be due to a hyperplasia of the sensory neurones. Evidence of motor hyperplasia could be obtained neither by numerical comparison of the motor nerve cells in both halves of the spinal cord at the level involved, nor by a comparison of the relative size of their ventral roots. Evidence of sensory hyperplasia was suggested by the obvious difference in the size of the spinal ganglia and of the posterior roots of the two sides.

In case AS456, the right anterior limb which was transplanted a distance of four segments posterior to the normal position, was innervated by the fifth, sixth, and seventh segmental nerves—the undisturbed left limb receiving normal innervation (from the third, fourth, and fifth segmental nerves). The right sixth and seventh spinal ganglia (connected with the transplanted limb) were found to be considerably larger than the corresponding ganglia on the left side (not connected with a limb). The comparative sizes of these structures are illustrated in figures 1 and 2. The removal

![Image 1](image1.png) ![Image 2](image2.png)
of the limb from its normal position, on the other hand, resulted in a marked reduction in the size of the third and fourth ganglia which normally supply it with sensory nerves (figures 3 and 4).

By counting the sensory cell bodies in the third and fourth ganglia on the left side (those connected with the normal intact limb) and comparing with the number counted in the corresponding ganglia on the right side, where the peripheral area was greatly diminished as a result of limb excision, a cell ratio between normal and hypoplastic development was obtained. Further, by counting the number of cells in the sixth and seventh ganglia on the left (normal) side and comparing with the number found in the right sixth and seventh ganglia (which contributed to the innervation of the transplanted limb), it was possible to obtain a ratio between normal and hyperplastic development. As a control for both hypoplastic and hyperplastic cell estimates a cell ratio was also made of the right and left ninth ganglia, which supplied homologous and undisturbed peripheral areas.

The weight ratios were next determined by comparing the weights of unassembled paper models of the ganglia. The results of both computations (cell and weight) are summarized in table 1.

The extensive hypoplastic development of the right third and fourth ganglia resulting from limb excision is readily seen, the total
Table 1. Showing the effects of removal of the limb and the functional activity of the transplanted limb upon the development of peripheral afferent neurones.

<table>
<thead>
<tr>
<th>Ganglion connected with normal intact left limb</th>
<th>Ganglion with right limb removed</th>
<th>Ganglion connected with right limb transplanted to a heterotopic position</th>
<th>Ganglion not connected with either limb</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Spinal Ganglion</td>
<td>No. of Cells Counted</td>
<td>Weight of the Model in Grams.</td>
<td>No. of Spinal Ganglion</td>
</tr>
<tr>
<td>3</td>
<td>1,725</td>
<td>30.4841</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>1,430</td>
<td>26.1604</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>955</td>
<td>16.8798</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
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</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>* Left ganglion.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>† Right ganglion.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Showing the effects of removal of the forelimb level of the spinal cord (3, 4, 5, spinal segments) and transplanting into the excavated area, a more caudal portion of the cord (7, 8 and 9 spinal segments) from another embryo.

<table>
<thead>
<tr>
<th>Stage of Development when operation was performed</th>
<th>No. of operations</th>
<th>Positive Experiments</th>
<th>Normal Results</th>
<th>Abnormal Results</th>
<th>Av. No. of days after operation when abnormalities were first observed</th>
<th>Av. No. of days after operation when reaction began</th>
<th>Initial Reaction</th>
<th>Limbs with perfect function</th>
<th>Limbs with imperfect function</th>
<th>Limbs without function</th>
<th>Av. No. of days after operation when limb reactions began</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cases</td>
<td>%</td>
<td>Cases</td>
<td>%</td>
<td>Cases</td>
<td>%</td>
<td>Cases</td>
<td>%</td>
<td>Cases</td>
<td>%</td>
<td>Cases</td>
</tr>
<tr>
<td>3-3½</td>
<td>4</td>
<td>6</td>
<td>15</td>
<td>4</td>
<td>67</td>
<td>2</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>11 days</td>
<td>6 days</td>
</tr>
<tr>
<td>4-4½</td>
<td>100</td>
<td>14</td>
<td>14</td>
<td>7</td>
<td>50</td>
<td>5</td>
<td>36</td>
<td>2</td>
<td>14</td>
<td>7-8</td>
<td>4</td>
</tr>
<tr>
<td>5-6</td>
<td>60</td>
<td>9</td>
<td>15</td>
<td>2</td>
<td>23</td>
<td>7</td>
<td>77</td>
<td>0</td>
<td>0</td>
<td>5-6</td>
<td>2</td>
</tr>
</tbody>
</table>

* Nine cases of the positive experiments were preserved before the period when limb reactions normally begin.
number of cells in each being less than half the number present in the corresponding left ganglia with the limb intact. This is also emphasized in the comparative weight ratios of the ganglia of the two sides, which show an interesting approximation to the cell ratios.

The marked hyperplastic development of the right sixth and seventh ganglia, connected with the transplanted limb, is likewise seen by comparing the number of their nerve cells with the number present in the corresponding left ganglia. The weight ratios in this case also approximate closely to those of the cell counts. The cell and weight ratios of the ninth ganglia, which were used as a control, show only slight differences which fall well within the limit of probable error.

Hyperplasia of the sensory centers was also demonstrated by an increase in the size of the posterior roots. Those connected with the transplanted limb on the right side were found to be considerably larger than those of the left side which were not connected with a limb (fig. 5). The hypoplasia of the sensory centers following limb excision
Confirmatory evidence of sensory hyperplasia, resulting from the reaction to increased peripheral demands, was obtained in other cases not reported (AS525, AS526, AS527, AS530).

The results so far accumulated suggest that augmentation of peripheral efferent supply in response to the demands of an increased musculature is accomplished by further division of pre-existing peripheral axones. The evidence supporting this contention is indicated in the fact that the segmental nerves of the two sides show considerable difference in size as the periphery is approached. The distal trunks of the right nerves (connected with the transplanted limb) were found to be larger than were their counterparts on the undisturbed left side. Further, the ventral roots were of equal size on both sides. These observations suggest that the distal enlargement of the nerve trunks on the side of the transplanted limb are due to an increased number of terminal peripheral axones.
MOTOR HYPERPLASIA.

The general failure of the motor centers to undergo hyperplasia in response to the increased demands of a functionally active transplanted limb, indicates that other factors of a different nature must combine in determining the degree of motor cellular differentiation in the cord.

It has been previously observed that transplanted limbs which do not receive their innervation from the normal limb level of the spinal cord (third, fourth, and fifth segments) function less perfectly than do those which are thus supplied. It is evident that the less perfect motility of such limbs is due to no structural deficiencies within the appendage itself, nor to a less perfect peripheral nerve supply; neither is it due to any rigid specificity between the nerve centers and the muscles which they normally supply. It would, therefore, appear that the functional imperfections of transplanted limbs, whatever their degree, must be due to some inadequacy of central connections. If this be true, then the segments of the spinal cord whose peripheral nerves are incapable of producing perfect function in transplanted limbs, should effect normal function provided they be connected with such central correlation pathways as are normally involved in coordinate limb movements.

In the light of these considerations experiments were carried out in which the anterior limb level of the spinal cord (third, fourth, and fifth segments) was excised and a more caudal portion of the spinal cord (seventh, eighth, and ninth segments) transplanted into the excavated area. By this procedure the neuroblastic forerunners of the seventh, eighth, and ninth segmental nerves in the grafted unit of the cord are not only brought under the influence of a foreign musculature, but they are subjected also to all the stimuli which normally produce the increased proliferation of nerve cells in the limb region. The resultant degree of development of their neurone components under these conditions can be compared directly with the undisturbed seventh, eighth, and ninth spinal segments of the host.

The majority of these experiments were performed on embryos just after the closure of the medullary folds, a period
Hyperplasia of Nerve Centers.

prior to the outgrowth of peripheral nerves. The experimental animals were reared in individual aquaria and kept under daily observation from sixty to seventy-five days.

The effects of this transplantation upon the development of the embryo, the initial swimming reactions, and the functional behavior of the limbs are given in table 2. The bearing of the experiments upon the question of healing and regeneration of the spinal cord \(^9,10\), and upon the development of the primary swimming reflexes as described by Herrick and Coghill \(^8\) will be considered later.

The observations on living operated animals showed that the limbs in fifty per cent of the cases performed normal adaptive and coordinated movements (table 2). Three of these cases have been sectioned in series (cases TrSc 90, TrSc 105, and TrSc 137). A microscopic study of this material showed the presence of a perfectly developed brachial plexus with normal intrinsic nerve distribution, derived from the grafted portion of the spinal cord (seventh, eighth, and ninth segments). Not only were the transplanted segmental nerves found to be larger than the undisturbed seventh, eighth, and ninth nerves of the host with which they can be directly compared, but also in the cord itself and in the spinal ganglia a marked increase in nerve cells was evident (table 3, A2 and B2). Thus, the increase in size of the cord and of the spinal ganglion in the transplanted segments was primarily due to increased proliferation of the neuroblasts (true hyperplasia), and not to a compensatory increase in the volume of a specific number of cell bodies and their axones.

**Table 3.** Showing the number of cells counted in (A) ten consecutive transverse sections in the right half of the spinal cord anterior to the exit of the fourth and eighth nerves, and (B) in the fourth and the eighth right spinal ganglia.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Level of the 4th nerve (connected with limb)</th>
<th>Level of 8th nerve (not connected with limb)</th>
<th>Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Normal</td>
<td>1750</td>
<td>930</td>
<td>1.8</td>
</tr>
<tr>
<td>2. 7th, 8th, and 9th spinal segments substituted for the 3rd, 4th, and 5th</td>
<td>1350</td>
<td>824</td>
<td>1.5</td>
</tr>
<tr>
<td>3. Limb excised (spinal cord intact)</td>
<td>1580</td>
<td>890</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>B.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Normal</td>
<td>1430</td>
<td>685</td>
<td>2.0</td>
</tr>
<tr>
<td>2. As in A2</td>
<td>1860</td>
<td>945</td>
<td>1.9</td>
</tr>
<tr>
<td>3. As in A3</td>
<td>685</td>
<td>720</td>
<td>0.9</td>
</tr>
</tbody>
</table>
The China Medical Journal.

**Table 4.** Showing the relative weights and the weight ratios of sensory and motor contributions to the fourth and eighth segmental nerves.

<table>
<thead>
<tr>
<th></th>
<th>Sensory Root</th>
<th>Motor Root</th>
<th>Spinal Ganglion</th>
<th>Spinal Cord (140 sections)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Fourth Nerve* (connected with limb)</td>
<td>1.39</td>
<td>4.35</td>
<td>14.57</td>
<td>209.69</td>
</tr>
<tr>
<td>Eighth Nerve (not connected with limb)</td>
<td>0.39</td>
<td>1.16</td>
<td>5.17</td>
<td>121.59</td>
</tr>
<tr>
<td>Weight Ratios</td>
<td>3.5</td>
<td>3.7</td>
<td>2.8</td>
<td>1.7</td>
</tr>
</tbody>
</table>

* The fourth nerve was developed from a transplanted portion of the spinal cord which normally gives rise to the eighth nerve.

The increased development of the motor and sensory components of the fourth nerve (originally the eighth) is shown in figure 9 (cf. fig. 8) and in table 4. In the latter is given the weights and the weight ratios of unassembled blotting paper models of the component parts of both fourth and eighth nerves, the former of which is in connection with the limb. Both sensory and motor roots of the fourth nerve (transplanted eighth) have undergone striking enlargement under the conditions which normally produce the increased proliferation of their

![Diagram 8](image1)

![Diagram 9](image2)
Hyperplasia of Nerve Centers.

centers in the limb region. The nerve cells in the transplanted portion of the cord have undergone a degree of development, as indicated by a cell count, which almost equals that of the normal (table 3, A 1 and 2). The hyperplasia of the motor centers under these conditions is evidently not the result of the functional activity of the limb with which the nerve is connected; for, in the absence of the limb the production of cells at the limb level of the cord is almost as great as under normal conditions (table 3A, 1 and 3).

The possibility, that the ingrowth of the axones of a given number of peripheral afferent neurones might determine the extent to which the motor centers will develop, is negated by the facts obtained from previous limb experiments. These have shown that a certain degree of both hypoplastic and hyperplastic development of the sensory neurones in a given reflex pathway can be induced experimentally without effecting a corresponding measure of development on the motor side.

The evidence thus far obtained indicates, therefore, that the factor which is primarily involved in the increased production of the motor cells is the stimulus afforded by connection with the central longitudinal tracts (bulbo-spinal), normally involved in the appendicular reflexes. This assumption receives considerable support from the fact that the seventh, eighth, and ninth segments of the cord in their normal position fail to produce normal movements when innervating transplanted limbs, and they further fail to undergo hyperplastic development under the added stress of the functional requirements of a normally differentiated transplanted limb. However, when they are transplanted into the limb level of the spinal cord, their nerves not only perform functionally adaptive movements in an alien musculature (limb muscles), but the motor and sensory centers undergo a degree of differentiation which almost equals in extent that which characterizes the normal brachial enlargement.

SUMMARY.

1. When a peripheral sensory area is increased by transplanting a limb to an abnormal position, the sensory nerve centers of the segmental nerves which supply the transplanted limb, undergo a hyperplastic development in response to the increased functional needs at the periphery.

2. Extirpation of the limb in the embryo results in a corresponding hypoplastic development of the sensory centers normally supplying the limb (v. table 1).

3. Both hyperplastic and hypoplastic development of the sensory centers involved in a given reflex pathway can be experimentally induced without effecting a corresponding measure of development on the motor side.

4. There is no evidence, as yet, to show that the motor centers will undergo a hyperplastic development such as occurs in the sensory centers in response to experimentally increased functional demands at the periphery.
The results of the experiments dealing with motor hyperplasia indicate that the prime factor involved in the differentiation of motor centers is the stimulus afforded by their connection with the central longitudinal tracts.

Motor hyperplasia has been produced by excising the limb level of the spinal cord and transplanting into the excavated area a unit of spinal cord taken from a more caudal portion in the embryo. The neuroblasts in the grafted unit of the cord have undergone marked hyperplastic development under the influence of the stimuli normally producing the brachial enlargement (v. table 3).

**Explanation of Figures.**

Figure 1. Drawing of reconstruction model of the sixth and seventh spinal ganglia which have no connection with a limb. X 50.

Figure 2. Drawing of a reconstruction model of the hypertrophied sixth and seventh spinal ganglia supplying efferent innervation to a transplanted limb. X 50.

Figure 3. Drawing of a reconstruction model of the third and fourth spinal ganglia connected with the normal intact limb. X 50.

Figure 4. Drawing of a reconstruction model of the third and fourth spinal ganglia to illustrate their great reduction in size as a result of limb excision. X 50.

Figure 5. Camera lucida drawings of serial sections of the sensory roots of the right and left seventh spinal nerve. The right root was connected with the transplanted limb and is considerably larger than the left, which had no connection with a limb. X 40.

Figure 6. Camera lucida drawings of serial sections of the sensory roots of the right and left third spinal nerve. The right root is greatly reduced in size as a result of excision of the right limb with which it was normally connected. X 40.

Figure 7. Photograph of living specimen of Amblystoma with composite spinal cord (Case TrSc 13). The limb level of the spinal cord (third, fourth, and fifth segments) was excised and a more caudal unit of the cord (seventh, eighth, and ninth segments) from another embryo was transplanted into the excavated area. Photograph taken forty-six days after the operation. X 2½.

Figure 8. Reconstruction model of sensory root (sr), motor root (mr), spinal ganglion (sg) of the right eighth spinal nerve, and the corresponding level of the spinal cord. Nerve not connected with limb. X 100. Case TrSc 137.

Figure 9. Reconstruction model of nerve roots and ganglion of the right fourth spinal nerve, and the corresponding level of the spinal cord. Developed from the eighth segment which was transplanted from another embryo into the limb level of the host. X 100. Case TrSc 137.

**Literature Cited.**

Nitrous Oxid-oxygen.

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NITROUS OXID-OXYGEN.

E. I. MICKISSON, M.D.

HISTORY.

Nitrous oxid is a gas at ordinary pressures and temperatures derived by the distillation of ammonium nitrate. It was discovered by Priestly who also discovered oxygen, but for many years its anesthetic properties were unknown, and many more years elapsed before the mixtures of nitrous oxid and oxygen were employed in prolonged anesthesia.

Almost accidental was the discovery of anesthesia by Horace Wells of Hartford, Connecticut, in 1844. In those days the inhalation of such gases as nitrous oxid or ether had become a means of entertainment of small assemblages not unlike the hypnotist of the present day. The subjects were usually placed upon a platform or stage and amused their audiences by peculiar (drunken) speeches and actions after its inhalation. Colton, a chemist and lecturer, was demonstrating among other things of interest chemically, the action of nitrous oxid when one of the subjects fell and sustained a rather severe injury without exhibiting the usual signs of pain. The incident attracted the attention of Horace Wells—one of the spectators, who questioned the subject and satisfied himself that the accident was painless. He arranged
with Mr. Colton to come to his dental office in Hartford, Conn., the next morning and administer to Dr. Wells some nitrous oxid gas while he had another dentist extract a molar which had been causing Dr. Wells some trouble.

Accordingly the arrangements were carried out, Dr. Wells having inhaled the nitrous oxid from a large bag held in his lap and inhaled through a tube inserted into his mouth until unconsciousness supervened. The tooth was removed and when Dr. Wells regained consciousness he exclaimed—"A new era in tooth pulling."

Dr. Wells at once prepared for the employment of this method of relieving pain in his practice, announced his discovery to the medical profession, and soon developed so much business in this work that it became necessary to set apart certain days for extraction of teeth under nitrous oxid.

Shortly after, Mr. Morton—his apprentice and assistant with whom he had discussed the use of ether, but condemned as more dangerous, sickening, and less respirable—left Dr. Wells' office and announced the discovery of the anesthetic properties of ether in Boston at the Massachusetts General Hospital and tried to get a patent on the drug but failed. He also failed in his efforts to have Congress decorate him (Morton) as the discoverer of anesthesia.

In the meantime Wells had administered nitrous oxid for reduction of fractures and dislocations, amputations and minor operations besides the extraction of teeth.

Morton's attempt to get congressional recognition brought about a controversy with Wells which disheartened the latter, who was found dead with an inhaler tied to his face. Death having occurred by the inhalation of ether it is not known whether Wells committed suicide, or whether he had been experimenting with ether.

Morton's efforts with Congress were finally blocked by Dr. Long of Georgia, who proved that he had used ether in his medical practice before Morton had announced his discovery, or even before Wells had taken nitrous oxid for the tooth extraction. Dr. Long, however, had kept his discovery secret until this time, and it is generally conceded that to Wells belongs the honor of the discovery of anesthesia.

VALUE OF OXYGEN DISCOVERED.

Further studies by Mr. Colton in his new work in producing a great number of anesthesias with nitrous oxid for the extraction of teeth led him to formulate rules for its successful administration, one of which, that air must be carefully excluded from the patient...
and that expiratory and inspiratory values were necessary in the apparatus employed.

Not long before Andrews used oxygen, it was found that air might be used in conjunction with the nitrous oxid to prevent asphyxia in extreme degrees and to make possible a more prolonged period of anesthesia. But air failed to produce the desired unlimited period of anesthesia because it contained so much nitrogen (79%), that if enough oxygen were thus obtained, not enough nitrous oxid remained to produce deep anesthesia.

It is now generally known that rarely may anesthesia of satisfactory degree be maintained with less than 80% to 85% of nitrous oxid; and a fair degree of oxygenation of the blood cannot be obtained with less than 6 to 8%, while in some cases 15 to 30% is needed. Therefore, when Andrews of Chicago announced the use of mixtures of N₂O and O in varying amounts a great discovery was made for this form of anesthesia. The discovery at the time unfortunately did not make much impression upon the medical profession who needed this information most, and ten years passed before Paul Bert again called attention to the importance of oxygen with nitrous oxid by a series of experiments.

The control of the mixture of the two gases gradually became the recognized difficulty in its administration during the next 25 years. This difficulty was not overcome until it had become apparent that chloroform and ether were far more dangerous in their immediate or remote results than nitrous oxid, and an incentive for the solution of the technical difficulties of gas-oxygen administration developed.

In nitrous oxid-oxygen anesthesia, we have an anesthetic agent which possesses no protoplasmic poison. It does not destroy cells, but temporarily arrests their chemical changes—growth and repair, only while these cells are bathed in high concentrations of the gas. A germinating seed, for example, stops growth in an atmosphere of pure N₂O, but resumes development when oxygen is added, or when the nitrous oxid is replaced with air. The cells are not killed even after days of exposure to nitrous oxid. Apparently the fundamental action of nitrous oxid in producing anesthesia is the arrest of chemical change of metabolism, which, if diluted with sufficient oxygen to maintain life in the human subject (from 5-20%) anesthesia is maintained, while the more basic functions, such as respiration, circulation, (digestion imperfectly), urinary secretion, etc., go on without more than slight interference. For example, the functional test for kidney efficiency is readily performed under nitrous oxid-oxygen.
anesthesia without alteration' from the readings obtained for the same patient without anesthesia. In this, nitrous oxid-oxygen differs from all other general anesthetic agents so far used clinically or investigated in the laboratory. Ether or chloroform practically stops urinary secretion, during their administration as an anesthetic, and the production of albumin and casts commonly follows their use.

Anesthesia is usually produced by inhaling pure \( \text{N}_2\text{O} \) for from 40 to 70 seconds before oxygen is added. If the operation may be performed by the time the patient might regain consciousness, no oxygen is administered, but the inhaler removed when primary anesthesia is obtained. It usually takes about one minute to regain consciousness.

If, however, the operation requires more than one minute, oxygen is administered after unconsciousness has set in and continued throughout the operation in varying amounts for different individuals and usually also in the same case as well. The regulation of the oxygen in the mixture which is used first to maintain metabolism, and second to dilute the nitrous oxid or limit its effects, is the most important procedure in the administration of this anesthetic.

No set mixture (that is, predetermined percentages of the two gases) can be successfully used in cases requiring deep anesthesia and a large percentage of failures would result in obtaining light anesthesia.

Therefore, the guiding signs of the depth of anesthesia must be derived from the patient and these phenomena must be recognized and their significance understood in the management of all cases.

There are two classes of physical signs:—first, those depending upon the reaction of muscular tissue, and second, chemical phenomena in the blood indicating insufficient oxygen,—cyanosis.

The second, or the degree of cyanosis, is, in fact, not a sign of anesthesia at all since one patient may be pink while perfect anesthesia is maintained, while another may be conscious and cyanotic.

Cyanosis represents the relation of the oxygen combining power of the blood to the oxygen available in the anesthetic mixture. Cyanosis, therefore, is not an anesthetic phenomenon in nitrous oxid-oxygen narcosis, but depends upon an excess of hemoglobin over the available oxygen for the formation of oxyhemoglobin. The same cyanosis would occur if the same ratios of oxygen and nitrogen—an inert gas—were inhaled though no anesthesia might develop.

The color of the skin, finger nails, or blood is a sort of color index which becomes useful after the anesthesia has been produced, and the
anesthesia color limits have been determined through the observation of the muscular system.

We interpret the phenomena of anesthesia wholly through the muscular system—the reaction of the pupil to light, the respiration, the reflexes to pain and trauma, the blood pressure, the facial expression, and the general muscular tone of the patient.

Muscle loses its normal reflexes in what may be termed the middle plane or normal anesthesia while it retains to variable degrees the reflexes and muscle tone in light anesthesia.

In profound anesthesia under nitrous oxid-oxygen we have a spastic stiffening (tonic) of the striated muscles most conspicuously with often a relaxation of smooth muscle. This is not due so much to the over-dosage of $N_2O$ as to the coincident anoxemia (not asphyxia as commonly interpreted or supposed). If it were not for the coincident anoxemia the profound anesthesia plane would be characterized by marked relaxation of musculature. But generally the opposite is found—the respirations are slow, labored, with powerful expiratory contraction, inadequate inspiration, prolonged expirations, with often crowing phonation, not much unlike the phonation of pain reflex found in light anesthesia:—the legs, arms, abdominal and back muscles are rigid—opisthotonos in some cases; the eyeballs rolled up; lids open, and pupils fixed and dilated though rarely irregular.

With the above signs well developed the patient is usually very cyanotic except in patients with well marked anemia in whom the hemoglobin may be satisfied or saturated sufficiently to show no cyanosis when an insufficient quantity of oxygen is carried by the blood to prevent the anoxemic signs just enumerated.

Dilitation of the pupil and respiratory embarrassment are our best signs of nitrous oxid over-dosage, but in borderland moments the plane of anesthesia may often have to be diagnosed from other signs associated at the moment.

The lack of oxygen produces undesired phenomena but it is often necessary to temporarily carry the patient into the profound plane in order to more perfectly replace all nitrogen and oxygen in the tissues with nitrous oxid in order to obtain the desired degree of anesthesia; then adding enough oxygen after the nitrogen has been replaced to bring oxygenation back to its tolerable level. This procedure is never safe or justifiable unless there is an adequate supply of oxygen at hand and a suitable device for inflating the lungs as a part of the anesthetic apparatus.
THE EMERGENCY VALVE.

To overcome saturation of the tissues with N₂O, above described, in an effort to secure the requisite degree of muscular relaxation when the oxygen is again administered in sufficient quantity many advocates of nitrous oxid-oxygen anesthesia add sufficient ether vapor to the N₂O-O gases to accomplish a similar saturation. The objections to ether with gas-oxygen are roughly the same as for ether alone, except the after and immediate effects may, or may not, be considerably mitigated. On the other hand, the advantages of a pure gas-oxygen anesthesia are all but unlimited as regards the patient's organs, convalescence, and comfort after the operation.

There are no contra-indications to gas-oxygen anesthesia as to disease, age of patient, or kind of operation. But an incomplete apparatus may limit its use to certain operations, or an inexpert anesthetist may render this anesthetic as well as other anesthetics extremely dangerous, or if properly timid as a result of inexpertness this narcosis becomes flagrantly inefficient.

Certain differences between gas-oxygen and other anesthetics as to signs that are at once noticeable are to be remembered.

How does gas-oxygen produce anesthesia?

Probably the best working hypothesis is the metabolic or oxydation theory:—(1) that life processes depend upon oxidation, that the higher the function or the more specialized the cells, the more easily are they rendered inactive by the lack of oxygen; (2) that nitrous oxid has a tendency to drive oxygen out of the cell when in high concentration, and with only a moderate amount of oxygen surrounding the cell membrane, while the reverse is true when oxygen in larger concentrations than found in the blood normally bathes the cell. Since the highest cell development has to do with association of ideas—reason—memory, the special senses and consciousness when the faculties are intact—the patient sleeps when these cells are unable to carry on completely their metabolic changes.

Ether and chloroform accomplish similar sleep, but in a vastly different manner and with much greater and wide-spread tissue degeneration. The fire in a stove may be reduced to a spark by proper regulation of the draft, that is by controlling the admission of oxygen, or it may quite as effectively be restrained by a judicious watering of the wood to make the timber less suitable for oxidation or combustion. Obviously the latter method is treacherous and uncertain. Ether and chloroform belong to the latter method, physically changing
Nitrous Oxid-oxygen.

the fat bearing cells of the body (not alone the brain and nerve cells) dissolving and combining with it in a very tenacious combination, unfitting the liver, the kidney, the nervous system, etc., for the proper performance of their functions for days following its administration, and immediately endangering the life of the patient if slightly overdosed. This is why surgeons unaccustomed to see gas-oxygen anesthesia are so frightened when they see cyanosis. Their ether and chloroform experiences have taught them dearly, for when like the wood the patient has been "soaked" there is little chance of reestablishing oxidation or metabolism in the more unstable, yet most essential centers.

Pasteurization of Milk—Report of the Committee on Milk Supply, Sanitary Engineering Section, American Public Health Association.—Experience with the pasteurization of milk by the use of the time and temperature recommended by this commission has justified in every way the selection of the time and temperature which were recommended, and the commission wishes, therefore, to confirm the original report on this subject by stating that so far as the commission is aware, there is no reason why it should change the recommendation originally made regarding the proper time and temperature of pasteurization of milk. The recommendation originally made and published in the Public Health Reports, February 16, 1917, was as follows:

(a) That pasteurization of milk should be between the limits of 140° F. and 155° F. At 140° F. the minimum exposure should be 20 minutes. For every degree above 140° F. the time may be reduced by one minute. In no case should the exposure be for less than five minutes.

(b) In order to allow a margin of safety under commercial conditions, the commission recommends that the minimum temperature during the period of holding should be made 145° F., and the holding time 30 minutes.

A large amount of experimental work has been conducted on the undesirable effects of pasteurization on milk that is to be used for infant feeding. Some conflicting opinions have resulted from this work, but it is now generally recognized that any ill effects from the use of such milk for infant feeding can be easily remedied by the addition of certain common substances such as orange juice and potato water. The protection from communicable diseases that pasteurization affords older children and adults far overshadows any of the easily remedied ill effects associated with infant feeding.—U. S. P. H. S. Reports.
THE PROGRESS OF MEDICAL EDUCATION
IN HUNAN, CHINA.

A Report of the Hunan-Yale College of Medicine and Hospital, Changsha, Hunan.

GENERAL STATEMENT.

Historical.—For the sake of those who have recently come to China we shall review briefly the past history of this institution, which is unique in the type and degree of real co-operation between foreigners and Chinese in medical education according to Western standards in China.

Hunan-Yale originated in 1913 when an agreement was drawn up between the Hunan Ru-Chun Medical Educational Association and the Yale Mission. (The former association was composed of Hunan gentry having the support of the Provincial Government. The Yale Mission had begun work in 1904 in Changsha under the auspices of the Yale Foreign Missionary Society of New Haven, Connecticut, and was then conducting a College of Arts and Sciences and a Hospital.) Immediately after the agreement was drawn up the first class of pre-medical students was begun (and the nursing school was organized). In 1914 the present form of the agreement was made and ratified. Its purpose is as follows:

1. To maintain in Changsha a Hospital for treatment of disease, and one or more dispensaries for out-patients.
2. To maintain a Medical School whose curriculum shall be determined after careful study of the regulations of the Board of Education; and to request this Board of Education to depute inspectors to examine the standards adopted.
3. To maintain a School of Nursing for instruction in the art of Nursing; and in connection therewith to maintain a department of Obstetrics.
4. To maintain a laboratory for the investigation of the cause of disease.

Under this agreement both parties assumed practically equal obligations. The Chinese were to erect buildings for the Medical College and Nursing Schools and to supply the necessary money for running expenses, not to exceed $50,000 (Mex.) annually. The Yale Mission was to erect the Hospital and to provide the salaries and expenses for 15 teachers, physicians, and nurses who were graduates of Western universities. The senior members of the teaching and clinical staffs and the supervising nurses were to be selected by the American Board of Trustees of the Yale Mission. The general expenses not included under “salaries of foreign staff and expenses of Medical School and Nursing School,” were to be met by the Association. Both parties were given equal representation on the Board of Manage-
ment. This agreement was made for a period of ten years with expectation of permanency.

A spacious Chinese building in the city was given by the Government for the Medical School and the original hospital which had been opened in 1908 was moved to this place and began work as the Hunan-Yale Hospital. Here female patients were seen and the training of women nurses begun. Male patients were treated and men nurses received their training in the Red Cross Hospital, also in the city. The first class of medical students, 11 men, was begun in 1916.

To rapidly trace developments from this time, plans were next made for the permanent institution and property was bought in a choice location outside the city, near the Hankow-Canton Railway
(north station) across the street from the College of Yale-in-China property. The plot now comprises 14 acres, but future growth will necessitate further expansion. The money for the hospital was secured at once and work commenced. In 1918 it was completed and now stands upon the most prominent spot, facing the main axis of the college campus. It is a modern, permanent, fireproof structure, built to accommodate 120 beds, capable of expansion to double the capacity. As it now stands it is one of the finest hospitals in China (a worthy monument to its builders, and a good ideal around which to construct the medical plant). This transferred all the clinical work, both male and female, and the training of the nurses, both men and women, to the new Hunan-Yale Hospital.

The College of Medicine steadily developed in spite of many difficulties. The European war made it almost impossible to secure doctors and large amounts of money had to be used to equip the Pre-Medical School. Nevertheless the agreement was lived up to by both parties, with the exception that during the dominance of the Anfu party in Hunan, under the governorship of Chang Ching Yao, the payments were curtailed and irregular. It was an encouraging proof of the steadfast loyalty of the local gentry to the cause, that on several occasions, even at their own financial loss, they raised the funds necessary to maintain the service of the institution. Last year nearly the total, $41,080, was secured. Since the Government has changed to Southern hands, and since the officials are the ones who were previously interested in the founding of the institution, the support is expected to be more dependable.

The next step in advance was moving the Medical School to the new campus. It was made possible by the erection late in 1919, of the first unit of the permanent College group of buildings. This furnishes teaching facilities as well as temporarily housing the students and male nurses.

Soon after this, another move was made when early in 1920 the $50,000 Science building was completed on the campus of the College of Yale-in-China and the pre-medical students were transferred to the administration of this faculty. They also are being housed there, pending the erection of their own dormitory. This building, the gift of China Medical Board funds, is a great addition to this campus.

Two permanent residences, four bungalows, and residence quarters in the new Tuberculosis Hospital furnish living quarters for the medical faculty.
Medical Education in Hunan.

COLLEGE OF MEDICINE.

(Including Pre-medical School and School of Nursing.)

Buildings and Equipment.—It is the plan that all college buildings shall be convenient to, and connected with, the main hospital. They will all be co-ordinated so as to give the best teaching facilities for the students and nurses and all in turn to give the best service to the patients. The accompanying ground plans of the whole Yale-in-China campus show the present buildings and indicate some of those yet to be built. (The exact location of the Out-Patient Department building depends upon the purchase of certain pieces of land which is now pending.)

This year the equipment is being materially improved because of increased funds at our disposal.

Course of Study and Degree.—The course is designed for five years, making the last two largely clinical. The last term is entirely devoted to "Clinical Clerkships." By this plan the students have practically the responsibilities and opportunities for experience that interns have.

All the teaching is done in English and the courses are planned and conducted according to Western standards. The degree of M. D. is conferred upon conclusion of the fifth year, under the charter of the state of Connecticut. Our first class of 11 men graduates this spring.

Staff.—A list of the teachers and the subjects they teach follows:

J. R. B. Branch, M.D., Gynecology, Obstetrics and Surgery.
H. P. Chu, M.D., Pathology, Bacteriology and Physiological Chemistry.
A. S. Crawford, M.D., (Acting Dean), Surgery, Roentgenology, Otolgy, Rhinology, Laryngology, and Neuro Anatomy.

J. H. Foster, M.D., Medicine, Pharmacology.
Helen Gage, M.D., Pediatrics.
Geo. Hadden, M.D., Physiology, Medical Jurisprudence.
Geo. K. How, Ph.G., Pharmacy, Materia Medica.
E. H. Hume, M.D., (Dean), Medicine, (home on furlough).
T. C. Lieu, M.D., Anatomy, Embryology.
T. L. Li, M.D., Urology, Dermatology, Minor Surgery.
Ed. Y. Kau, M.D., Orthopedic Surgery, Histology, Surgical Anatomy.
G. S. Shibley, M.D., Medicine, Nervous and Mental Diseases, Therapeutics.
F. C. Yen, M.D., (Principal) Ophthalmology, Hygiene and Preventative Medicine.

H. J. Dunham, Business Manager.
H. C. Tsao, Executive Secretary.

Student Enrollment.—Exclusive of pre-medical students there are at present 42 students. They came to us from eight provinces and from 37 different schools. Of these latter, 16 are Christian (Mission) and 21 non-Christian schools. Of the Mission schools are such institu-
tions as Boone University, Nanking University, Tsinan University, etc., and other colleges and well known middle schools. This has given us students of exceptionally fine character and ability; 75% of them are Christians, which is most gratifying.

Their distribution according to provinces may be of interest:

<table>
<thead>
<tr>
<th>Province</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunan</td>
<td>13</td>
</tr>
<tr>
<td>Hupeh</td>
<td>7</td>
</tr>
<tr>
<td>Kwangtung</td>
<td>5</td>
</tr>
<tr>
<td>Kiangsi</td>
<td>3</td>
</tr>
<tr>
<td>Chekiang</td>
<td>4</td>
</tr>
<tr>
<td>Anhwei</td>
<td>2</td>
</tr>
<tr>
<td>Fukien</td>
<td>1</td>
</tr>
<tr>
<td>Kiangsu</td>
<td>7</td>
</tr>
</tbody>
</table>

Students Activities.—During the past few years the students have managed very efficiently all the extra curricular activities through two student organizations—viz., the Students' Union and the Y. M. C. A. This year the latter is fulfilling the function of both and manages the religious, social, and other activities among the students.

Among its religious activities are Bible Classes, Weekly Prayer Meetings, Sunday Morning Service at which outside pastors and the teachers are asked to speak, and Evangelistic Work in the Hospital wards.

For Social Service they are delivering weekly hygiene lectures among the city schools, aided by the city Y. M. C. A. They also plan a sanitary survey of the city, under the guidance of Dr. Yen and in co-operation with the Changsha Civic Improvement League. This when properly financed and managed has great future possibilities for the city as well as offering valuable experience to our students.

Its special activities are—a Glee Club, a Medical-Social Club to promote better fellowship and stimulate original reading and thinking, and a Business Committee to raise the needed funds for the various departments. A Sanitary Committee inspects school premises and servants' quarters.

Their physical welfare is cared for by participation in tennis and interclass contests in other sports.

Pre-medical School.—We have already mentioned that this school has been transferred to the College of Yale-in-China. They have a total enrollment of 29 students. Their teachers are,—R. W. Powell, M.A., Physics; J. W. Williams, M.A., Biology; and Z. Z. Zee, M.A., Chemistry. The standards are equal to the leading schools in China.

The Nursing Schools.—The course is four years. At least one year in a middle school or its equivalent is required for admission. The plan in the near future is to change the admission requirement to
graduation from a middle school or its equivalent. This will not be difficult, for there are plenty of applicants for admission.

The aim is to give them an all-around training, not only the best possible clinically, but as well to provide adequate facilities for physical exercise and religious training. Both men and women have their own Y. M. C. A., Y. W. C. A., Bible classes, etc. There are now 15 women and 21 men students in training and 12 probationers. Twenty have graduated. Of these, 16 now have good professional positions, two are in special nursing, one is studying medicine, and one has married.

The Teaching Staff is:

N. D. Gage, A.B., R.N. ... ... Principal and Dean of Nursing School, Superintendent of Nurses in Hospital.
M. D. Warfield, R.N. ... ... Assistant Dean, Instructor in Practical Nursing.
J. M. White, R.N. ... ... Instructor, Operating Room Supervisor.
Edith C. Huang, Ph.B., B. Ped., Dietetian and Anesthetist.
S. C. Sung, N.A.C. ... ... Proctor and Assistant Instructor.

There are in addition seven graduates who are acting as supervisors and head nurses in the wards, operating room, and clinics. Dr. Crawford and Dr. Li assist by teaching surgery and urology.

THE HOSPITAL.

General Statement.—This building has been a much used one. It has given refuge to multitudes in times of trouble, and has during the past two years not only accommodated patients to capacity, but has as well housed the women nurses, the pharmacy staff, and held the Out-patient Clinics and classrooms for training of nurses.

During the 2½ years we have been working in this building, we have learned many lessons in the management of a large modern hospital. Although it is a thing entirely new and foreign to the locality, large numbers have come to us and have shown confidence in our work, as can be seen by the statistics for the past two years.

Hospital Staff.—In the absence of Dr. Hume, who is home on furlough, the administration of the hospital is being carried on by Drs. Yen and Branch, Mr. Dunham is the Business Manager and Geo. K. How Pharmacist. The clinical staff is.—J. R. B. Branch, Gynecology, Obstetrics, and Surgery; H. P. Chu, Pathologist; A. S. Crawford, Surgery and Ear, Nose and Throat and X-Ray; J. H. Foster, Medicine; Geo. Hadden, the O. P. D. Clinics; Ed. Y. Kau, Orthopedics; T. L. Li, Urology; G. S. Shibley, Medicine, Pediatrics, Neurology; F. C. Yen, Ophthalmology and Surgery. S. C. So and
Y. L. Chow are resident internes on the women's side and T. L. Li, J. Hsuan, and T. C. Lieu are the same on the men's side. The senior students are doing most of the routine clerical work of internes. The total hospital staff is,—13 doctors and internes, 61 nurses, 17 non-medical workers, and 51 servants.

**HOSPITAL STATISTICS.**

Summary of and comparison with previous year.

<table>
<thead>
<tr>
<th></th>
<th>Year Ending May 1920</th>
<th>Year Ending May 1919</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In-patient Statistics:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Total in-patients</em></td>
<td>1,438</td>
<td>1,211</td>
</tr>
<tr>
<td>Total hospital days</td>
<td>21,324</td>
<td>25,155</td>
</tr>
<tr>
<td>Ave. no. days per person</td>
<td>14.8</td>
<td>20.7</td>
</tr>
<tr>
<td><strong>Out-patient Statistics:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total out-patients</td>
<td>28,111</td>
<td>11,937</td>
</tr>
<tr>
<td>Total office calls</td>
<td>921</td>
<td>457</td>
</tr>
<tr>
<td>Total out-calls</td>
<td>725</td>
<td>667</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29,757</td>
<td>13,061</td>
</tr>
<tr>
<td><strong>Operations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Total operations</em></td>
<td>212</td>
<td>261</td>
</tr>
<tr>
<td><strong>Fees:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital fees</td>
<td>$25,533.62</td>
<td>$20,040.85</td>
</tr>
<tr>
<td><strong>Expenses:</strong></td>
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<td></td>
</tr>
<tr>
<td>Total expenditures</td>
<td>$37,083.62</td>
<td>$40,079.86</td>
</tr>
<tr>
<td><strong>Grant:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant from Chinese</td>
<td>$41,080.00</td>
<td>$19,782.30</td>
</tr>
</tbody>
</table>

*Of the In-patients: 3% were foreigners, 18% Chinese private, and 79% public ward cases.

Subdivision according to services was as follows:
- Medical, 53.7%; Surgical, 32.3%; Eye, 7.4%; G. U., 5.1%.
- Obstetrical, 1.6%.
- Number of Deaths, 100; Death rate, 14%.

†Operations grouped as follows:
- General anesthesia, 168; local anesthesia, 40; no anesthesia, 4. Total 212.

*Religious Work in the Hospital.*—Religious work is carried on in the wards by four men from the Union Theological Seminary of Changsha and by Yale-in-China and Hunan-Yale students on alternate Sunday afternoons.

Besides this an evangelist distributes tracts and talks to the clinic patients while they are waiting.
Every Sunday afternoon services are held in the hospital chapel for patients and staff. Every evening services are held for the servants.

Social Service in the Hospital.—Some of the wives of the Mission as well as wives of some influential Changsha gentry are rendering valuable Social Service. Visits to the wards, gifts of flowers, toys, money, and even such things as artificial limbs are of material aid. Some work has been done in investigating home conditions of the poor. A number of free beds have been provided and a sum of $500.00 has been set aside for charity. It is called "The Good Samaritan Fund." These are, of course, but the beginning of much greater developments along the lines of Social Service.

SUMMARY STATEMENT OF HUNAN-YALE.

Financial.—The total value of property and buildings at present is approximately $500,000.

Some recent grants have been made in the U. S. A. to our work, viz., The Commonwealth Fund has provided $30,000 (gold) per year for five years for new extension work. In addition $25,000 (Mex.) is promised for an out-patient building on condition that an equal amount is raised by the Chinese here. (To meet this, the Hunan Government has given us deeds of title to property whose value when sold will be more than the needed sum.) A grant by the China Medical Board of $48,000 Mex. and $6,000 gold per year is available for five years, an equal amount to be appropriated by the Yale Foreign Missionary Society.

Besides the above, some $12,000 in cash from the Chinese for additional buildings, G. $5,000 for equipment in the Hospital, and G. $40,000 for purchase of additional land. We gratefully acknowledge the receipt of supplies from the American Red Cross valued at $5,000 (Mex.).

The total expenses last year of Hunan-Yale, including all departments were, $56,957.56 (Mex.); of this sum $28,968.21 was from fees, tuition, etc., and $27,989.35 from appropriation by the Hunan Ru-Chun Medical Educational Association. Total grants last year by Chinese for Hunan-Yale work $41,080.00 (Mex.).

Co-operation.—Already a beginning has been made in co-operation with other Missions in Hunan. The Wesleyan Mission has loaned us Dr. Hadden. We hope this is but the beginning of more real co-operation, not only with other Missions in this and neighboring provinces but with other universities in the U. S. A. (Several now have an active
interest in our work and a way may be found to enlarge to an intercollegiate basis.)

Conclusion.—In conclusion, we feel very grateful for the definite progress we have made. The Hospital is fulfilling its function and is already a center of influence in the community. The Medical College is now ready to launch on a new period of its existence. The Chinese are back of it and can be counted upon to do their share, and the home board is definitely committed to its medical work. The nursing schools are well established.

Our needs for completion of equipment and teaching staff should soon be met in order that we may more efficiently carry on our work of practice and teaching. The field is a great one and worthy of our united efforts.

ANTI-TYPHUS MEASURES.

CONDITIONS IN THE TEHCHOW AREA.

This survey applies exclusively to the work under the auspices of the American Red Cross.

Apart from this organization we found no evidence of other organizations or plans for work in this area. This area is roughly a triangle bounded by Tehchow, Tsinan, and Liutsingchow. At present ten thousand men from the superlatively poor class are employed within this area on road construction. Plans are in hand to have at an early date as many as twenty thousand men employed. Relief is administered to these men in return for their labor. No money is paid them. In addition to their own rations each man is allowed to carry home once weekly sufficient grain to feed four in his immediate family. At present the approximate number being fed is forty thousand. And when the plan is complete eighty thousand refugees of the superlatively poor will be fed daily. Beyond this number the American Red Cross authorities feel they cannot go owing to the limitations of funds available. The anti-typhus measures recommended by the Commission apply only to this number of ten to twenty thousand laborers. Fortunately for any anti-typhus plan the entire number is made up by a series of small groups numbering from 100-300 separated by varying distances of from 3-8 li.

Approximately twenty foreign workers are available to supervise the scheme. Five of these are doctors and three are nurses (foreign
Anti-Typhus Measures.

There is a well furnished base hospital at Tehchow under foreign mission auspices, and also an additional base hospital at Lintsingchow under foreign auspices. Scattered along the line between these two hospitals there is a series of dispensaries manned by Chinese doctors. The original plans of the Red Cross did not include providing garments for these refugees. As a rule, wadded garments are worn next to the skin, undergarments being the exception. The shortage of undergarments is important in planning for an anti-typhus campaign because lice inhabit preferably the garments next to the skin and undergarments can be more easily changed and deloused than wadded garments. The Commission recommended that undergarments be provided so far as possible to those in the camps.

Dr. Strothers, the Medical Director, in charge of the sanitation of these camps had planned before our arrival to construct bath-houses at different points along the line as part of an attempt to delouse the laborers as a prophylactic measure against typhus.

The problem of typhus in the Red Cross area is simplified by the fact that the housing is in camps of from 100-300 men adequately separated from each other. We recommend this small unit camp system wherever it is possible to apply same in dealing with refugees in large numbers.

There have been only a few cases of undoubted typhus reported from this area in recent years, so far as reports can be relied on. Should typhus appear in this area, the conditions and plan already outlined appear to us to be of such a nature as to make for a workable control of the disease. Mr. J. F. Baker, the General Director, is ready to apply any measures which seem necessary to prevent typhus. To start with, the kerosene treatment is being applied to one camp as an experiment. Those in charge have manifested a willingness to cooperate with Peking as to methods and a uniform system of records which may be adopted. The person to write to regarding future developments is Dr. Strothers, at Tehchow.

CONDITIONS IN THE TIENSTIN AREA.

The area served by the local society is that through which the Tientsin-Pukow Railway runs from Tientsin to the borders of Shantung. Information derived from this area has been received from
missionary and business sources. No detailed investigation has been made by the Committee agents. Questionnaires have been submitted and upon this information all relief is based. In any information submitted from these various counties no reference has been made to the existence of typhus in particular or general cases of sickness.

Plans for the institution of prophylactic delousing measures have not been made so far as we can learn in this entire area, or in local camps such as are found in Tientsin. This absence of preparation arises largely from the feeling that typhus will not break out until the camp of 40,000 refugees is broken up about April first and that so far as the country districts are concerned such measures are both impracticable and unnecessary.

There is a difference of opinion between the Commission and some of the local medical faculty of Tientsin as to the probable outbreak of typhus in the refugee camp. Judging from a personal inspection of this camp the conditions are favorable for an outbreak at a much earlier date, probably about the end of February. The close proximity of such a large camp as this to Tientsin constitutes a menace not only to the refugees themselves but also to the city and perhaps the outlying districts as well. There has not been nor is there in sight any adequate medical inspection or supervision in this camp, and should typhus occur and the camp be broken up before the presence of this disease is established, it is obvious that the scattering of the refugees back into the country will make for a widespread epidemic.

The problem of the sanitary control of this camp is greatly increased by the fact that there are several relief organizations working in close proximity but without co-operation. This absence of co-operation does not affect the administration of food relief nor the usefulness of these several relief organizations, but when the problem of camp sanitation and delousing measures is considered the absence of unified control presents an insuperable difficulty. The Commission desires to point out that this problem can be met only by the appointment of a Sanitary Committee with full power of control covering the several sections of the camp.

The immediate phases of the problem the Commission has in mind are: (1) the employment of a sufficient number of able-bodied but now idle refugees to carry out the following sanitary and prophylactic measures;

A. Reconstruction and supervision of latrines which are now totally inadequate.

B. Erection and operation of bath-houses which may conveniently be placed alongside existing hot water stations. These may be of the simplest mat structure fitted with perforated tins or other facilities to provide a simple bath.
Anti-Typhus Measures.

C. The preparation of beating grounds and the erection of cheap mat dressing huts which may be used as part of the delousing plant, particularly if these can be located near the hot water and bathing sheds.

D. To alleviate the present dangerously overcrowded conditions by the thinning out of huts and moving or rebuilding on adjacent barren areas and by the erection of double-size huts for families of eight and over.

E. The present idleness of large numbers of able-bodied men and women constitutes a definite health menace by their lying around in the huts in close contact without adequate exposure of bedding and clothing to the outer air. There are large numbers of extensive pits which might be filled in, roads to be built, water to be carried, matting to be made, huts to be erected, in addition to the small army which will be required to carry out the various sanitary procedures suggested. If present conditions are allowed to continue, when the camp breaks up in the spring, the refugees will be soft and flabby and in no condition to resume the hard task of gaining a livelihood.

Without disturbing the existing food relief administration, the Camp Sanitary Committee should have the sympathetic co-operation of the local police as well as the power of withholding food and shelter from individuals who obstruct the carrying out of proper sanitary regulations. As a preparation for the institution of these measures in the camp, the Commission recommends an educational campaign among the refugees, conducted by students and other volunteers.

This camp of 40,000 refugees in its condition constitutes now the largest, single hot-bed for typhus in North China. Smallpox, which sometimes precedes typhus, is now present in Tientsin in epidemic form and reports appear to indicate that it is increasing. The unsanitary condition under which the present smallpox hospital is administered constitutes in itself, in addition to the smallpox, an active typhus menace.

The Tientsin committee members present in the meeting with the Commission expressed a willingness to co-operate in the execution of a uniform plan of anti-typhus work.

CONDITIONS IN THE PAOTINGFU AREA.

In this area we found more than one hundred schools operated or in process of organization by the famine relief forces. These are scattered quite evenly throughout their field, and are manned by one needy teacher for each school who assists the central committee in securing information through the children and their families, in daily teaching in the school and in the grain relief administration. It is the intention of the committee to use these schools as health centers for educational work and anti-epidemic measures in case of necessity. The only suggestion your commission had to add to this excellent scheme was the further use of these school centers as a means of
utilizing the unemployed refugee labor in some forms of constructive labor such as digging new wells which are needed in certain localities as well as road improvement. By the adoption of this plan of schools, the Paotingfu committee feels that it has a certain degree of disciplinary control for the promotion of labor and anti-epidemic measures through food control.

The local medical staff consisting of Drs. Lewis, Wiley Mackey, reinforced by Dr. Young from the Mukden area as well as a Chinese medical and foreign and Chinese nursing staff seems quite adequate to cope with any ordinary epidemic of typhus.

Typhus is endemic in this area. The history during the last 18 years does not include a single epidemic. A few sporadic cases are observed each year and occur about April. There have never been more than two cases seen at any one time in the hospital. It is assumed that there are many cases which do not come to the hospital.

In answer to the question as to the probability of an epidemic in this area, the answer was: "Our largest refugee camp numbers 113 people. If the severity of the famine brings about a great deal of herding it is difficult to prognosticate what will happen."

The local committee proposes to erect a delousing plant (Ingram) at Paotingfu and Wenhsien. This is apart from any plans for an epidemic impending. If typhus appears, the plan is to take the nearby cases into the hospital.

Smallpox is present in the city, and the hospital staff is considering an isolation wing. The disease is "worse than usual this year."

We found the doctors in favor of the Ingram process and inclined to concentrate their efforts on the use of the same. There was every indication toward continuing the friendly co-operation with the Peking Sanitation Committee.

CONDITIONS IN THE TSINANFU AREA.

This district lies on the southern outskirts of the famine area and is practically untouched by famine conditions. In so far as inquiries concerning typhus are concerned, the results are nil. This fact is reflected in the attitude of the members of the famine relief committee conferred with, and the medical faculty who appeared not to have considered a typhus epidemic as a remote probability, so far as Tsinanfu area is concerned. But they manifested an interest in the problem and a willingness to co-operate by providing supplies and personnel in the event of a need for such help arising. They also expressed themselves as willing to co-operate with Peking in carrying out any
uniform plan decided upon. Should the magnitude of the work of combating typhus require it, there is every likelihood that they would be willing to close the medical school in order to release both faculty and students for anti-typhus work.

CONDITIONS IN THE SHIHCHIACHUANG AREA.

This country town with about 35,000 people, at the junction of two railroads, has one foreign doctor (French) who gives all his time to the railroad and the small foreign community. Should typhus break out in this vicinity it is obvious that medical help will be needed either from Paotingfu or a detail from Peking.

At the committee meeting, to which we were invited, there were present seven Chinese, two Danes, one British, one American, and three French priests. The Chinese advocated as a delousing measure the widespread use of mercury saturated string tied around the body and an alternate method of holding a similar string in the mouth.

The commission explained in detail the use of the kerosene and Ingram methods of delousing.

The school system in operation in Paotingfu was also found here. Fifty-seven schools are already open.

Owing to the absence of trained observers there were no facts secured of an epidemiological nature regarding typhus.

We met Mr. Green who had Rev. Galt wire to Peking for doctors to investigate a mysterious disease which resembled dropsy. We planned to visit this point (Ching Hsing Hsien), 60 li from the Chen-T'ai Railway. But Mr. Green had further reports through his evangelist indicating that there have been no more deaths. Eight people died in one day, this being the highest number for any one day. The people locally consider the cause to have been some form of poison. We therefore decided, in view of Mr. Green's suggestion that it would not be necessary to visit the place, to proceed to Shuntehfu.

We visited two refugee centers in Shihchiachuang. One under the direction of Mr. Rasmussen with seventy-five women and children fed by the Peking committee. The place was practically devoid of bedding. The inmates slept on a thin layer of straw spread on the ground in a mud building.

At the time of the flood this town was infested with a large number of beggars many of whom remained. Under the stress of present famine conditions there has been a new influx of beggars. Beggars are more numerous here than in any point previously visited. We visited a compound containing a collection of 270 of the very
lowest of professional beggars. Nothing of this sort has ever been observed in the experience of the oldest missionary in the town. Food, provided by the gentry of the city (2/3) and a Buddhist society of Peking (1/3), was being distributed by Buddhist monks. The food was obviously insufficient, as observed from the faces of the inmates. There was no bedding. They were more than overcrowded. Their clothing was of the worst and of all kinds and descriptions. They were heavily infested with lice. We saw several dying, and a number of others very ill. The deaths run from 2-8 a day. Mixed up with these beggars were some women and girls and men not of the beggar class. Several fresh, clean country boys were also noted. These have been driven into this refuge by extreme want.

The members of the local committee expressed their desire for educational material in Chinese on the subject of typhus fever. The committee felt their need for medical leadership and raised the question of how this need could be met. The chairman asked whether we would stay. They inquired whether Peking could supply them with one of their medical squads.

A YEAR'S WORK IN AN EYE CLINIC.


The chief disease in the eye clinic consisted in treating trachoma and its complications. Out of a total of 2,287 patients 1,023 had trachoma. Out of these 1,023 patients 755 had complications.

These complications given in order of frequency were:—corneal ulcer (186); pannus (183); corneal scars (109); corneal infiltrations (154); entropion (92); trichiasis and distichiasis (25); atrophy of conjunctiva (3); hypertrophy of caruncle (2); massive hypertrophy of conjunctiva (1).

Not included in the figure "1,023" are the cases of symblepharon (22) and the cases of ectropion (70), yet I believe many of the former are due to trachoma whilst the latter are due to trachoma except a few cases, which were due to scar tissue following on injury. However, more careful observation on these two complications will be made this year. Of the 332 ulcers treated in this hospital 186 were due to trachoma. In Manchuria, as in India, as mentioned by Herbert, the advancing margin of a pannus may be interrupted by a number of small sharply defined semicircular indentations. The blood vessels, in their
advancing course, pass down between them. These pitted areas may sometimes be quite deep.

The loss in a country's efficiency is seen to be great when we note that in 1,023 patients there were 724 who had conditions (entropion, corneal infiltration, ulcers, scars, pannus, entropion) that led to the cornea being permanently damaged due to nebulae or leucoma. The disease could not, I believe, be controlled in this province, unless travelling trachoma hospitals were established. The treatment generally adopted in this hospital is the application of silver nitrate 2% to the eyelids, until the accompanying conjunctivitis and corneal ulcers are healed. In addition we have begun to douche such eyes with perchloride of mercury (1:3000) for a period of one minute or more as Herbert, according to Elliot, advocates this douching, followed by atropine for trachomatous pannus and ulceration. We seldom see the necessity for atropine. Trachomatous ulcers are not allowed to be fomented or bandaged. Instead of fomentations we use Japanese snuff warmers, which the patient applies three times a day himself. Trachomatous patients are treated three times a day, if, they are in-patients and twice if they are out-patients. The morning and afternoon treatment is as mentioned above, whilst the evening treatment consists in applying an ointment (hyd. perchlor., 0.10; sod. chlor., 2.70; paraffin molleed, 300.00) sometimes preceded by a douche of lotio hydrarg. perchlor. (1:5000).

The conjunctivitis and corneal ulcers having thus been healed the pannus and corneal infiltrations are treated by copper sulphate stick applied to the eyelids in the morning and alum stick similarly applied in the afternoon and evening. Recently we have preceded this treatment by a douche of hydrarg. perchlor. (1:3000) for one minute. This treatment is interrupted periodically by a course of tinc. sulphate 1% or 2%.

Dionine in our hands has not been successful in treating corneal infiltration.

As regards pannus, we agree with MacCallan that the division of the blood vessels by the cautery is based on a wrong principle and so we rely wholly on the above treatment.

Sometimes Heisrath's operation is performed immediately after the corneal ulcers and conjunctivitis have disappeared and the pannus, etc., treated later. This, in fact, is the method we now favour.

Heisrath's operation, which we have now performed forty-seven times, consists in excision of the tarsus and overlying conjunctiva, followed by undermining the fornix conjunctiva and suturing it to the margin of the lid, tying the sutures on the surface of the skin.
The technic of inserting the sutures in healthy conjunctiva before any incision is made, facilitates the completion of the operation. In Manchuria the operation is most efficacious, because the follicles and scar tissue is practically always confined to the tarsus and the conjunctiva immediately approximating the tarsus. In only one case was it necessary to excise the fornix on account of the follicles being confined to that situation. If there are only two or three follicles then we use Grady's forceps, to express them, following this by vigorous massage with hydrarg. perchlor. (1 in 500). The best anaesthetic for this and also for Heisrath's operation is cocaine \( \frac{1}{2} \% \) with a few drops of adrenaline, injected into the fornix. In future, for expression, we intend to use somnoform. Somnoform is an ideal anaesthetic in hospitals that cannot procure \( N_2O \) gas. It seems to take the place of \( N_2O \) gas completely.

In mild cases, i.e., stage 1 in MacCallam's classification, the eyelid is massaged with pure boric acid and lotio hydrarg. perchlor. (1 in 500). However, our mild cases are few.

For entropion and trichiasis we use Hotz-Anagnostaki's method, as described by Meller. This operation depends on paring the tarsus with a scalpel and then fastening the lower margin of the skin wound to the upper border of the thinned tarsus. If the suturing is properly done, the results are perfect. However, since gaining experience of Heisrath's operation, we simply employ that operation for entropion, if the tarsus is very thick.

For corneal scars with or without anterior synechiae we do an iridectomy.

Hypertrophies of the conjunctiva we have excised.

Ectropion we have treated by a combination of Kuhnt and Szymanowski's operation as described by Meller, i.e., splitting the lower lid in the intermarginal border in its outer half, then excision of a triangular section from the tarsus, then removing a triangular piece of skin from the region of external canthus, then undermining the skin of the eyelid and finally suturing the open wounds.

The treatment of symblepharon was a failure in my hands until I adopted Hay's operation as used for a contracted socket. My first cases were treated by division of the bands. This was useless, as they merely reformed. I then used grafts of mucous membrane from the lower lip. These grafts did not live. Finally I have adopted Hay's operation. The technic of this is as follows:—a pedicled flap of skin is taken from the area between the eyelid and eyebrow or from the lower eyelid and cheek. This is passed through a temporary opening
Serobacterins (Sensitized Bacterial Vaccines).

in the eyelid, upper or lower, as the case may be. It is then fixed to
the denuded areas by suturing to the remaining conjunctiva and
denuded area on the eyelid. Healing is allowed to take place for one
week before the base is divided and the opening in the lid closed.

As regards note taking we commenced by using a chart with every
possible symptom, sign, and complication printed on it and we had
merely to underline what was present. This was suggested by Mayo's
new gastro-intestinal chart. Later, however, we adopted MacCallam's
classification, which meets all our needs and allows us to use our
ordinary ophthalmological note sheets.

(To be continued.)

REFERENCES.

Elliot: Tropical Ophthalmology.
Meller: Ophthalmic Surgery.
MacCallam: Trachoma and Its Complications in Egypt.

SEROBACTERINS (SENSITIZED BACTERIAL VACCINES).


In 1902 Besredka discovered that by treating killed bacteria with
the serum of an animal immunized to the same bacteria, the reaction,
termed by Wright the "negative phase" could be avoided. Besredka
termed bacterial vaccines modified in this manner "Sensitized
vaccines." The Mulford Laboratories adopted for them the trade
name of "Serobacterins."

HOW SEROBACTERINS ARE PREPARED.

The first step in the preparation of Serobacterins is to obtain a
specific immune serum by injecting animals with selected strain of
killed bacteria. Cattle* are injected at stated intervals until the blood
contains a certain standardized amount of specific antibodies.

The animals are then bled; the serum containing the specific
antibodies is separated from the clot and kept for several weeks until
the complement disappears. The serum thus obtained is similar to

* Goats and sheep have been used for this purpose but cattle are now used on
account of the larger volume of serums obtained. Persons treated with bacteria
sensitized to horse serum might become hypersensitive. Subsequent doses of
horse serum in the form of antitoxic serums might produce severe reactions. Such
cases are rare but we prefer to be on the safe side and use only serum from cattle,
sheep, or goats.
those obtained from horses and used for curative purposes, i.e., it is a serum containing specific antibodies.

The specific antibodies have the peculiar property of forming a more or less firm union with some constituent (probably a protein of the particular species of bacteria which have been used for injection of the serum producing animal). In the presence of complement, this union will be followed by clumping (agglutination) or by actual dissolution and destruction of the bacteria. If no complement be present as is the case in the serum employed for sensitization, the reaction does not proceed beyond the union of the antibodies and the bacterial protein.

The bacteria suspended in salt solution are carefully heated for a time sufficient to kill them.

The next step in the preparation of a serobacterin is to bring about this union between the antibodies of the serum and the killed bacteria or bacterin to be sensitized. After removing the salt solution the killed bacteria are mixed with the specific immune serum. The mixture is kept for two hours at body temperature and over night at room temperature, being shaken at intervals to prevent the organisms from settling out. The union between the bacteria and the antibodies is now complete and the sensitized bacterin is removed by centrifuging*. To remove all trace of the serum, salt solution is added and the centrifuging repeated. This is called "washing." We now have a mass of bacteria combined with antibodies, i.e., a bacterin free from serum yet containing antibodies, which they have extracted from the serum.

Each step in the process is controlled, so that the bacteria to be sensitized will not exceed the number which can properly be sensitized by the amount of the specific sensitizing serum used.

* The centrifuge is an apparatus in which tubes containing substances to be separated are whirled around with great speed, the heavier substances settling to the bottom of the tube. The bacteria, being heavier than the serum, are thrown to the bottom and the serum is then drawn off.

The term "sensitized" was devised by Besredka from the French word used to describe the type of antibody, which takes part in the reaction, namely, the sensitizing substance ("Substance Sensabilatrice"). The various immune reactions between bacteria and serum all require the presence of two substances in the latter. First a specific body, that is a body which is different for each species of bacterium and which unites with the organism and prepares it for the action of the second substance. This first body was termed by Ehrlich "amboceptor" and this name has found wide use in this country and England. By the French, it is called the "sensitizing body," as it renders the bacteria "sensitive" or susceptible to the action of the second substance. The second substance completes the reaction and was termed "Complement" by Ehrlich. By the French, it is called "Alexine."
Serobacterins (Sensitized Bacterial Vaccines).

Serobacterins are made up into suspensions (that is, the sensitized bacteria are mixed with salt solution in the regular way just as are ordinary bacterins) and are standardized by estimating the number of bacteria per mil. They are then placed in syringes or vials ready for administration.

When bacteria thus combined with the specific antibody are injected into man they are therefore immediately attacked by the complement present in his blood and the bacteria are at once dissolved.

WHO ORIGINATED SEROBACTERINS.

Credit for originating sensitized bacterial vaccines (serobacterins) belongs to A. Besredka, Professor of Bacteriology in the Pasteur Institute, Paris. His work has been verified by many prominent investigators of whom we shall mention a few.

Dr. Elie Metchnikoff (Assistant Director of the Pasteur Institute) together with Besredka, conducted experiments on chimpanzees with sensitized typhoid vaccine (living) and demonstrated that the animals thus treated could be fed large quantities of virulent typhoid bacilli without harm. (Metchnikoff is famous for the discovery of phagocytosis, and its bearing on immunity, his work on intestinal putrefaction, and the use of Bulgarian Bacillus in its treatment, etc.)

Dr. Theobald Smith (formerly Professor of Comparative Pathology, Harvard Medical College, and Director of Antitoxin and Vaccine Laboratory, State Board of Health of Massachusetts, at present Head of the Department of Animal Pathology of the Rockefeller Institute for Medical Research at Princeton) showed that a mixture of diphtheria toxin and antitoxin, or, in other words, SENSITIZED DIPHTHERIA TOXIN constitutes an effective vaccine for the prevention of diphtheria.

Dr. Charles Dopter, Physician-in-chief, and Assistant Professor at the Hospital Val de Grace, who has achieved prominence for his work on the serum treatment of cerebrospinal meningitis, dysentery, etc., demonstrated by experiments with SENSITIZED DYSENTERY BACILLI that sensitization converts even this extremely toxic organism into a perfectly harmless vaccine. The plain bacterin (unsensitized) cannot be used on account of the very toxic properties possessed by the dysentery bacillus even after it is killed.

Dr. A. Marie (of the Pasteur Institute) prominent for his work on rabies, tuberculosis, and tetanus, has been conducting extensive researches with SENSITIZED RABIES VIRUS. The results of the experiments led to the adoption of sensitized rabies vaccine instead of
the regular Pasteur treatment on account of the more prompt action and the smaller number of doses required.

Dr. A. Calmette (Director of the Pasteur Institute at Lille), together with an associate, Dr. F. Meyer, has demonstrated the absence of toxicity in Sensitized Tuberculin.

Dr. M. M. Gordon (Assistant Pathologist at St. Bartholomew's Hospital, London) made important clinical investigations with sensitized streptococcus vaccine or strepto-serobacterin in the treatment of erysipelas, etc.

ADVANTAGES OF SEROBACTERINS.

The work of the above-mentioned scientists, as well as that of numerous other investigators (see Bulletin No. 18) has verified beyond question the law laid down by Besredka that "Whatever the nature of the virus, whether the microbe of plague, dysentery, cholera or typhoid fever, or whether the virus of rabies, or the toxin of diphtheria, whether the microbes are killed or living, sensitization confers upon them properties which convert them into vaccines of the first order, possessing an action sure, rapid, inffessive, and durable."

Briefly stated, the principal characteristics and advantages claimed by Besredka for Serobacterins are that they produce but slight local and general reactions; that they may be given in much larger doses and more frequently than unsensitized bacterins (every 24 hours); that the immunizing effect is almost immediate and that they sometimes give successful results in very late stages of a disease when no response is secured from ordinary bacterins.

DEMONSTRABLE DIFFERENCES BETWEEN SEROBACTERINS AND BACTERNIS.

Important research work on Serobacterins conducted at the Mulford Laboratories at Glenolden has progressed to a point where the principal results may safely be used as confirming and supplementing the advantages claimed for sensitized bacterins by Besredka and others. This work has demonstrated certain differences between comparable doses of serobacterins and bacterins. These differences are observable in both reactions and results and may be classified as local and systemic. Tests were carried out with a strain of B. Typhosus and also a strain of Pneumococcus, Type I, on guinea-pigs and white mice.
LOCAL REACTIONS AND RESULTS.

A series of guinea-pigs were injected with very large doses of typho-serobacterin and a similar series was injected at the same time with comparable doses of typho-bacterin. The pigs were killed in sets at the end of 2, 4, 7, 10 and 14 days after injection, and the local differences noted at or around the site of injection.

It was found that the bacterin injected was followed by a distinctly more severe local reaction. In several series of guinea-pigs the local reaction was accompanied by marked ulceration which healed slowly while with comparable doses of serobacterin there was no tendency to ulcerate.

The reaction following bacterin injections was diffuse, that is, it involved a large area while serobacterin injections resulted in well circumscribed reactions. The return to normal was comparatively quick with the serobacterin-treated guinea-pigs, while the bacterin-treated guinea-pigs showed physical effects of the injury.

In these experiments the guinea-pigs were given eighteen times the therapeutic dose for man. In human beings treated with the usual therapeutic doses these reactions of course occur in only a mild degree and the differences between bacterins and serobacterins are usually slight as regards local reactions. The difference in systemic results is more important.

SYSTEMIC RESULTS.

The systemic results were demonstrated with Pneumo-serobacterin, Type I, in comparison with Pneumo-bacterin Type I. Both the bacterin and the serobacterin were prepared from the same strain of pneumococcus and from the same culture.

A large number of white mice were injected subcutaneously with the serobacterin and another series was injected on the same day with comparable doses of the plain bacterin. At various intervals of time after the injection, beginning with five minutes, four hours, twenty hours, etc., up to twenty-one days, some of the mice were tested for development of immunity. At each test sets of mice from each series were injected with varying multiples (one to one million) of the fatal dose of living virulent cultures of Pneumococcus Type I. The degree of immunity was marked by the highest dose which the mice survived, while the mice receiving the next larger dose died; thus if the mice which received 1,000 fatal doses survived while those which received 10,000 fatal doses died, 1,000 fatal doses was taken as the limit for immune resistance for that date.
The degrees of protection obtained from the bacterin and serobacterin are represented graphically in the chart attached. Note especially:

1. That five minutes after the serobacterin was given the mice could receive and survive 100,000 fatal doses of living virulent pneumococci. This shows that the serobacterin actually carries a distinct specific protective antibody charge which is in large part set free on the injection of the dose subcutaneously or intraperitoneally. Thus a high degree of passive immunity is imparted almost immediately. The bacterins on the contrary show no signs of producing any passive immunity, and no effective protection is in evidence until the seventh or eighth day.

2. That the passive immunity established by the serobacterins, although it decreases rather rapidly, yet protects until the processes of active immunity have been well established.

3. That an active immunity response appears much earlier with the serobacterins than with plain bacterins. With the serobacterins the active immunity develops before the passive immunity has disappeared. There is therefore no so-called opsonic or clinical negative phase following use of serobacterins.

4. That as far as the production of active immunity is concerned the antigenic value of each of the two products is in the end about the same. It may be said therefore that the process of sensitization does not lessen the degree of active immunity but rather hastens its development.

The experiments referred to were repeated several times on a large number of guinea-pigs and white mice, and the views expressed are well supported. It is reasonable to conclude that these differences are fundamental and that the points brought out by these experiments with pneumo-serobacterin will apply equally to other serobacterins.

**THE OUTLINE.**

The outline given on the second blue print attached hereto is very valuable in explaining the results produced by serobacterins. The message which this outline is intended to convey may be briefly stated as follows:

The immunity produced by bacterins or vaccines is seen to result from the direct administration of the antigen with antibody formation in the human body itself, after a time interval, and is a more or less permanent active immunity.
Immunity produced by serums or antitoxins on the other hand results from the production of antibodies in the bodies of horses or other animals. Those antibodies, when separated from the animal’s blood, purified and injected into the human body, give rise to an immediate effective but more or less temporary passive immunity.

The chart and the outline studied together will make it clear that the immunity produced by serobacterins partakes of the character both of that from the direct and indirect antigen. The first and immediate response is a passive immunity due to the release in the blood stream of the antibody charge which the bacterin had absorbed during the process of sensitization. The secondary response shown in the second part of the curve is an active immunity which appears as the result of antibody formation stimulated by the presence of the killed bacteria themselves.

**SUMMARY.**

To summarize, it may be stated that the serobacterins possess the following advantages:

1. The immunizing effect is immediate.
2. There is no temporary depression of immunity (negative phase). In acute infections there is always a certain amount, perhaps inadequate, of antibody in the blood. Ordinary (plain) bacterins use up a certain amount of these antibodies and thus cause a temporary depression of immunity. For this reason it may be dangerous to give them during severe acute infections. Serobacterins, on the other hand, cause an immediate increase in the immune bodies of the blood, and may therefore be used in the treatment of the most desperate cases.
3. The local reactions (inflammation at the site of injection) are very slight.
4. The general reactions (malaise, higher temperature, etc.) are lessened.
5. Their low toxicity makes it possible to give larger doses and at more frequent intervals.

**HOW SEROBACTERINS ARE USED.**

Serobacterins should be used by preference in every case where bacterin treatment of any kind is indicated. On account of their harmlessness and rapid action they may be used even in the very latest stages of a disease. In such cases it was heretofore thought that only serums could be of any value. The reason
for this belief was that the patient could not any longer produce antibodies and that it would be necessary to introduce them from without, which could be accomplished only by administration of curative serum. It has been shown, however, that even in these cases, good results following the administration of serobacterins may be expected. Serobacterins do not interfere with the administration of serum as a supplementary treatment.

ADMINISTRATION AND DOSAGE.

Serobacterins are injected in precisely the same way as the ordinary bacterins. Their rapid action, however, enables one to give the doses much closer together, and their harmlessness makes it possible to rapidly increase the amount administered. For example, in the treatment of erysipelas Gordon employed with excellent results Strepto-serobacterins in doses ranging from 100 million to 2,000 million at daily intervals. Cruveilhier used sensitized gonococcus bacterin in similar dosage and intervals in a series of cases of gonococcic infection. (See Bulletin No. 18 for abstract of Clinical Reports.)

Immunizing Value of Serobacterins and Bacterins Compared. Curves Show Resistance of immunized white mice to fatal doses of virulent living Pneumococci, Type I.

SUMMARY OF EXPERIMENT 52-E, 6-1-20
True Efficiency in Mission Hospitals.

SEROBACTERINS.

An Outline.

Showing their relation to similar products and explaining the nature of the immunity resulting from their use:

- **Active Immunity**
  - **Antigen Direct**
    - (i.e., antibody formation takes place in the human body following direct administration of antigen.)

- **Passive Immunity**
  - **Antigen Indirect**
    - (i.e., antibodies formed in body of horse or other animal, then transferred to human body.)

- **Proteins** (Pollen Extracts, etc.)
- **Toxins**
- **Vaccine** (Living) Smallpox
- **Bacterins** (Dead)
- **SEROBACTERINS**
  - **Antitoxins**
    - Antianthrax
    - Antidysenteric
    - Antimeningococcic
    - Antipneumococcic
    - Antistreptococcic
    - **Diphtheria**
    - **Tetanus**

TRUE EFFICIENCY IN MISSION HOSPITALS.

D. M. Gibson, Kaifeng, Honan.

We doctors in China have been talking about efficiency for years, writing articles, answering questionnaires, compiling statistics and generally realizing our deficiencies. We have been ashamed and rightly so at the way in which our hospitals have been run and our patients housed and most if not all of us will never rest content until our wards are clean and airy, our methods orderly, and our patients nursed by those who know what nursing means. But the danger is that we shall be content with this. For after all what we have been talking about and are working for now is "scientific efficiency." When we get it there will inevitably be a tendency to pat ourselves on the back and say, "We thank God that we are not as other hospitals are," etc., falling thus into the snare of the Pharisee of old who was content with mere externals. For while we do "all these things which should be done" maybe there are others, far more important, left undone.
The fact is "scientific efficiency" is the lesser part of hospital efficiency especially in the case of a mission hospital. Scientific efficiency ensures that a patient is accurately diagnosed and adequately treated from a professional standpoint; the term hospital implies much more than this. The word originally had the meaning of "hospitality" and that meaning should never be lost. Our patients are not merely "inmates," but "guests" and as such their comfort both physical and mental should be a primary consideration. No hospital however fully equipped with laboratories, electric and hydraulic improvements and so on is efficient if its "guests" are not treated with Christian courtesy and gentleness. No mission hospital is efficient unless its walls are "Salvation" and its gates "Praise." This is the crucial test of efficiency. Are men and women coming into the Kingdom of God in our hospital wards? Do the patients when they leave go out of the hospital gates praising God for new life not only in their limbs but in their souls? If not then all our scientific efficiency counts for very little. Let us face the real issue. There are many hospitals where scientific efficiency up to top standard is precluded by lack of income. Nevertheless, these hospitals can be efficient in the highest sense. The patients in the wards can in nearly every case be treated with definite success as far as relief of suffering is concerned, and this is the primary consideration from the patient's point of view, and further through the efficacy of the power of the Holy Ghost they can be brought to a knowledge of the Truth.

The true efficiency of a mission hospital, therefore, while including scientific efficiency to the fullest degree available locally, is a great deal more than this. Further, it is entirely independent of dollars or £.s.d. What it does depend on is the personnel of the hospital staff and the prayers of its supporters. Dare we employ men on the hospital staff who, while professionally qualified, are gravely deficient in Christian character and evangelistic zeal? Does the influence of such men conduce to the true efficiency of our mission hospital work? The answer to each query is in the negative. That being so whither can we look for a supply of men with guarantees as to their integrity and zeal for souls? Such a guarantee cannot be reasonably demanded of the graduate from the big training centre. He enters upon his studies avowedly to become a doctor in the professional sense. He is trained scientifically to be a qualified physician along lines similar to those employed in Western lands. He is not trained specially for service in a missionary capacity and it is not reasonable to demand of him the high standard of Christian living and motive which is required of the
personnel of a mission hospital staff. This does not imply that the big schools produce no such men. They do, but they cannot be expected to guarantee the spiritual efficiency of their graduates any more than do the medical schools at home. It comes to this then that if we want such men in our mission hospitals in adequate numbers we must either produce them in individual hospitals or attempt some more centralized training along special lines.

It may be objected that such training would lower the status of Western medicine. Even if it did, should professional status be accorded precedence over true missionary efficiency or over mere humanity? Surely our first duty as medical missionaries is to the sick and suffering of our present generation rather than to the medical profession of the future. Were the supply of fully qualified men adequate for the needs of the suffering millions of this generation then such an objection might be valid. Until the supply is sufficient and that is anything but an immediate prospect, it is inhuman to deny a sick man the services of a practically capable doctor who can afford him relief just because the said doctor has not been through the whole gamut of a modern medical course. There is scope, yea and urgent need, in our mission hospitals and outside them possibly too for men with practical medical knowledge who exert also a potent influence for Christ. Possibly some more concerted effort ought to be made to furnish a supply of such men for the fuller realization of true efficiency in our work. We who are medical missionaries are not primarily the emissaries of science but the servants of Jesus Christ and it is to His exacting and lofty standard of efficiency that we must diligently conform even at the sacrifice of some of our cherished notions and personal professional ambitions.

THE SIMPLE DETECTION AND QUALITATIVE TESTS FOR MORPHIA, ITS COMPOUNDS, AND DERIVATIVES.

By B. E. Read, Ph.C., M.S., Union Medical College, Peking.

As noted in the Lancet,¹ twelve years ago, the attempts to abolish the opium traffic in China have led to the development of a heartless business which, under the pretext of supplying medicines calculated to alleviate the craving for opium, offers remedies which contain its essential principle. To-day, not only have we many of these heartless cures but also a widespread trade in the pure article which shamelessly flaunts itself before the public eye. All sane-minded people are both
The China Medical Journal.

willing and anxious to help stamp out this appalling vice, yet, for lack of easy and ready methods to detect it, they are more often than not oblivious of its presence on every hand. Hence it behooves every hospital and dispensary in the land to acquire the information concerning the easy detection of opium or its derivatives, in whatever form they may occur.

The most impressive fact that one realizes, when delving into the literature of this subject, is the intricacy and subtlety of the chemist in devising specific tests for opium preparations by elaborate methods with rare drugs and chemicals; quite outside the experience of the ordinary laboratory worker. The writer has analyzed many samples submitted for examination during the last twelve years, and perchance circumstance has forced the development of a much needed simple method. The following method should be of service to many others, whose work is limited to the use of simple hospital drugs:—

Take the powder or the pulverized material and add several times its volume of dilute sulphuric acid. Let stand overnight, then filter. Add one volume of hot chloroform and after the chloroform enough strong ammonia to make the solution alkaline; test with litmus paper. Mix, and after allowing the chloroform to separate, remove it with a pipette or by any other suitable means. Allow the chloroform to evaporate to dryness in an evaporating dish or a watch glass, and test the residue with a drop or two of Kobert’s solution, i.e., strong sulphuric acid containing about five per cent of formalin, made by mixing two or three drops of formalin with 3 or 4 mils of strong sulphuric acid. An extract from an opium or morphia preparation will always give a vivid purple violet colour. Another spot on the dish may be tested with strong nitric acid, which gives with morphia an orange colour quickly fading to yellow.

If the sample tested be a white powder or of very small bulk, the above tests with formalin-sulphuric acid and nitric acid may be made directly, i.e., without mixing with acid and subsequently extracting chloroform and ammonia. A few grains of powder under the microscope surround themselves with purplish-red or violet zones when treated with formalin-sulphuric acid.

From time to time, one sees the problem of the detection of opium or morphia approached from various angles, such as the toxicological detection of morphine in the various body organs. Practically all of these tests are included in a general statement of the reactions of morphia with various test solutions and reagents. The other compounds of morphia very occasionally met with, such as heroin (diacetyl
morphine), peronine (benzyl morphine), dionine (monoethyl morphine hydrochloride), etc., respond to a number of these tests as indicated. These are given here for use of the more expert worker, in the order found to be most useful to the writer.

1. Robert's test, as mentioned above. Dionine, heroin, codeine and most morphia compounds give a similar reaction.3
2. Morphine gives with strong nitric acid an orange colour, changing to yellow. Codeine and heroin give only a light yellow colour.4
3. Morphine, or its compounds, is precipitated by all the usual alkaloidal reagents: e.g., Picric acid, potassiomercuric iodide, iodo-potassium iodide, etc.
4. Morphine gives a blue colour to a paste of ammonium molybdate in strong sulphuric acid. Sensitive to one hundredth of a milligram. Titanic acid and tungstates give similar reactions.3
5. Morphine and its salts give a blue colour with ferric chloride solution, this is assisted by the presence of acetic acid. Heroin, codeine and dionine, give this reaction after heating with sulphuric acid.4
6. A trace of morphine added to 5 mils of very dilute potassium ferricyanide to which has been added a trace of ferric chloride produces a deep blue colour. Peronine, codeine, and dionine do not give this colour. Heroin gives this reaction after heating with sulphuric acid.4
7. Steam heated with strong sulphuric acid cooled and treated with diluted nitric acid, morphine produces a violet colour rapidly changing to blood red, (a) treated with sodium arsenate, morphine produces a bluish green colour.4
8. Morphine liberates iodine from iodic acid, giving a blue with starch paste. Peronine, heroin, codeine, and dionine, fail to liberate iodine.4
9. Lloyd's test. A mixture of morphine and hydrastin mixed with a few drops of sulphuric acid develops after about five minutes a blue-violet colour. This is specific.3
10. Morphine heated gently with a few drops of concentrated sulphuric acid and a little pure potassium perchlorate gives a pronounced brown colour.5
11. A five per cent solution of sodium phosphomolybdate produces with morphine solutions a yellow precipitate soluble in ammonia.
12. Sulphuric acid containing a crystal of potassium bichromate after some time may give a green colour. Strychnine gives a purple colour.5
The above simple chloroform extraction method is dependent upon the solubility of morphia in ammoniated chloroform. The standard solvents usually quoted are, hot amyl alcohol, cold acetic ether, and a mixture of equal parts of ether and acetic ether. Various technical objections have arisen concerning amyl alcohol, and it is very doubtful if amyl alcohol is to be found in two hospitals in the country. Acetic ether needs to be particularly free from acid and generally pure, it also is a rare thing to the average person in the Far East. Ether is strangely quoted as a solvent, it should be taken good note of here by any laboratory worker unacquainted with the fact, that morphia is almost insoluble in ether, for upon this is based the present British Pharmacopoeial method of extraction and assay. With regard to the solubility of morphia in chloroform, statements vary considerably, ranging from one in 1220 at 25°C. in the U.S.P., to one in 4167 at 15.5°C. in the B.P.C. Squire very aptly remarks that the solubility depends greatly on the physical condition of the substance. The extraction with ammoniacal chloroform, as recommended above, provides the most favorable circumstance for almost complete extraction and solution of the alkaloid. The solution is rendered warm by neutralizing and alkalizing with ammonia; the precipitated alkaloid is in an anhydrous non-crystalline form and is taken up directly by the hot chloroform. From opium other alkaloids may be extracted together with the morphia, but they in no way interfere with the simple tests indicated.

In order to positively guarantee the solubility of morphia and its derivatives in ammoniacal chloroform, known amounts were taken and extracted with chloroform. One gram of morphine hydrochloride, codein phosphate, dionin, and heroin hydrochloride, respectively, were each dissolved in 100 mils of dilute sulphuric acid. 100 mils of chloroform were added in separatory funnels and each was made alkaline with 30 mils of strong ammonia. After rotation, the chloroform was separated off. The remaining aqueous solution was agitated with two further portions of 50 mils of chloroform. The mixed chloroformic solutions of the alkaloid were in each case evaporated to dryness at room temperature with the aid of an electric fan. The dry residue was titrated with decinormal sulphuric acid. They yielded dionin 76%, morphine 80%, heroin 86%, codein 93%. From these high values one would not be far wrong in assuming that hot chloroform in place of cold would make a total extraction of the substance.

For a qualitative test this makes a most simple experiment, the residue so obtained giving the following results with the different reagents used:
Morphia, Its Compounds, and Derivatives.

<table>
<thead>
<tr>
<th>Tested with</th>
<th>Morphine</th>
<th>Codein</th>
<th>Heroin</th>
<th>Dionin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaline-sulphuric acid</td>
<td>vivid purple</td>
<td>vivid purple</td>
<td>viv. purple</td>
<td>viv. purple</td>
</tr>
<tr>
<td>Nitric acid</td>
<td>orange</td>
<td>light yellow</td>
<td>light yellow</td>
<td>yellow</td>
</tr>
<tr>
<td>1 in K I</td>
<td>brown ppt.</td>
<td>brown ppt.</td>
<td>brown ppt.</td>
<td>brown ppt.</td>
</tr>
<tr>
<td>Picric acid</td>
<td>yellowish ppt.</td>
<td>yellowish ppt.</td>
<td>yellowish ppt.</td>
<td>yellowish ppt.</td>
</tr>
<tr>
<td>Potassio-mercureic iodide</td>
<td>yellowish</td>
<td>yellowish</td>
<td>yellowish</td>
<td>yellowish</td>
</tr>
<tr>
<td>Ammonium molybdate-sulphuric acid</td>
<td>violet turning</td>
<td>violet</td>
<td>violet</td>
<td>violet</td>
</tr>
<tr>
<td>Ferric chloride</td>
<td>blue</td>
<td>blue</td>
<td>blue</td>
<td>blue</td>
</tr>
<tr>
<td>Prussian blue test</td>
<td>deep blue</td>
<td>no effect</td>
<td>no effect</td>
<td>no effect</td>
</tr>
<tr>
<td>Sulphuric and nitric acids</td>
<td>violet to blood</td>
<td>no blue col.</td>
<td>blue</td>
<td>no blue col.</td>
</tr>
<tr>
<td>Iodic acid and starch</td>
<td>blue</td>
<td>blood red</td>
<td>blood red</td>
<td>blood red</td>
</tr>
</tbody>
</table>

Morphia gives a characteristic blue colour with ferric chloride, also with iodates and starch.

Heroin, when warmed with alcohol and sulphuric acid, gives the odour of ethyl acetate. 4

Dionine is differentiated by its solubility. Half a gram dissolved in five mils of distilled water gives a precipitate with ammonia (S. G. 0.910) which re-dissolves on addition of about five mils of ammonia, from which the free base separates in a short time. 6

Codein under similar circumstances is permanently dissolved.

References.

Opening Ceremonies of the Peking Union Medical College.

The opening ceremonies of the Peking Union Medical College will be held during the latter part of September, probably during the week between September 15 and 22, 1921. The trustees of the college will hold their annual meeting at Peking at this time, and it is hoped that most of the British and American members of the board will be able to be present. The trustees have made provision also for inviting a number of eminent medical scientists to be present on this occasion to present papers and hold clinics, which should be of great interest. A cordial invitation is extended to all members of the China Medical Missionary Association to attend these opening exercises. Announcement will be made later regarding the exact dates of the meetings, the program, and the provision for entertainment of guests.
OBSTETRICS AND GYNECOLOGY IN SOUTH CHINA.*

By J. Preston Maxwell, Union Medical College, Peking.

When one looks back day by day one is apt to think that the great nation, in whose midst we live, makes very slow progress. But when one takes a wider and broader outlook and considers the progress of the last twenty years, one may well stand amazed. This progress, too, would have been impossible but for the work of one's predecessors often carried on amidst difficult surroundings. When the writer thinks of his father, driven out from the capital city of Formosa, chicken bones that had previously been buried under the bed being disinterred as proof of his dealings in new-born children to make medicine, one wonders at the confidence which now allows the doctor to do craniotomy, embryotomy and the like in Chinese homes. When I came to South Fukien in 1899 obstetrics and gynecology were in their infancy. I had the privilege of opening the ball, so to speak, south of Amoy, and even in Amoy itself at that time the number of abdominal operations which had been performed could be numbered on the fingers of one hand. The first operations for ovarian cyst had to be done without vaginal examination. I remember to this day the difficulty one had in persuading the first patient to consent to operation. She was done and did well. A week or two later, another woman came into the consulting room and with considerable difficulty was persuaded to lie down on the table for examination. It was another case of ovarian cyst. When I told her she must undergo operation, she got up from the table, fled straight out of the door and was seen no more. Three months later the same patient appeared with a relative and a bundle and said that she had come in for operation. Between her first and second visits she had met patient No. 1. She was operated on and did well but was noticed to be very uneasy. Getting one of my assistants to enquire quietly into the matter, she confessed that she had minutely questioned the other patient and as her treatment was not exactly alike, she was grievously dissatisfied.

Ovarian cysts of all kinds have been met and I will now give you a few details of some of the interesting cases. Here is a young girl of sixteen brought to me the day after her marriage. At the age of ten a large mass had been noticed in the lower abdomen, a sinus had formed at the umbilicus and discharged filthy smelling pus. Fearing the breaking

*Paper read at the October meeting of the China Medical Missionary Association, Peking Branch, 1920.
off of the engagement, the matter had been carefully concealed by both parents and patient, and the rage of the bridegroom and his family was proportionate when they found a damaged and offensive article palmed off on them. After much wordy strife the two families had agreed to bring the girl to the hospital and if I could cure her all would be well. The operation revealed a dermoid of the ovary adherent to the abdominal wall in front and when it was away the peritoneum was absent over a large area. This I filled in with omentum, sewing it into the gap. The case did well and the family feud was averted.

Here is another woman who came in, bringing her grave clothes with her. She had been to two other hospitals where she had been tapped, and finding chocolate colored fluid, they had declined to operate, fearing malignancy. A free small multilocular cyst was found and the patient did well, carried her grave clothes home again, and has had two healthy children since that time.

Chocolate colored ascitic fluid is not by any means of so grave an import as reddish ascitic fluid. The latter is generally associated with malignancy, the former not.

Another case in which the fluid was chocolate colored was that of a young woman of seventeen. She had had an ovarian cyst which had been diagnosed by an able foreign doctor. One day it disappeared and a month after the abdomen began to swell. Two cauliflower papillomatous growths of the ovary were found with small implants all over the intestine. Both of the growths were removed, the implants left alone; she made a good recovery and was well at least six years after.

These ovarian cysts reach a large size. I have had two eighty pound tumors within a fortnight and the chair bearers who carried the second home again were congratulating one another as they went out at the gate on the difference there was between their burden on carrying in and their burden on going out.

One of the difficult questions about ovarian cysts is the question of malignancy. One may open an abdomen and find an uncomplicated non-adherent small multilocular cyst which is removed entire without tapping, and yet I have seen such a case back within six months with inoperable malignant disease studded all over the abdomen. One has to be cautious about operating on these secondary cases even in the way of an exploration. The case just spoken about was explored and sewn up again. On the tenth day she developed a pinhole fistula in the abdominal scar from which ascitic fluid spurted to a distance of a couple of feet. It was not altogether a misfortune as it acted as a safety valve and made the patient much more comfortable during the
remaining months of life. But some of these cases are not so successful. Another patient after much persuasion got me against my better judgment to explore her. I had offered operation five years before but it was then declined and now the case did not wear at all a favorable aspect. At operation one found oneself confronted with a large immovable malignant mass. The abdomen was closed with difficulty. Two nights after, the patient got out of bed, roamed about the hospital and tore the abdominal wound open. The opening was closed by the malignant tumor and there was no peritonitis. But of course it never healed up to her death.

With regard to the large tumors the question of preliminary tapping comes up. I am opposed to it if the patient is in good condition. First, the withdrawal of a lot of fluid may upset the bien être of the patient very seriously, and secondly, you may spread the contents of the cyst over the abdomen and if you wait for some days rouse a low grade of peritonitis in the neighborhood of the puncture, and if tapping has been frequently employed you may meet with dense adhesions. But if it is not done, then no anaesthetic should be given till the operator is ready for work. Some of these cases, fortunately not many, will suddenly stop breathing under the influence of the anaesthetic and can be saved if the operator at once opens up the cyst and relieves the pressure. Otherwise they will almost certainly die.

Ovarian tumors in pregnancy have only been met with three times. Two were in Chinese patients, and one at five months was operated upon and did excellently. The other came in the puerperium with a small ovarian cyst but refused operation. She came again five months pregnant with the same cyst and again refused operation. She was very big and had a good deal of respiratory and pressure distress. When near time one day the cyst burst internally and she died in a few hours undelivered.

The third case was in a European. A swelling was discovered in the left flank after labour and as the patient had a temperature and was not doing well, I was asked to see her. On operation, an ovarian cyst with a long pedicle, six twists, was found adherent in the flank and suppurating. A portion of the wall of the cyst was so adherent to the colon that it was left in situ. The patient made a good recovery and was quite well several years later.

These ovarian cysts may sometimes form curious adhesions. Within the last few days my brother, Dr. J. L. Maxwell, has had in his hospital a woman with a cyst which was giving trouble after labour. He found that the cyst had acquired an omental pedicle and suspended
between its proper attachment and the new one, had rotated several times, both pedicles looking like umbilical cords.

Fibroids are not unknown but cannot be said to be very common, and with one exception the tumors I have seen have been of moderate size.

Fibrocellular tumors of the vagina are not excessively rare. Three have been seen in the last twenty years and one was so large as to practically obliterate the vagina. As a rule these tumors shell out without a great amount of difficulty.

Lymphangiectasis of the vulva has been met with and also elephantiasis of the vulva, both the sessile and the pedunculated variety.

With regard to venereal disease, this is terribly common, in the main innocent as far as the women are concerned. Chancre, chancroid, and gonorrhea are very common but, as far as one knows, pyosalpinx and hydrosalpinx are rare. I say, as far as one knows, for gynecological work is still in its infancy and one is hardly in a position to make a dogmatic statement on the subject.

The position of woman is South China in a rather miserable one. The overwhelming majority of the women can neither read nor write, and the life they live is almost bound up in eating, sleeping, and household work. They are bought and sold very much like cattle and up to very recent years it was the exception for a bridegroom to have seen his bride. The result is that one meets with real tragedies. I should think that I have seen at least ten cases either without uterus, which is bad, or without vagina, which is worse. In the latter class I have seen the urethra patulous and dilated, having been used with the bladder as a vagina. The cases of which I speak are congenital cases and one may mention in this connection that it is not rare for female infants to be brought to one with the statement that "there is no vagina." Closely examining these, one finds that the labia are adherent and a very little force suffices to separate these and all that is needed is a little cotton wool between them for a few days.

Allied to these cases are those where sloughing has taken place as a result of childbirth, prolonged and mismanaged. There may be merely a stricture of the vagina or the whole vagina may be contracted or entirely obliterated and in this case the uterus almost invariably undergoes hyperinvolution. Then with these one gets the most horrible fistulae, the base of the bladder gone, the front wall of the rectum destroyed, or both. As a rule the floor of the urethra has likewise gone and it is very difficult to know what to do with these cases. Colpocleisis is no good if the urethral sphincter is not intact and even
then is an operation which may afterwards give rise to much trouble from phosphatic deposits. Occasionally they can be closed by a series of operations but at the best they are a very difficult class of cases.

One patient came to me with a large vesico vaginal fistula which however had contracted and was so attached to the pubic bone as to act as a sphincter and a very tight one and this patient had also a urachal fistula secondary to the vesico-vaginal one. And I found out that she had been bought cheap by a syndicate of three men who were trusting to my being able to patch her up, when she was to be sold at an increased rate. Another of my patients had been bought out of the hills by a syndicate of thirteen men. One took a fancy to her and bought her away from the rest, bringing her to the hospital for a hemorrhoid operation.

Where the vagina is present but generally contracted, I have had good results by incising the lateral walls, spreading the incision and then sewing into the gap a flap taken from the labium majus on each side. The Chinese woman has practically no hair on the labia so that this is not a contra-indication to the operation.

I have not yet had a suitable case where the woman was willing to take the risk of a Baldwin or similar operation.

Prolapse is by no means rare and some of the total prolapses form large tumors between the legs. The operation that has been more often performed in the south than any other is abdominal fixation and in suitable cases I am far from convinced that it is an operation which should be thrown on the scrap heap. Provided that the sutures are inserted well down on the anterior surface, the results as regards future pregnancies seem to be good, and the results as regards the prolapse are distinctly good. A perineorrhaphy may be done at the same time with advantage.

Cancer of the cervix and uterus is fully as common as at home but the cases rarely come in time for a radical operation though palliative operations may greatly help, such are scraping and swabbing the cavity out with chloride of zinc or using the actual cautery freely.

As regards the whole question of obstetrics, we are still back in the dark ages. There are no native midwives worth calling by that name and any help at delivery is as a rule given by "wise" women or the mother-in-law. The value of this help is shown by the number of catastrophes in labour.

Rickets is practically unknown in the South and I have never had to deal with a flat pelvis. The principal cause of delay in delivery is an unreduced occipito posterior position of the vertex and I have seen
a woman die from this after being five days in labour. I was called at the last gasp, delivered the child in a few minutes, but the patient was too exhausted and may, moreover, have had some uterine rupture. Barring this complication, the commonest cause of delay in delivery is a small round pelvis and often a large child. The contraction is not great and it must be remembered that the Chinese pelvis is undersized as compared with the European. Generally a forceps delivery is all that is needed, but occasionally craniotomy and the use of the cephalotribe are required.

But this pelvic contraction often leads to great swelling of the external genitalia and passage, and sloughing of the vagina to a greater or lesser extent is very common. One case in which I had considerable difficulty in delivery, owing to the great swelling, got a very bad contraction of the vagina. In her next pregnancy she came into hospital and a successful Cæsarian section was performed. She again became pregnant, but within a week or two of the time of labour the hospital was looted and wrecked by a band belonging to the "Three Dots" society, her husband being one of the leaders in the attack. Despairing of help, she hung herself.

Transverse presentations are by no means rare and generally result in the death of the mother, though I know of one case which ended by spontaneous evolution. The Chinese have no idea of how to manage these cases. Breech and face presentations occur in about the same proportions as at home, but it is quite one thing to have a difficult face presentation in home surroundings and one in a ten-foot square room, three quarters of which is filled up by a big Chinese bed.

One has said that we are still in the dark ages. Too often the doctor is called in as a last resort. I lost the only case of severe pelvic contraction with which I have had to deal in the South from this cause. The patient was a young woman of 23. There was extreme contraction and the conjugate measured about 2½ inches. The patient had been five days in labour and five so-called midwives had all taken their turn. Of course it was a difficult and prolonged operation but the child was extracted and one hoped that the mother might do well although she already had fever. She died on the 14th day of puerperal sepsis after a hard fight for life.

Rupture of the uterus is by no means uncommon. Four cases have come into my hands in reasonable condition. The first ruptured during labour with a marginal placenta praevia, was treated by ergot and packing and recovered. The second, which also was a posterior rent during a hard labour, recovered in the same way. The third was
a case of transverse presentation where a semi-foreign trained midwife had tried to do version and failed. In this case after delivery a loop of bowel could be felt in the uterus. As they refused to let the patient come into the hospital, I pushed it back, placed a large gauze pack in the uterus and rent and gave heavy doses of ergot. Much to my surprise she recovered. The fourth was brought into the Women's Hospital in Choan Chiu, Fukien, by one of the old students. The child had already escaped into the abdomen. In this case by invitation of the doctor in charge I performed laparotomy, removed the child and placenta, then amputated the uterus at the supravaginal cervix and sewed over all the raw surfaces. The left broad ligament had been stripped up, showing the ureter from the brim of the pelvis to its insertion into the bladder. She did well after a stormy convalescence.

Of late years there has been a distinct tendency for one to be called in at the beginning of labour, not to conduct it but to say that all is going well.

Ectopic gestation is not excessively rare though it appears to be much rarer than at home. I have met with only two undoubted cases amongst Chinese. The first had a rupture into the broad ligament and came in with great pain and dysuria. The cavity was opened, the blood evacuated as far as possible and light packing used. She did well. The second case had a large hematocele in Douglas' pouch, refused operation, and slowly recovered, and the collection of blood was absorbed.

Eclampsia occurs in about the same proportions as at home. Occasionally one has an opportunity of getting the case into one's hands in the early stage and averting the attacks by suitable treatment, but as a rule one is called to the case in an attack. With a multitude of remedies and treatments for this disease it is difficult to fix on one as so vastly superior to the others as to make it the treatment of election.

I have had good results with morphia and chloroform, and although one acknowledges the danger of the latter drug, yet I am not convinced that its careful use is deleterious to the patient.

Hydatidiform mole is apparently rare in the South and I have only met one case of it, but here as I have observed before, the cases may simply not have come under one's notice.

Occasionally curious experiences are met with concerning diagnosis of pregnancy. One day the wife of a secretary in the Salt Office walked in. She was suffering from swelling of the abdomen and had been to several doctors who had picked up a smattering of foreign
medicine. The last one had concluded that she was a case of nephritis and had purged her pretty severely, without any benefit. She was pregnant 4½ months but when I told her so she flatly refused to believe it. There was no reason why she should not have been pregnant in the ordinary way but she had been married ten years, had no child, and did not think she was going to have one.

This attitude of mind persisted right up to full term. She then told her husband that she felt ill and went on board a river boat to go on a visit to a relative. Pains came on and she just got home again before a fine healthy boy was born.

In conclusion let me add a few remarks on what might be called the forensic side of the question. One day I was called from my office to see a party who had just arrived from the Yamen. There was a woman, who presented me with a uterine cast, several days old, in a piece of paper; a man who belonged to her family; a Yamen runner, and a letter. The letter was from the magistrate before whom a prisoner had been brought charged with having struck the woman in the abdomen and caused an abortion. He wanted to know whether this was a real uterine cast, whether the woman had passed it, and whether the case had been the result of violence.

About the cast there was no doubt, it was a conception of about six weeks' duration, and on examining the woman the uterus was undoubtedly bulky and would correspond to the cast, but about the third point I refused to give any opinion. Afterwards it transpired that it was a case of blackmail, the woman having aborted during an attack of malarial fever.

There is no doubt that a large number of abortions take place in South China from this cause. Moreover, the Chinese have got the idea that quinine causes abortions and many will refuse to take it during pregnancy. The truth is that quinine will not cause an abortion unless the uterus is already contracting and trying to expel the ovum and far from causing it, it is the one way of preventing it. Again and again have I given 10 to 15 grain doses of quinine in acid in pregnant cases without any ill result.

One sad case comes to my mind. When at Unsio on a medical missionary itineration, I was approached by a man who wanted medicine for his wife who was pregnant and had malarial fever. He refused quinine in spite of my explaining the matter to him and the result was that the woman not only aborted but lost her life.

Quite a number of patients have come asking for abortion to be performed. Herbs said to cause abortion are surreptitiously sold and
occasionally foreign bodies are thrust up into the cervix but fortunately this latter proceeding is rare. But there is no doubt that there is a great deal of attempted abortion.

Infanticide exists and in certain regions not to any small degree. One does not find it as a rule on the surface and this is where the ordinary observer is useless as an authority on such a subject. One requires to know the people, to obtain their confidence, and be admitted to their homes, and then one gets the information which one seeks. Twice have I met with it on the surface. On one occasion I was called to an impacted transverse, the second twin, to find the first twin, a girl, lying strangled under the bed. On another occasion, having saved the life of a mother and child in a case of eclampsia, I found on my first subsequent visit that the baby, a fine girl, has disappeared. On asking where it was, the old grandmother just shrugged her shoulders.

I have known women patients who have killed seven girls in succession but very often it is not an active killing, but merely that the baby is placed in an outhouse to die or else placed on the wall or sold to a peddler of girl babies.

What of the future? Many problems confront us in this land but one of the most urgent is the creating of a new public opinion, (1) on the frightful waste of life and health caused by the accidents and neglect of necessary care during childbirth, and (2) on the wicked and senseless practice of destroying girl babies either in an active or passive way.

AN OVARIAN CYST OF UNUSUAL DIMENSIONS.
SUCCESSFULLY REMOVED.

L. F. Homburger, M.D. and E. M. Ewers, M.D., Weihsien, Shantung.

Several reports have been made by surgeons in China of large ovarian cysts removed successfully. These cases are always of interest to us because of their rarity and also the great relief given to unfortunate carriers of these tumors by their removal. Recently a monstrous cyst was successfully removed by the authors and we wish to report it because of its unusual size and because of the length of time it had been carried by the patient.

Early in November, 1920, a farmer's wife, Mrs. Liu, age 48, was carried into the dispensary for treatment. On examination she was advised to enter the hospital for operation and consented.
Ovarian cyst (multilocular) removed in American Presbyterian Hospital, Weihsien, Shantung, China.

On entrance to hospital; patient in semi-reclining position.
Right side of tumor.

View of upper borders of tumor. The portion next to diaphragm.
History. Had scarlet fever and measles during early childhood; vaccinated by Chinese method during early childhood; denies further disease.

Married when 20 years old (Chinese); has had seven children of whom five are living and well, the oldest being 25 years old and the youngest 14. The last pregnancy occurred seven years ago, labor took place at term and a full-sized female child was born which died a few days after birth in convulsions.

Menstrual history normal except for the last forty days during which period the menses have not appeared. Menses always regular and normal since appearance at the age of 16. No history of malaria, typhoid, or epidemic diseases; denies all venereal or skin disease.

The present trouble began nineteen years ago with intense pain in the left side which lasted several days and finally was "cured" by Chinese medicine; following this the patient noticed a small lump in the left side which was painless and gave her no trouble. This mass gradually enlarged until it reached the present size. The patient complained of no pain but was very dyspneic and was troubled with the inconvenience of the size of her abdomen in walking and doing her housework.

The patient came for treatment because of the increased difficulty in breathing and weakness: abdomen very tense and prominent.

Examination. Patient emaciated and anaemic; respiration labored; Patient measures 64 inches from head to feet in recumbent position.

Head and Neck—negative. Chest—signs of pressure in both lower lobes of lungs. Heart displaced slightly upward: sounds normal.

Abdomen—measures 64½ inches at umbilicus; large tense fluctuating mass occupying whole abdominal cavity: edges not palpable because of size and also tenseness of abdominal wall; tympanitic note in both flanks extending from margin of ribs to crest of ilium; otherwise whole abdomen dull.

Genitals—external, negative; vagina, passive hyperæmia; cervix, large, firm, fixed in middle position; uterus and adnexia, not palpable.

Extremities—signs of emaciation. Laboratory findings negative.

Blood pressure 160 m.m., systolic.

Operations. The removal of the tumor was effected in two stages; during the first operation a small incision was made in the right lower quadrant of the abdomen down to the cyst wall; a trocar was inserted, bored ⅔" and 54 lbs. of brownish-black, semi-gelatinous fluid was removed; no fluid escaped into the peritoneal cavity because all escaped.
through a rubber tube attached to the trocar, into a pail on the floor; the purse string suture which had been made previous to the insertion of the trocar was drawn up and the trocar was allowed to remain in the cyst wall, a clamp having been put on the rubber tube so no leakage would result; the wound was sutured and dressed, and the patient returned to her bed. Blood pressure before operation 160 m.m.; before being lifted from the operating table 140 m.m.

The second and main operation was performed four days later, after an unsuccessful attempt to remove more fluid through the retained trocar in the interim. Chloroform-ether anaesthetic preceded by hypodermic of morphine and atropin; more fluid was allowed to escape through the trocar, which was cleared out, while the incision was being made; a median incision was made extending from three inches above the umbilicus to three inches below; this incision was carried down through the peritoneum; by this time eighteen pounds of fluid had escaped from the cyst. The cyst wall was exposed and the hand inserted to feel for adhesions; the cyst was found to be attached only to the ovary from which it had grown; after manipulation the whole tumor was delivered through the incision, the tube and ovary of the left side removed close up to the uterine body and the whole mass removed; ligation of arteries and vessels of the broad ligament; covered with peritoneum with chromic catgut sutures; peritoneal filled with 1,000 mils normal saline solution and abdominal wound sutured with a glass drain to the cul de sac of Douglas; patient's condition good. Time of operation one hour and fifteen minutes.

Tumor was a large multilocular cyst of the ovary; weight of cyst walls, etc., 31\(\frac{1}{2}\) pounds; total weight of fluid removed 90 pounds; total weight of cyst including walls and fluid 121\(\frac{1}{2}\) pounds.

Post-operative History. Uninterrupted recovery, patient walked out of hospital after thirty-two days. Weight of patient on leaving the hospital 89\(\frac{1}{2}\) lbs. which is 22\(\frac{1}{2}\) lbs. lighter than the tumor we removed.

A curious feature of this case was the tendency for her to fall backward when she first started to walk after the operation. For several days it was impossible for her to walk alone but finally she learned to accommodate herself to her loss of weight. She had been so accustomed to throwing her body back to balance the weight of the tumor in front that she naturally lost her balance the first few days on her feet.
The China Medical Journal.

Vol. XXXV. March, 1921. No. 2

All medical papers and other literary communications intended for the Journal, and all books for review and magazines in exchange, should be addressed to the Editor, St. John's University, Shanghai.

Changes of address of members of the Association, departures and arrivals, and all business communications should be sent to Dr. R. C. Beebe, 5 Quinsan Gardens, Shanghai.

Every member of the China Medical Missionary Association, who has paid his dues for the current year, is entitled to a copy of the China Medical Journal for the year, postage free. To those not members the subscription to the Journal is $5.00 Mex., per annum. In remitting by cheque, please specify Shanghai Currency. Payment should be made to the Treasurer of the Association, Dr. H. H. Morris, 48 Minghong Road, Shanghai, or to Dr. Beebe, 5 Quinsan Gardens Shanghai.

Editorial.

The opening ceremonies of the Peking Union Medical College, the tentative program of which is published in this issue, ought to be of great interest to all medical men in China. The only difficulty in connection with the arrangement so far as the rank and file of the medical missionaries is concerned, is that it comes so late in September that most of them, especially those who are connected with educational institutions, will have started in on their fall work, and will be unable to get away.

In all other respects the program, as presented, is most alluring, and will certainly be appreciated by all those who are fortunate enough to be able to attend.

Dr. J. PRESTON MAXWELL, Head of the Historical Material. Department of Obstetrics and Gynecology, in the Peking Union Medical College, asks for donations of obsolete forms of pessaries, mid-wifery forceps, and other archaic types of instruments particularly connected with his department, to begin a collection of historical interest.

If his professional brethren in China or elsewhere, have such material that they are willing to dispose of, it will be gratefully received by Dr. Maxwell.
The Secretary of the International Anti-Opium Smoked or Opium Association, Peking, seems to be worried because more replies have not come in in answer to his letter, with extracts from the "Punjab Excise Manual" published in the January number of the CHINA MEDICAL JOURNAL.

It seems almost foolish that any intelligent physician should claim that opium taken habitually in any form was not detrimental. If a serious opinion is really desired on so obvious a matter it is earnestly hoped that the medical profession in China will respond with such convincing arguments as may be appropriate.

Editorial on Educational Program, C.M.B.

Dear Doctor Merrins:

I am afraid that the editorial on the educational program of the China Medical Board in your November issue was written under a misapprehension, since you state that the China Medical Board has decided to carry out only about one-fourth of its enterprise as originally planned.

The recommendations of the China Medical Commission, which were adopted as a guide to the policy of the China Medical Board, included proposals for the organization of medical education in connection with the Peking Union Medical College and that the second medical work of the Foundation be established in Shanghai. It was also recommended that assistance be given to the plans of the Canton Christian College and the Yale Mission for medical education.

Later definite action was taken for the organization of schools at Peking and Shanghai.

Aid was given to the Yale Mission in the amount recommended by the China Medical Commission, and this aid has been substantially increased since that time.

No promising organization for medical education in Canton presented itself. It seemed clear that unless the China Medical Board itself should assume responsibility for organizing a school and for meeting the greater part of the expense, there was little likelihood of any substantial achievement at that city in the near future. It will be noted that in the case of Canton and Changsha
the only suggestion made was that aid should be given, and there was, so far as I am aware, no thought that the China Medical Board should assume the degree of responsibility which was contemplated for the schools at Peking and Shanghai.

On the other hand, there developed at Tsinanfu a very promising union of missionary societies in a medical school having the approval of the China Medical Missionary Association. The China Medical Board has given to this institution quite as much assistance as had ever been contemplated for a school at Canton.

It will be seen, therefore, that of the four projects recommended by the China Medical Commission two have been carried out as planned—at Peking and Changsha—only at a far greater cost than had been previously estimated in both cases. One project, that at Canton, never matured, and no commitment was ever made by the China Medical Board, but a fifth school, not recommended by the commission, was aided. One school, that at Shanghai, has been definitely abandoned. Under these circumstances I believe that it is not wholly fair to say that the Board has decided to carry out only one-fourth of its enterprise as originally planned.

Yours sincerely,

ROGER S. GREENE.

SHORT COURSES IN PRACTICAL DIETETICS FOR NURSES.

A short course in practical dietetics for nurses is offered at the Peking Union Medical College, under Miss E. Grace McCullough, formerly of the Massachusetts General Hospital and the Peter Bent Brigham Hospital, Boston.

A limited number of scholarships will be available providing free board, lodging, tuition, and travelling expenses, in return for assistance in the work of supervision. The duration of the course will be four months. In special cases, arrangements may be made for a longer period.

Work in both foreign and Chinese diets will be given. The course is open to Europeans and Americans, and to Chinese having a good command of the English language. As the facilities are limited, applicants engaged in institutional work and those having a fair working knowledge of the Chinese language will be given the preference. Persons interested may secure detailed information by communicating with Miss McCullough, care of the Peking Union Medical College, Peking.
At a regular meeting held on Friday, January 28th, a paper was read by Dr. E. C. Faust entitled "Preliminary Survey of the Parasites of Vertebrates of North China." The following abstract is presented by the author:

The work was undertaken:

(1) To secure an accurate record of the parasites in a dry temperate region that has up to this time been unsurveyed.

(2) To determine the possible types of life histories in such a region at various times of the year, and in this way to gauge more readily the probable sequence in the histories of parasites, a knowledge of the life cycles of which is desired.

(3) To establish the fundamental relationships between parasites of man and lower animals.

(4) To discover animals capable of transmitting parasitic infections either as vectors or intermediate hosts.

(5) To utilize the accounted data in eliminating human sooparasitic diseases here and elsewhere.

More than 2,000 animals mostly from the vicinity of Peking have been examined for parasites, consisting of 20% mammals, 71% birds, 2% reptiles, 1% amphibians, 4% fishes, and 1% mollusks. Infection incidence for the Peking area is as follows: mammals, 60.3%; birds, 33.5%; reptiles, 22.3%; amphibians, 55%; fishes, 66%; mollusks, 5.1%. Most of these parasites have been found in the intestine of the host, although liver and lungs have relatively high infections. A direct correlation between the habits of the parasite and the dryness of the climate was found to obtain, since groups requiring no water-loving intermediate host showed high percentages, and those requiring no intermediate host always ranked high. While many of the parasites infecting men are likewise found in other vertebrates either as larval or definitive hosts, no correlation of types of parasites has been established.
MEDICAL SOCIETY MEETINGS.

PEKING MEDICAL MISSIONARY ASSOCIATION.

December 1st.

The regular December meeting of the Peking Medical Missionary Association was held at the home of Dr. Phillips on December 1st, there being thirty members present.

Dr. H. J. Howard presented a paper entitled "Hospitals in Japan", being a survey of some fifty hospitals of the principal cities of Japan visited by Drs. Lennox and Howard during the summer of 1920. A partial comparison was made between those hospitals and similar institutions in the United States and China. In general, the survey showed that while many hospitals were conducting very creditable laboratory and research work, there was a definite lack in the scientific care of the patients.

December 18th.

A special meeting of the Peking Medical Missionary Association was called, December 18th, to consider the sanitation of the famine relief camps near Peking. Meeting held at the Yu Wang Fu with twenty-seven members present.

Upon invitation, Dr. Liu of the Chinese Red Cross reported on the lack of sanitary measures and precautions in the famine relief camps about Peking. This was supplemented by a statement by Dr. Ingram as to the various diseases prevalent in the camps and the need for better food and clothing. As the local Chinese Red Cross Society did not feel equal to the situation, suggestions or help from this society were welcomed. After discussion as to the best way for this society to proceed in order to assist the people in the camps and to safeguard the health of Peking from the various epidemics which were liable to break out in these camps and to spread to other regions, it was voted that Drs. Cormack, Ingram, and Hsieh constitute a committee to interview the Minister of the Interior, in order to bring these matters before his attention, urging action and promising the co-operation of this society.

January 5th, 1921.

The regular clinical meeting of the Peking Medical Missionary Association was held January 5th at the Peking Union Medical School Hospital, there being thirty-five members present.
Dr. Cormack reported for the Sanitation Committee saying that the Minister of the Interior was quite sympathetic with the purpose and motive of their call and promised to have the local yamens under whose jurisdiction the famine relief camps came, investigate and then consult with the Sanitation Committee in regard to their suggestions.

Case Reports.

Dr. Woods presented two cases of epidemic lethargica encephalitis with discussion of the symptomatology and differential diagnosis of the disease.

Dr. Robertson presented a case of purpura hemorrhagica. Discussion and differential diagnosis from hæmophilia.

Dr. Maxwell presented a gross specimen together with microscopic preparations of malignant degeneration of a cervical fibroid.

Dr. Taylor presented two cases of empyema, one chronic and the other acute, both treated surgically and with Dakin solution irrigations. ... He also presented a case of tuberculosis of the skin of the chest (lupus) treated very successfully by surgical removal and skin grafts.

Dr. Dunlap reported four cases of acute mastoiditis caused by streptococcus hemolytica and also spoke of the apparent epidemic of that infection as demonstrated by throat and ear cultures in a number of cases recently.

Dr. Hodges demonstrated the X-ray findings in the above mentioned four cases of mastoiditis.

D. V. Smith, Secretary.

ANATOMICAL AND ANTHROPOLOGICAL ASSOCIATION OF CHINA.

At a regular meeting held on Friday, December 31st, a paper was read by the Director of the Geological Survey, Mr. C. K. Ting, "On the Native Tribes of Yunnan." The following abstract is presented by the author:

Toward the end of 1913 the lecturer was sent by the Ministry of Agriculture and Commerce to the province of Yunnan where he spent the following year studying the geology of Eastern Yunnan. He took the opportunity to make a few measurements of the tribes he met on his way from Yunnan to Hueilichou in Szechuan.
Before presenting the results of his own observations he discussed the question of classification. In Chinese literature there were at least 170 tribal names known, many of which were really synonyms. The classification based on language first put forward by Major Davis was the one adopted as the basis of study. It was, however, incomplete and the lecturer proposed certain additions and modifications. The following are the two classifications side by side.

**Major Davis' Classification of the Languages of Yunnan.**

| A. Mon-Khmer | a. Miao-Yao group | 1. Miao |
|              |                  | 2. Yao |
|              |                  | 2. Minchia |
|              |                  | 3. Wa |
|              |                  | 3. La |
|              |                  | 3. P'uman |
|              |                  | 4. Palaung |
|              |                  | 5. K'amu |
| B. Shan      | a. Shan          | 1. Shan or Tai |
| D. Tibeto-   | a. Tibetan       | 1. Tibetan |
| Burman       | b. Hsifan        | 1. Hsifan |
|              |                  | 2. Moso or Nahsi |
|              |                  | 3. Lutzu or Anung |
|              |                  | 4. Woni, including Mahei, K'ato, Putu Pio, Ak'a, Sansu, K'uts'ung, etc. |
|              |                  | 1. Ach'ang or Ngach'ang |
|              |                  | 2. Maru |
|              |                  | 3. Lashi |
|              |                  | 4. Zi or Asi |
|              |                  | 1. Kachin or Chinp'aw |

**Classification Modified by the Author.**

| A. Mon-Khmer | a. Miao-Yao group | 1. Miao |
|              |                  | 2. Yao |
|              |                  | 2. Wa |
|              |                  | 2. K'awa |
|              |                  | 3. La |
|              |                  | 3. K'ala |
|              |                  | 3. P'uman |
|              |                  | 4. Palaung |
|              |                  | 5. Chiehshi |
| B. Shan      | a. Shan          | 1. Paiyi, including Lüjên, Nungjên, Shajên, Chungchia, Tulão, Mengwu, Lamo. |
|              |                  | 2. Minchia or Nama |
| C. Tibeto-   | a. Tibetan       | 1. Tibetan or Kutsung |
| Burman       |                  | 2. Hsifan |
|              |                  | 3. Moso |
|              |                  | 4. Lutzu |
|              |                  | 5. Chiutzu |
The China Medical Journal.

c. Lo Lo group
1. Lolo or Neizu including Miyi, Achê Lowu, Shawa, Mutsa, Chêsu P'iyi, Pishayi Menghuayi Ach'eng, etc.
2. Liso or Lisu
3. Woni, including Putêh, K'atu or Atu, Piojên, Muchi K'uts'ung, P'ula, Mala, Ak'a Sansu, Lopi, Heipu, etc.
4. Lahu or Lohei including Pupio

c. Burmese group
1. Ach'ang
2. Maru
3. Lashi
4. Zi or Asi Chingp'an

d. Kashin
   1. Kashin

Most of the tribal names were included in the modified scheme but there were still twenty names known in Chinese literature which remained to be identified. The lecturer differed from Major Davis in his classification of Miuchia. He regarded them to be descendants of the Nanchao, which formed the Shan Empire with its capital in Talifu where the modern Minchias are found. Like the Nauchow people the Minchias are also the most Sinianised tribe of Yunnan. The conquering generals of the Ming Dynasty treated the Nanchao people rather cruelly, making many of them slaves. This probably accounts for the tradition that they came from Nanking. Major Davis' reason for classing them with the Mon-Khmer family was that their language contained numerous words of Mon-Khmer origin, whilst they have no modern neighbours belonging to that race. But this does not really mean anything because the Nanchao Empire had numerous Was and K'as in their army who might have been responsible for the introduction of the Mon-Khmer words.

A brief account of their geographic distribution both at the present time and in history was given. It was seen that before the formation of the Nanchao Empire the Shans occupied Eastern Yunnan which is now a Lolo country. The region of Talifu was originally peopled by the Marus who were driven out by the Nanchao. Otherwise the Lolos have always been a people in Northern Yunnan whilst the Shans predominated in the South.

The following tables give the measurements made by the lecturer and the calculated indices:
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(b) Liso of Huanchow, Wuting.

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(c) Hciyi of Lungtsuoshan, Hwetli.

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### Table II Indices

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#### (b) Lowu of Huanchow, Wuiling 武定州之羅瑤

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#### (c) Heiyi of Langtsaoshan, Huwei 合理喇喇山之黑夷

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#### (d) Chinmiao of Yinach'ang, Wuiling 武定迤那鰲之青苗

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Except the Miaotse all the people measured belong to the Lolo family who have often been noted by travellers as showing many non-Mongoloid characters such as tall stature, fair skin, and more regular features. The cephalic indices of the three series given show clearly that on the whole both the Lisos and the Lolo are dolichocephalic. This may also be an indication that the Northern Lolos had some blood other than Mongolian. Historically the Lolos were in association with the Ch’iangs who formed an important people in North-western Szechuan, Kokonor, and Southern Turkestan. In the last place they were known to have intermarried with the Iranian people known as Yuehchi. The Iranian element may have found its way into the Lolos through the Ch’iangs. That would account for the non-Mongoloid cephalic indices as the Iranians were certainly dolichocephalic.

**Public Health.**

**CHINA’S FIRST MINISTER OF PUBLIC HEALTH APPOINTED.**

Dr. S. M. Woo left Shanghai in January to assume the duties of organizing a Department of Health under the reorganized Canton local government. Soon after his arrival he was also appointed Minister of Public Health under the Southern Government. Although no word has come since of his acceptance of this position, yet it is significant that the leaders of the Southern Party struggling for recognition and power should so early see the necessity for dealing with public health problems and in consequence create a Ministry of Public Health.

It is also a reflection on the character and ability of Dr. Woo that he should be the first to be called to this important position. After graduating from St. John’s University he finished a medical course at Johns Hopkins University, and a course in public health at Harvard-Massachusetts Institute of Technology. While still in America he was engaged by the China Medical Missionary Association and the National Medical Association to return to China as Secretary of the Council on Health Education. He served in this capacity from July 1917 until 1921. During this time he devoted himself chiefly to the preparation of health literature in Wenli and Mandarin and also to three illustrated health lectures on “Modes of Infection,” “Hookworm,” and “Kill the Fly.” More than six million pages of health literature and thousands of various health charts have been sold by the Council. Dr. Woo
offered his resignation but it was not accepted by the Executive Committee of the Council. It was mutually agreed that he should have an indefinite leave of absence.

W. W. P.

THE DELOUSING PROBLEM.

If typhus fever or relapsing fever break out in epidemic form during this famine, there are four groups to be considered from the standpoint of delousing. (1) Famine relievers; (2) schools and churches in mission stations often the centers for famine relief work; (3) refugee camps, fortunately few, and (4) the people at large. There are four requirements to be considered in the choice of a delousing method, effectiveness, simplicity of operation, the degree of control it is possible to exercise, and lastly, cost. In the light of these requirements, groups one and four present the extremes of the delousing problem, in point of numbers involved and difficulties to be faced.

What methods for delousing are practicable in China? This whole question is under consideration by the Sanitation Committee of the Peking International Famine Relief Society of which Doctors Charles W. Young and S. H. Chuan are Co-directors. Two methods have been suggested, kerosene and hot air.

In the light of his experience in the typhus epidemic in Servia, Dr. H. G. Barrie holds most strongly to the use of kerosene, especially in dealing with groups one and two and even with group three, as supplementary to baths and disinfected clothes wherever possible. He does not believe in the use of special garments such as outer uniforms, adhesive tape around wrist or ankle as safeguards against lice. He raises the point that other methods do not safeguard against bites between baths and changes of garments, and that kerosene when properly applied to the body from head to foot from twice a day to three times a week according to the degree of danger in which the individual finds himself will protect absolutely even though lice gain access to the body. He would bathe the people if they were willing and change their undergarments if said luxuries were available, but his mainstay for protection would still be a tin of neat kerosene, fifty or even one hundred people to the tin. Lice will not bite a body covered with a film of kerosene, is his contention, for the oil will clog up the breathing parts of the adult louse and in the air prevent the interchange of gases necessary for its development.

A second method for delousing is put forward by Dr. J. H. Ingram of Peking as the result of his attempt during the flood some years back to delouse about 400 flood refugees. At the present time the Sanitation
Committee is rather inclined to favor this method. Two buildings constructed with walls of 'kao liang' stocks and mud are necessary. One of them must have double walls with an air space between to help retain heat and save fuel. The latter is used for delousing the clothing. Brick and mud stoves at either end burning hard coal are the source of heat, 70 degrees C for 30 minutes. In the other building which is divided into three sections, the people take their time bathing while their clothes are being disinfested. The advantages claimed for this method are simplicity of construction with material commonly available everywhere in the North, the ease and rapidity of operation, low initial cost and low operating cost.

During the recent meeting of the C.M.M.A. Hospital Committee in Shanghai, Mr. T. T. Tretnoff, the inventor of the Ural Continuous Bath and Disinfector, gave a demonstration at the headquarters of the Council on Health Education. He reported that 7,000 such plants had been built during the war and used in the Russian army. His machine requires two brick or mud walled rooms in an ordinary house. It must be possible to seal up one of them. In the other the fire-box opening projects through a hole made in the partition. The stove is made of sheet iron surmounted with an iron casting pyramidal in shape having a series of shallow trenches on to which water drips from a perforated pipe leading outside through the partition. Thus superheated steam may be used to increase the temperature and to provide a certain amount of moisture. Heavy stove pipes wind back and forth within the room in which clothes are hung in bags from poles and thus help to add radiating surface. An asbestos perforated sheet is stretched across an iron frame above the stove and smoke pipes to prevent the clothes from catching fire. If the room has a wood floor, a layer of brick or sand is first spread out.

The inventor brings these claims for his outfit. It worked in Russia and his present device is the result of five years of experience. A temperature of 150 C (270 F) can be secured in 45 minutes from the time of firing, using brush and coal. It can be installed in any building having a chimney and fairly dense rooms of a size sufficient to hang up 150 full outfits. It can be taken down in a hour after cooling and although it weighs 620 pounds, it can be transported in parts quite easily. It burns wood, coal or brush with equal ease and can be fired eight times a day and thus delouse 1,200 people a day. By the increase of the amount of steam used it can also be made to disinfect as well as delouse. It does not burn clothes or even furs. It is simple and economical of operation.

Kerosene, hot air, or hot air plus steam,—which one of these three methods is the best for North China? We do not know. The kerosene method may have been a success on a limited scale under strict military
conditions in Servia. This does not necessarily make it the method of choice for North China. The only Ingram plant thus far reported in operation outside Peking has for some reason failed to measure up to Dr. Ingram's success in securing and maintaining the required temperature. And regarding the outfit used in Russia, some doubt was expressed at the Shanghai demonstration as to whether it would yield the high temperature claimed by its inventor. Should disinestation become necessary to fight typhus and relapsing fever, each of these methods will probably be tried out. Not until after further data become available shall we be able to say what method stands up best under the trying conditions prevailing in China.

W. W. P.

SIX AMERICAN HEALTH ORGANIZATIONS COMBINE.

Emphasis in public health work is more and more centering around the child. During the last few years there has been a very marked growth of several national child health organizations in America. At the request of a number of them, the good offices of the American Red Cross were secured to bring about a series of conferences looking toward co-ordination in plans and work. The following organizations are charter members of the newly formed National Child Health Council:

- American Child Health Association
- American Red Cross
- Child Health Organization of America
- National Child Labor Committee
- National Organization for Public Health Nursing
- National Tuberculosis Association

The purpose of this Council is to co-ordinate the work of the member organizations between themselves first of all, and also with the various governmental agencies whose work relates in any way to child health. The Council will develop a systematic monthly exchange of information on plans of work and itineraries of field workers for the purpose of keeping each organization fully informed as to the work and plans of the others, and for developing the soundest methods of co-operation, and of supplementing one another's work. The same plans will be followed in planning for, preparing and distributing literature. Conferences of workers, written reports, and oral discussions of plans by the Executive Secretary with each departmental director will be the methods used. As a result of the formation of such a National Child Health Council it is hoped the triple danger of waste, overlapping and neglect will be avoided.

The Executive Secretary of this National Child Health Council is Mr. Courtenay Dinwiddie, with headquarters in the national headquarters of the American Red Cross, Washington, D. C.

W. W. P.
Japanese Medical Literature.

Review of Current Periodicals by the Staff of the Research Department, Severance Union Medical College, Seoul, Korea.

RALPH G. MILLS, M.D., Director.

Iji Shimbun
(Medical News)
No. 996. April 25, 1918.


The author studied the number and distribution of the glycogen granules stained by Best's Carmine method in the muscles, and also in the myocardium, liver, and kidney of 200 cadavers. In only five cases were they regularly distributed along the cross striations. More often they were found longitudinally distributed between the muscle fibrils, and in groups about the nucleus. Frequently they were irregularly scattered. In some cases they fused to form small droplets, most often situated just beneath the muscle sheaths. In other cases there was diffuse staining along the cross striations, or over the surface of the muscle fibrils.

No change in number was observed in bodies examined within twelve hours after death, but the number diminished progressively after this period. The number of granules was greater in the spring and autumn than in summer and winter. They were fewer in children. No marked difference was noted between males and females.

Glycogen was most abundant in the gastrocnemius, less in the intercostals, diaphragm and rectus abdominis, least in the upper arms, fore arms and masseters. Granules were numerous in cases of muscular paralysis, and were present in one case of paralysis agitans, and even in tetanus, and suppurative meningitis. A positive reaction was obtained in thirteen of twenty-nine cases of beri-beri, in six of ten cases of cardiac disease, but rarely where decompensation was marked, in four of eight cases of severe anaemia, in two of five cases of leukemia, in fourteen of twenty-seven of pulmonary tuberculosis, in two of four cases of miliary tuberculosis, in ten of nineteen cases of acute suppuration, ten of twenty-three cases of cancer, and two of sarcoma, and in eight of ten cases of hepatic cirrhosis. They were usually negative in jaundice, including two of Weil's disease, and in nephritis. The significance of these figures is further reduced by the varying time after death at which the examination was made.

Nisshin Igaku
(Journal of Modern Medicine)


Alimentary atherosclerosis was more marked in castrated animals than in controls. This he attributed to the hypercholesterinæmia which exists in castrated animals, which results in the deposit of both neutral and doubly refractile fat in
the walls of the vessels. The anatomical changes were practically identical with those of human atherosclerosis. He attributes the greater prevalence of atherosclerosis in Europeans than in Japanese to their meat diet.

(Kitasato Archives of Experimental Medicine)

Vol. xi, No. 3. December, 1918.

(696) TSUTSUGAMUSHI DISEASE. (Conclusion.) T. Kitashima and M. Miyajima. Pages 237-734. German text. Extensive bibliography. 13 plates.

Biological studies of the virus.

The susceptibility of monkeys to the disease made possible an exhaustive study of the virus. As already reported monkeys were infected by exposing them in infected regions. In seven out of fourteen trials over a period of three years a spontaneous infection was secured, numerous mites being found on the animals in all cases. Kitasato in 1892 in a single experiment succeeded in infecting a monkey with blood from a human case, and the authors have confirmed his finding and have succeeded with great regularity in infecting monkeys with the blood of both infected monkeys and human beings. In one case Tanaka reports transferring Kedani disease to a human subject by inoculation of 0.2 mils of blood from a human case of the disease.

In man the virus is present in the blood during the febrile period when the exanthem was at its height but not after the temperature had returned to normal. Inoculation of tissues from the region of the bite were negative. In monkeys the blood during the fever usually, but less constantly, gave positive results. The virus was also present in the lymph glands, liver, spleen, kidneys, and adrenals, but the most constantly positive results were obtained from the spleen. Subcutaneous, intravenous, and intraperitoneal injections were equally effective, but the animals could not be infected by rubbing the material on the scarified skin. As a rule 1 mil of blood sufficed to infect, while 0.1 mil was the smallest infecting dose. Only two animals died of the disease.

The endemic species of monkey, Pithecus fuscatus, Blyth, was most susceptible, being infected in 70% of the tests. The long-tailed species, P. fascicularis, irus. and pileatus next, in 60.9%; the short-tailed species least in 30%.

The incubation period in monkeys is usually six or seven days, regardless of whether the infection is naturally acquired or given by inoculation. In the former case a local lesion always develops as in man but not when experimentally infected, even by subcutaneous injection. The temperature rises gradually from the normal of 38-39 C. to about 40 or 41 C., persists at this point for several days, and gradually returns to normal, the duration averaging two weeks. There is loss of appetite, weakness, usually swelling of the regional lymph glands, but never any exanthem, even in an orangoutang. In the two fatal cases the only gross lesions were swelling of the lymph glands and swelling, congestion, and friability of the spleen.

An animal which has survived an infection is immune to further inoculations. The virus from human cases and from naturally infected monkeys was identical in behavior. No difference whatever could be detected as a result of animal passage, even after thirty-three animal passages in one strain.

The virus did not pass through a Berkefeld filter which held back B. coli and Staphylococcus, but allowed B. prodigiosus to pass through. The residue was infective. Serum free from cells by centrifugation, and citrated plasma were not infectious, but the sedimented cells were, as was the exudate obtained by intraperitoneal injection of aleuronat in an infected animal. Hence it seems probable that the virus is in or on the leucocytes.

The virus was quickly destroyed by glycerine, and was much enfeebled after five to seven days in salt solution.
It was killed by exposure for fifteen minutes to 45 C.

Although one attack confers immunity, no protective power was conferred by serum either from convalescent patients or monkeys, or from immunized monkeys. Complement fixation tests were also negative, using a splenic emulsion as antigen.

Negative results were obtained on injection of rabbits, guinea-pigs, mice, rats, dogs, cats, calves, sheep, horses. They found, however, that the spleen of guinea-pigs might be infectious for monkeys ten to fifteen days after inoculation, even if the pig had shown no symptoms whatever, and were able in one case to carry the virus through five successive passages from pig to pig. The same observation was made in apparently insusceptible monkeys.

The same is true of field mice. They show no symptoms after inoculation, but may carry the virus, and thus infect the mites which find in them their natural host.

The red mite.

(See also an article by the same authors, review No. 168.)

All the mites which have been found on man in these regions are larvae of a single species. The small forms are identical with the large ones in their mouth parts, legs, and arrangement of the bristles, and differ only in the size of the body, which depends solely on whether or not they have fed.

A detailed description of the larval mite is given.

The body is covered with a thin chitinous membrane, marked on its upper surface by fine transverse lines. On the anterior portion of the back is a trapezoidal scutum, finely punctate, and bearing seven bristles, the medial posterior pair of which are longer and slenderer, are surrounded at the base by a double circle, and represent sensory hairs. Adjacent to the margin of the scutum are a pair of eyes consisting of ten rhabdomes, arranged in an anterior and posterior group of five each. In the live animal they are glistening blood red points. The back behind the scutum is covered with many strong feathery hairs, from 0.046 to 0.061 mm. long, arranged in transverse rows, about six in number, with two in the first, then 6-10, 6-10, 6-8, 4, with a few scattered ones posteriorly.

The anterior part of the ventral surface is covered by the coxal plates, except for a narrow medial portion which is longitudinally striated. On the posterior and lateral surface of the first coxal plate is a large stigma with slightly elevated margins. The posterior part of the ventral surface is transversely striated, and covered with twenty to twenty-five bristles arranged in four to six rows. There is a pair between the first and between the third coxal plates, the latter are covered with many pointed bristles.

The hind legs are 0.2 mm. long, the fore legs, 0.17 mm. the mid legs 0.14 mm. The legs have five joints, each femur being made up of two parts. The fifth (terminal) joint, the tarsus, is the longest, the second and fourth next, the first and third the shortest. The legs are covered with stout pointed hairs, which are thickest on the distal joints. On the dorsal surface of the first and second tarsi is a thorn-like tactile hair, which is lacking on the third. At the tip of the terminal joint is a depression from which springs three claws, two short lateral ones, and a longer slender central one.

Mouth parts. The two middle mandibles, which are made up of a single piece, are provided with stout up-curved claws. They lie close together over the labium above, the latter being closed below by the fused basal joints of the palpi. The labium ends in a two-lipped margin, but without chitinous border extending laterally at the margin of the labium, which is found in most species. On the upper margin of the labium there are small feathered hairs.

The five jointed palpi are markedly enlarged in the middle, and arched inward. The second joint is much larger than the rest. The next to the last joint ends in a three-toothed claw, curved medially, the middle tooth of which is the longest and strongest. The last joint is a small wart-like outgrowth covered
with seven feathered hairs, and a thorn-like bristle. The hairs on the dorsal side of the palpi are all simple except for one feathered hair on the next to the last joint. The structure described as sucking tube or hypopharynx probably is not a part of the mite at all, but an inflammatory reaction produced in the skin of the host.

A description of the internal organs is also given.

The mites found on the field mice, the natural host, are identical in every respect with those found on human cases. Mites found in spring are more thickly covered with hairs than those in summer, but this is a seasonal difference.

While the mites in infected regions showed large numbers of mites, the latter have been found on mice and other small mammals in non-infested regions, and seem to be quite widely distributed in the Orient. They have been found in Aomori-ken, Kumamoto-ken, in parts of Korea, and in the Philippines, where the disease is not known.

While infested mice may be found at all seasons, there is an enormous increase in the summer months, especially July to September inclusive. At this time 124 of 136 mice examined were infested, and there may be hundreds of mites on a single mouse. They have also been found on house rats in infested regions.

The mites may quickly fall off the mice and may live several days in water. Mites which have fed fully burrow in sand or mud, and change into the pupal state, as nonmotile structures of reddish-yellow color, from which after seven to nine days the small eight-legged nymphs emerge. The latter are larger than the larvae, have an S-shaped body, and a faintly reddish white color. By feeding them on juice from potatoes, melons, etc., Miyajima and Okumura succeeded in following the development into the adult form. The nymphs again burrow in sand, pass through a second pupal stage of seven to ten days duration. The adult form resembles closely the nymph except for its larger size. It moults several times before sexual maturity. (See review No. 168.) A detailed description of the adult form is given. The eggs are laid singly, and in the warm months the larvae emerge after about three weeks. The entire cycle of development may occur within three months.

The akamushi differs from Beptus autumnalis chiefly in the following points:
The legs are shorter (in the akamushi).
The anterior margin of the scutum is straight instead of concave.
The hairs on the back are more numerous.
The long tactile hair on the third tarsus is lacking.
The hairs on the dorsal side of the palpi are not feathered, except one hair on the fourth joint.

A pair of hairs on the galea are feathered.

They conclude that the akamushi is similar to and probably identical with Trombicula coarctata (Berlese).

The common field mouse in these districts is Microtus montebelli (M. Edw.). They live in the fields, in underground burrows, coming out chiefly at night. A pair produces three to four litters a year of four to six young, which become sexually mature in two months. They are good swimmers, and thus survive the recurring floods which destroy many of the weasles and other natural enemies. As a result they multiply in enormous numbers and do tremendous damage to crops, and the farmers are quite unable to make any headway in destroying them. The authors recommend the protection of the small carnivorous birds and animals which are endemic, and the use of cultures of mouse-typhoid bacilli, mixed with buckwheat meal and scattered over the infested areas. The authors tested this method in two islands in the most heavily infested region, using 4.5 liters of a broth culture, in one pound of buckwheat meal, to an area of 87 ha., and scattering it twice a year over a period of three years. The total cost was 22 yen.
As a result the number of field mice was so reduced that it was possible to catch only four mice on one of these islands, and there were no mites on the animals caught. The number of cases of infection among the farmers visiting the islands was greatly reduced. The increased yield of harvest resulting from the destruction of the mice repaid six times over the cost of the procedure, aside from practically eliminating the danger of infection.

Attempts of the authors to find the casual agent of the disease were unsuccessful. In about 4.5% of the field mice examined they found spirochaetes similar to and possibly identical with spirochaeta icterohaemorrhagiae, but certainly having nothing to do with this disease.

The akamushi bodies, found in from 25 to 30% of the mites, they believe on morphological grounds to be parasitic blastomyces, and have suggested the name of Chlamydomycyes akamushi. As in most other cases of yeasts parasitic in insects cultivation was not successful. They were not able to infect monkeys with the bodies of the mites, though Nagayo and others have reported positive results in three out of five experiments.

In the blood patients and infected monkeys the authors described the following structures, more or less resembling parasites, none of which have any casual relation to the disease.

(1) "Randkoerperchen," small bodies consisting of one to two chromatin granules surrounded by a bluish zone (Giesma stain) eccentrically attached to red cells, and resembling piroplasmata. They are found in anemias of other origin.

(2) Cabot's strings.

(3) Plasma globules of Koch, round or oval bodies of variable size, extracellular or mononuclear cells, taking a violet or azure stain, present in films from the spleen, glands, and kidneys, and identical with the bodies described by Ginder and Meyer in coast fever. They may occur in normal animals.

(4) Kurloff's bodies, vacuoles filled with minute granules and rods occurring in endothelial cells of the spleen and lymph glands, resembling the "Chlamydozoen" of Prowazek, the Strongyloplasma of Lipschutz, and Lymphocylozoon cobaye of Ross.

(5) Haemosiderin granules.

Many attempts to cultivate the virus were unsuccessful.

They call attention to the similarity of the disease to typhus fever, and to Rocky Mountain Spotted Fever, though it has been shown by others to be distinct from both. They think it is to be placed in the same group of diseases as yellow fever and dengue fever, due to filterable viruses, although the virus of this disease is not filterable.

They were not able to influence favorably the course of the disease in man or animals by the administration of quinine, iodides, mercury, arsenic, salvarsan, trypan red, or immune serum.


In a bacteriological study of these cases they isolated the Bacillus influenzae of Pfeiffer from the sputum in 30% of 46 cases and from the nasal secretion in 68% of 26 cases. It was found in four of 65 normal individuals. Agglutination tests with serum of human cases gave positive results in some instances. For these reasons they think it is the cause of the disease, and also because the lesions in experimentally infected guinea-pigs, the hemorrhagic inflammation in the lungs, stomach, and intestines, as well as the paralysis of the hind legs, "quite agree with the anatomical findings as well as with the clinical manifestations of the human cases."

The pregnant female rabbit, and castrated females formed more haemolysin than did normal males, or non-pregnant normal females. This he refers to cessation of the internal secretion of the ovaries.


By means of the complement fixation test the author demonstrated the presence of human blood in "fly specks" deposited on furniture under natural conditions, as well as in the excreta of flies which had been observed to suck up human blood under experimental conditions.


In the domestic white rat and guinea-pig the spirochætes are found in the tissues of the lips, eyelids, tongue, and frequently in the lymphatic and salivary glands. They are numerous in the testes, and in the adventitia of the aorta, and the media of the pulmonary and renal artery.

The spirochæte is not excreted with saliva from the salivary glands. It is possible that it may penetrate into the deeper layers of the epithelium of the mucous membrane of the mouth and then reach the oral cavity as the epithelium is shed.

It is rarely excreted in the urine (1% of guinea-pigs). It was not found in the bile or intestinal contents.

The spirochæte escapes mainly through an abraded area in the mucous membrane or skin injuries which are commonly present in lips and gums of the rat. It is conveyed to a normal animal by the bite of one infected animal.

Healthy animals caged with infected animals did not become infected unless bitten.

Instillation of suspension of spirochæta into the eyes and feeding organs of infected animals caused infection in only a small percentage of cases.

Guinea-pigs, domestic and white rats, and mice are susceptible to infection with the spirochæte from the domestic rat, from the field mouse, and from man. Guinea-pigs show fever, loss of weight, and falling out of hair. Rats and mice show no symptoms.

The Japanese monkey shows fever with infection with the spirochæte from the domestic rat, and from man, but not from the field mouse.

In their reactions to immune serum, the spirochætes from man, monkeys, domestic and white rats, mice, and guinea-pigs are the same.
Japanese Medical Literature.

Taiwan Igakukai Zasshi
(Journal of the Formosa Medical Society)
No. 186. April 28th, 1918.


This mosquito resembles Anopheles sinensis, and A. lyndseyei of India, differing from them in the arrangement of the spots on the wings and legs. In both these species there was found a wide yellowish white spot in the center of the posterior articulation of the femur. The author's species has also a yellowish white spot at the tip of the tibial joint, and a similar one at the knee.

On the wings, the author's species has a pale spot at the tip of the posterior branch of the fifth vein, while the Indian species has a similar spot on the anterior branch of the fourth vein.

Nippon Gaukwagakkai Zasshi
(Journal of the Japan Ophthalmological Society)
Vol. xxii, No. 4. April 28, 1918.

(702) Conjunctivæ, Bacteriology of the Normal. O. Kawano and C. Ohbashi.

The author studied the bacteriology of the conjunctivæ of forty-six males and thirty-four females. No bacteria were found by direct smears. By culture, Staphylococcus albus was found in 56.9 of the conjunctivæ, Xerosis bacillus in 56.2%, Staphylococcus aureus in 10.6%, Hay bacillus in 6.3%, Pneumococcus in 3.1%, and Pseudo diphtheria bacilli (?), (?) sarcinæ each in 1.3%. Of the conjunctival sacs 1.3% were sterile, 43.8% contained only one strain of bacteria, 39.4% contained two strains, 13.8% contained three strains, and 1.5% contained four strains. The number of bacteria present in the culture was greater among men employed in dusty occupations than among those in clean trades. The bacteria were usually the same in the two eyes. No difference in the bacteriology was found in the two sexes.

Gunidan Zasshi
(Journal of the Military Surgeons of Japan)
No. 76. April 30, 1918.


One plate.

The study is based on examination of ten caterpillars and five adult moths sent from the surgical department of the thirteenth division of the army. It had been the cause of an urticarial eruption among the troops during the 1917 manoeuvres in the Kwan San military district.

The caterpillar is 1.5 to 2.5 cm. long. The trunk is composed of twelve joints, three thoracic and nine abdominal. The head is glossy black in color. The body black, with regularly distributed reddish brown and yellowish brown spots. Along the mid-dorsal line, and on both sides anteriorly and posteriorly are a number of stout hairs. Each thoracic segment bears a pair of three-jointed legs, yellowish brown in color, while six of the abdominal segments carry a pair of dark brown two-jointed legs.
Each segment of the trunk bears four or five pairs of minute yellowish brown or blackish wart-like protuberances. These bear two kinds of hairs, (1) soft branched hairs 0.2 to 1.5 mm. long, and (2) stinging hairs, relatively stout, forked at the tip. These are relatively easily desquamated, and when they come in contact with skin cause a dermatitis. Each caterpillar possesses about 500,000 of these stinging hairs.

(704) **EPIDEMIC (MENINGOCOCCUS) CEREBROSPINAL MENINGITIS COMPLICATING SCHISTOSOME JAPONICUM INFECTION.** Pages 211-228. C. Maruyama and R. Tokiguchi.

(Sei-I-Kwai Medical Journal)

(705) **CHOLESTERIN AND FATTY ACID CONTENT IN THE BRAIN.** T. Magayania. (Reviewed from Tokyo Igakwai zasshi. Vol. 22, No. 8. English text.)

The dried powdered brain of the ox contained 44.4% of substances soluble in warm petroleum-ether. Of this a half was fatty acids, and half non-saponifiable substances. The cholesterin content was 10.4%.

(706) **TRYPSIN, A STUDY OF.** V. Masai (Reviewed from Tokyo Igakwai Zasshi, Vol. 32, No. 10) English text.

The author found that pancreatic trypsin was made more active by urinary erepsin, and also by intestinal and yeast erepsin. It is therefore most effective in initiating the digesting of protein but less active in the later stages of protein digestion.

(707) **NASAL MUCOUS POLYP.** Pages 382-383. H. Tominaga.

This was remarkable for its size, measuring 10.2 cm. by 2.5 cm. and weighing 27 g.

**Kyoto Igaku Zasshi**

(Kyoto Journal of Medical Science)

(708) **IMPLANTATION OF HUMAN TUMORS IN BIRD EMBRYOS.** Page K. Kiyono, V. Sueyasu and H. Tsuji. Abstract in German text.

The authors report nine successful implantations three partially successful ones in sixty-four cases. Of the nine positive cases, two were carcinomata, five sarcomata, and one fibroma.

**Tokyo Igakukai Zasshi**

(Mittheilungen der Gesellschaft z. Tokyo)

(709) **THE NORMAL SPLEEN.** Pages 1-41. Y. Nishikawa and S. Kawagita. Two plates. Abstract in German text.

The study was based on 522 normal spleens selected from 3,300 autopsies; and the microscopic study on spleens from 112 Japanese.
Japanese Medical Literature.

Table I.

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of cases</td>
<td>Mass in cm.</td>
<td>Weight in grams</td>
</tr>
<tr>
<td>1 yr.</td>
<td>28</td>
<td>6.8×3.5×1.5</td>
</tr>
<tr>
<td>2-5</td>
<td>20</td>
<td>7.6×4.5×2.0</td>
</tr>
<tr>
<td>7-15</td>
<td>18</td>
<td>9.1×5.0×2.2</td>
</tr>
<tr>
<td>16-24</td>
<td>27</td>
<td>10.7×5.3×2.4</td>
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<td>25-40</td>
<td>58</td>
<td>10.5×6.8×2.7</td>
</tr>
<tr>
<td>41-60</td>
<td>89</td>
<td>10.4×6.3×2.4</td>
</tr>
<tr>
<td>60+</td>
<td>50</td>
<td>8.5×5.3×1.9</td>
</tr>
</tbody>
</table>

Table II.

<table>
<thead>
<tr>
<th>Age</th>
<th>Thickness of capsule</th>
<th>Thickness of trabeculae</th>
<th>Width of venous sinuses</th>
<th>Thickness of pulp cords</th>
<th>Diameter of follicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>New born</td>
<td>23-33</td>
<td>15-72.5</td>
<td>12-28</td>
<td>6-16</td>
<td>183-293</td>
</tr>
<tr>
<td>Infants</td>
<td>28.6-44</td>
<td>15.5-110</td>
<td>10-3.5</td>
<td>6-16.5</td>
<td>149-314</td>
</tr>
<tr>
<td>Children</td>
<td>30-50</td>
<td>24-173</td>
<td>13-3.7</td>
<td>6-16.5</td>
<td>219-400</td>
</tr>
<tr>
<td>Youths</td>
<td>65-75</td>
<td>36-193</td>
<td>11-28</td>
<td>6-16</td>
<td>230-370</td>
</tr>
<tr>
<td>Young adults</td>
<td>79-90</td>
<td>31-197</td>
<td>15-31</td>
<td>6-16</td>
<td>244-433</td>
</tr>
<tr>
<td>Adults</td>
<td>68-84</td>
<td>33-204</td>
<td>13-33</td>
<td>5-15</td>
<td>240-440</td>
</tr>
<tr>
<td>Old</td>
<td>115-128</td>
<td>39-250</td>
<td>15-7.32</td>
<td>5-16</td>
<td>180-308</td>
</tr>
<tr>
<td>Senile</td>
<td>105-120</td>
<td>41-427</td>
<td>10.9-30.8</td>
<td>5-13.6</td>
<td>199-373</td>
</tr>
</tbody>
</table>

The embryonic development was also studied in detail.

(710) **Trachoma**: A study of the histological changes in the conjunctiva. Pages 1-7. T. Masuda. German text.

In three incipient cases the only change was slight cellular infiltration in the sub-epithelial layer.

In seventeen cases moderately advanced, the chief change was a diffuse sub-epithelial zone, which was not pronounced in the fornix (peripheral portions) and was looser near the cornea.

In five advanced cases with visible pannus formation, the changes were similar but still more pronounced.

In all cases, even the earliest, there was infiltration in the limbus. This he regards as a process distinct from the subconjunctival infiltration, and as probably due to a specific trachoma toxin.

The cells in the exudate were plasma cells, epithelioid cells, lymphocytes, leucocytes, and mast cells.

Pannus formation, like the infiltration in the limbus, is a process which starts in loco and is not merely an extension of the exudate from the conjunctiva.

The reviews in English of the current medical literature of Japan are very reluctantly concluded with this issue, but it is sincerely hoped that the results of this effort may live on and help to bring together more intimately the medical men of all nations.

Previous to the war the scientists of Japan looked to Germany for their instruction, inspiration, and guidance. Graduate work was done there and all important articles were published in the language of that country. The German journals were the only means by which the work done by Japanese medical men was made available to the rest of the medical world.
The China Medical Journal.

The outbreak of the war in Europe suddenly closed this one channel, and for a time the results of investigation in this part of the Orient were available only to those able to read the native character. The necessity of opening a new outlet for this information was apparent and in view of the inevitable increase in the use of the English language as a conveyor of scientific thought, the course seemed clear indeed.

The influence of such a move upon the political situation was fully appreciated, the exchange of medical thought by means of a language common to the English-speaking and reading nations could lead only in the direction of greater harmony and better understanding.

The first abstracts were printed in the China Medical Journal in July, 1916, and they have appeared in every issue since, save two. A number of illustrations have been copied and one original photograph has been reproduced. Special search was made for newly discovered facts and for points in which diseases in the Orient differed from those in the Occident. Many statements have been made by writers based upon limited observation, setting forth the supposed frequency of certain pathological states and suggesting explanations for the same. Additional evidence bearing upon such controversial questions was diligently sought by critical survey of many articles not actually abstracted. The personal observations made during a decade of residence among these people were occasionally mentioned in reviewer's notes.

During the year following the publication of these abstracts there appeared in Japan a journal devoted entirely to articles in foreign languages. This was the Kitasato Archives for Medical Research and was issued twice a year. We made favorable comment at the time and expressed appreciation of the fact that the Japanese themselves were realizing the difficulty and rising to meet it.

Here and there articles by Japanese began to appear in English in various American journals. In a few instances the writer was able to assist in putting them in easy acceptable form.

A complicated combination of circumstances finally made it necessary to discontinue the service. The Research Department of the Severance Union Medical College gave it up when the writer severed his connection with it. Unofficially, however, it has continued until now.

From the first Mr. David H. Yuh has been of great help in the preparation of the translations and has been assisted by others at various times. My most sincere appreciation of his faithful service is hereby expressed.

Drs. Edward M. Merrins and Robert C. Beebe of the China Medical Journal have been very helpful in placing the manuscript in acceptable form before the public and in making suggestions for the improvement of its quality. Latterly, Drs. Paul W. and Mildred C. Clough have written many of the abstracts.

Almost from the first the Tropical Diseases Bulletin has been receiving copies of the manuscript for simultaneous publication, this arrangement having been made with Dr. A. G. Bagshawe, the editor, at the suggestion of Dr. Lieper. Likewise Chemical Abstracts, with proper acknowledgements, has made use of many of the abstracts after they had appeared in the Journal.

The recent action of the China Medical Missionary Association, seeking to assist in the continuation of this feature, was greatly appreciated. Many letters and personal communications received indicate what this series of articles has meant to persons in various parts of the world. Although the efforts of the writer in this direction must cease, it is with much pleasure that an announcement can be made that this work is to be taken up by the Japanese themselves. Dr. Miyajima wrote to Mr. Roger S. Greene that the Kitasato Institute for Infectious Diseases is soon to begin the publication of an abstract journal that will continue the idea of this serial and tend to bring together more closely the medical men of the different nations by the interchange of thought and the use of a common language.

Ralph G. Mills.
Congenital Hypertrophic Stenosis of Pylorus. It was said by them of old time that the amount of pernicious anaemia in any locality was in direct proportion to the diagnostic acumen of the local practitioners. Of the many other pathological conditions to which the same statement would apply, no doubt congenital hypertrophy of the pylorus is one. When diagnosed early the results of surgical treatment are now so brilliant that it behooves us all to be on the lookout for it.

The leading symptoms, as outlined by W. W. A. Downes (Jour. Amer. Med. Assn., July 24, 1920) are vomiting, usually forcible in character, and loss of weight in infants a few weeks old. Visible peristalsis of the stomach is present in practically every case, while on careful deep palpation the thickening caused by the hypertrophied muscle fibres of the pylorus may be felt, usually to the right of and above the umbilicus. The clinical picture is said to be so clear that as a rule it is not necessary to resort to the Roentgen ray for confirmation of the diagnosis. Although the total mortality of one hundred and seventy-five cases operated on by Downes was high (17.1 per cent) it was only eight per cent in cases coming to operation within four weeks of the onset of symptoms. It is stated that in selected cases the operative mortality need not exceed two per cent.

In cases that do not respond to medical treatment the operation performed is the one usually ascribed to Rammstedt, but more correctly described as the Fredet-Rammstedt operation. The pylorus having been exposed by an incision through the upper right rectus, the hypertrophied circular fibres are divided by an incision an inch or an inch and a quarter in length. This incision is confined to the pylorus, extending not quite to the beginning of the duodenum, and involves only about half the thickness of the muscular coat. The deeper muscle fibres are gently torn through by spreading the blades of an artery forceps between the sides of the incision until the mucous membrane is exposed and bulges out. This completes the operation. After attending to any bleeding points the pylorus is dropped back into the abdomen and the abdominal wall sutured. Feeding is begun one hour after operation.

Ether-oil Colonic Anaesthesia. Is it justifiable to advocate the practice, in China, of those newer methods of treatment which, though promising and alluring, can scarcely be said to be established? We have all found out that few men are able to describe discoveries of their own without magnifying the virtues and minimizing the dangers. Yet if we fail to familiarize ourselves with a procedure until some case appears to be in urgent need of it, we shall be unable to do full justice to the case or to the method. In medio tutissimus ibis. The present position of colonic anaesthesia may be gathered from a paper read and discussed at the meeting of the American Medical Association in April last (1920). If for no other reason, the time and care needed in preparation of the patient make the method unsuitable for routine use. Moreover, cases could not be brought into the theatre in rotation unless...
The China Medical Journal.

The time required for each operation could be predicted and no delays occurred. Any diseased condition of the rectum would be a contraindication while, apart from disease, the introduction of the mixture may cause pain and necessitate its abandonment in favor of inhalation anaesthesia. The most disquieting feature of all would appear to be that although lavage of the bowel may bring away a certain amount of the drug yet the anaesthesia once begun cannot be quickly interrupted. One is in the position described by the Chinese proverb as having "mounted the tiger and unable to get off its back" (骑虎不能下背). This danger is, however, said to be more apparent than real. And, strange though it seems to those who have not tried it, the mucous membrane of the colon is very little irritated by the ether, if at all.

The advantages, on the other hand, are many and obvious. There is no chilling of the mucous membrane of the respiratory tract, no excessive secretion of saliva or of bronchial mucus. During operations on the head, face or neck the anaesthetist is not in the way and the cautery may be used with impunity. If the patient is extremely nervous and apprehensive, above all, if it is desired to "steal" part of her exophthalmic goitre without her knowledge, this is one way of doing so. For details of the technique of administration readers are referred to the Jour. Amer. Med. Assn., July 10, 1920.

Death from Apothesin Anaesthesia. It has been stated by one who is apparently an authority that spinal anaesthesia when properly given, with apothesin or novocain, is as safe as a local anaesthesia with these drugs. It is therefore well to note that occasionally death does occur, apparently directly due to the anaesthetic. Such a case is reported in Journal A. M. A., August 28, 1920. A gastrostomy under spinal anaesthesia was to be performed on a cachectic patient for dysphagia from tuberculous laryngitis. One and a quarter grains of apothesin were dissolved in three mils of distilled water, mixed with seven mils of the spinal fluid and injected with the patient sitting up. He was then placed on his back with the head slight raised. Analgesia was complete in three minutes but before the surgeon had begun the patient became ashy and complained of tightness in the chest. The pulse could not be felt: respirations ceased a few seconds later. As death was evidently due to diffusion of the anaesthetic into the medullary centres it seems possible that it might have been prevented by keeping the shoulders raised. It was to retard such diffusion that Professor Barker of University College many years ago advocated the addition of two grains of glucose to the solution used. One cannot but wonder, however, why spinal anaesthesia was chosen for a case of this kind. Of all abdominal operations, gastrostomy in an enfeebled patient is perhaps the one where local anaesthesia, with or without a few whiffs of ether, is most clearly indicated and gives the most gratifying results.

Hernia Operations. For many years surgical opinion has been fairly unanimous that to prevent recurrence of a hernia the sac must be so dealt with as to leave no funnel-like depression at the neck as seen from the deep surface of the peritoneum. In small inguinal herniae that do not call for reconstruction of the inguinal canal the above is the only point requiring attention. It follows naturally from this view that attempts will be made to approach the sac without
cutting down directly over it. Sir G. L. Cheatle (Brit. Med. Jour., July 17/20) reports a few cases in which, after putting the patient in the Trendelenburg position he made an incision through the lower part of the rectus down to, but not through, the peritoneum, retracted the abdominal wall to the side of the operation, separated the peritoneum from the pari­etes and thus exposed and ligatured the neck of the sac. The part of the sac that lay in the inguinal canal was then drawn up as far as possible, tied low down and allowed to fall back. Practically the same opera­tion can be performed for femoral hernia. If, however, there were intestinal adhesions within the sac of any hernia it would not be appropriate.

It may be questioned whether, for the simple cases above referred to, the old operation would not serve quite as well. Where recurrence follows a carefully performed operation it may sometimes be due to interference with the nerve supply of the abdominal muscles. A year or two ago Dowd of New York devoted a monograph to the impor­tance of preserving the ilio-hyypo­gastric nerve when operating for inguinal hernia.

G. P. Laroque (Surg. Gyn. and Obst., November, 1919) makes the usual Bassini incision and then, at a point one inch above the lower margin of the internal oblique, separates the fibres of this muscle, of the transversalis, and of the transversalis fascia, opens the peritoneum and is thus enabled to sew up the neck of the sac from within the peritoneal cavity. Adhesions, or even strangulation if taken early, would not contraindicate this method of approach.

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**Parasitology.**

**SUCCESSFUL TREATMENT OF GIARDIASIS IN MAN WITH NEO-ARSPENAMIN.** Carr and Chandler, *Jour. Trop Med. HYG.*, September 1, 1920. On the theory that the oxidized products of this salt which are found in the digestive tract after injection of the salt into the system ought to devitalize the cysts of protozoan parasites, the authors have found that on administration of the drug not only cysts of *Giarda intestinalis* and *Chilomastix mesnili* but also those of the intestinal amoebae disappear from the stool.

**RECENT WORK ON ROUND WORM INFECTION.** Stewart, *Trans. Roy. Soc., Trop. Med. Hyg.*, August 1920. The author’s own experi­ments at Hongkong and in India show that rats and pigs may be infected with eggs of ascaris and that larvae may be developed to four mm. in length. Further development of the worm is not known.

**SUR LA SOURCE D’INFECTION DU CHIEN ET DU CHAT AVEC L’ECHINOCHASMUS PERFOLIATUS (v. Ratz), et la question d’infection de l’homme avec les distomes de la famille des Echinostomides.** Ciurea, *Jour. Parasit.*, June 1920. From comparative experiments on the dog and cat, Ciurea suggests that *Echinostomum ilocanum* and *E. malayanum* may be produced from eating fish.

**A NEW RECORD OF TRENCH CONFUSA, WITH ADDITIONAL NOTES ON ITS MORPHOLOGY.** Chandler, *Jour. Parasit.*, September 1920. In this study of material collected in Texas, the author has been able to bring to
light additional points in the morphology of this worm, the systemato-
logy of which has previously been in dispute. It is believed that it bears relations to *T. bremneri* Stephens, 1909, from Northern Nigeria.

Über Stechmücken, besonders deren europäische Arten und ihren Bekämpfung. Martini, Leipzig, 1920. In this monograph the author discusses the European mosquitoes, emphasizing their practical relation to dengue, filariasis, yellow fever, and malaria during the Great War, both in the camps of the Central and Allied Powers. A thorough acquaintance of the anatomy and systematology is evidenced, while a considerable part of the treatise is devoted to prophylactic measures.

A Preliminary Note on Two Intestinal Parasites in Pigs. O'Connor, *Med. Jour. Australia*, October 2, 1920. The investigator has discovered a vicious cycle between the pig and man in Funafuti, Ellice Islands, with respect to the intestinal parasite of man, *Ancylostoma duodenale*, and possibly *lodamoeba bütschlii*.

**Pyrexia Mortelle par un Flagelle.** Leger, *Ann. Inst. Pasteur*, August 1920. In this article, convincing both from the clinical and the parasitological standpoint, Dr. Leger discusses a new type of pyrexia produced by a flagellate new to science, for which the name *Trypanopsis malignus* is proposed. The parasite was found in the blood as well as in hepatic smears of patients in French Guiana. Five forms of the parasite were noted, long free flagellates, oval forms, both with and without flagella, and two degenerate forms. The two cases under observation failed to respond to quinine and resulted fatally.

**Zur Wirkung einiger Phenole auf Würmer.** Schulemann, *Deut. Med. Wochr.*, September 16, 1920. From experimental work on the frog and the mouse the writer has determined that thymol may be used as an anthelminthic without killing the worm, whereas a dose sufficient to kill the worm would constitute a lethal dose for the host.

**Observations on the Geographical and Ethnological Distribution of Hookworms.** S.T. Darling, *Parasit.*, September 1920. The author presents an interesting protocol of data in which he shows that an unmixed native population has a certain index of infection for *Ancylostoma duodenale* and *Necator americanus*. Migration of these peoples to other centers tends to change the parasitic index of the countries to which they go, while their children born in the adopted country take on the parasitic index of that country. Thus the Chinese, Japanese, and North Indians, infected primarily with Ancylostomes, have carried that infection to Malaya and Polynesia, while their children acquire Necator which exists as an almost pure culture (98.99%) in those countries. Such changes are continually going on in Malaya, Fiji, Guiana, and Brazil.

While the author's theories concerning the use of these data in determining the migration of primitive tribes is certainly suggestive, they must be considered as a stimulus for further investigation rather than demonstrated facts.

the tissue is largely dependent on a mechanical process in which the spines are an important factor. One wonders how Major Perry would explain the process in *S. japonicum*, where the spine is lacking.

**Zur Kenntnis der Bothriocephalus-Anämie.** Fr. Herzog. *Münch. Med. Wochenschr.*, November 26, 1920. There are two opinions with respect to the anaemia produced by the broad fish tapeworm. The proponents of one view, working with the extract of macerated Diphillobothriads have concluded that the extract is a poison which constitutes the known cause of a pernicious anaemia, which has its primary onset in the haemopoietic organs and through the production of less resistant elements brings on the anaemia. The other view sets up against this exogenous cause an inherent constitutional disposition to this anaemia, as also the tuberculous and nervous disorders.

The writer describes a case with the past history of having eaten uncooked fish salad. Sickness was first noticed at the beginning of 1920, when a noticeable paleness and icterus set in, together with a general weakness. He had never had any serious illness before and his family history was not suggestive. Examination at the clinic May 19, 1920, showed that the skin except for face and hands was pigmented with brown but no pigmentation of the mucosa of mouth was noted. The gums were reddened and slightly hemorrhagic. There was slight œdema of joints and face. Lungs, heart, liver, and spleen were not noticeably involved. Urine negative for albumin, sugar, and bilirubin; positive for urobilin, urobilinogen. Stomach examination by Ewald process: free HCl varying from 24 to 52; total acidity from 46 to 70. Stool showed large numbers of *Diphillobothrium latum* eggs. June 1, eight minims extr. filic. maris was administered and a large mass of worms passed, with ten heads. Since then no eggs were found in the stools.

<table>
<thead>
<tr>
<th>Blood Chart, Showing Improvement in Condition</th>
<th>After Removal of Worms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Hb</td>
</tr>
<tr>
<td>June</td>
<td>103,000</td>
</tr>
<tr>
<td>28</td>
<td>115,500</td>
</tr>
<tr>
<td>Blood Platelets</td>
<td>103,000</td>
</tr>
</tbody>
</table>

Whereas there was marked poikilocytosis and immature red and white cells in the blood stream on first examination, by June 28 none of these pathological symptoms was present. The writer regards the pigmentation of the skin as due to the infection and separates it from Addison's disease because the mucosa lacked pigment. While this anaemia has the blood picture of Biermer's disease it lacks the other diagnostic symptoms of that disease and must not be confused with it.

**Re: Pathological Specimens.** —Dear Dr. Lincoln, the Anatomical and Anthropological Association of China has already circularized
the profession in regard to information and material for various collections. Many of the items mentioned are pathological in nature although included under other headings. The circular was published before our pathology service was organized and before the plans for the museum were formulated. The request herein contained is in direct accord with the intent of the circular referred to and is an elaboration of the original idea.

The Central Pathological Laboratory of the Peking Union Medical College is an interdepartmental service created for the diagnosing of tissues and the storing of specimens. Here is centralized the common activity of half a dozen departments, making it possible to assemble in a common collection, all slides and pathological material together with copies of all descriptive records relating to such material belonging to the institution.

The definite advantage of this arrangement to the special student and the research worker, is the chief consideration which led to its adoption by all departments concerned. The autopsy and other pathological material which has been secured in past years is being incorporated in the collection, as well as that which belonged to the Harvard Medical School in Shanghai. All the material coming from the surgical and pathological services of this institution is receiving much better care than would be given similar material in other countries whose medical problems are better known. The system of classification and filing will make this mass of material readily available for study. The teaching museum will be composed of interesting specimens chosen from this collection, properly labelled and credited to the donor.

A great deal of valuable material comes to hospitals in China every year and is lost for want of proper storage facilities. It is our purpose to provide these storage facilities, to encourage the shipment of specimens to this central station, and also to welcome any who may desire to study them.

A diagnosis on any specimen will be sent upon request. For the present, at least, no charge will be made for this service, but it is expected that in such instances a full abstract of the case will be forwarded. This information aids materially in making the diagnosis and also increases the value of the specimen for future study.

It is suggested that oil tins containing formalin be prepared in which to receive specimens fresh from the operating room and that these be sealed up and shipped when full. All expenses connected with the preparation and transportation of the specimens will be defrayed by the College.

In view of the difficulties in shipping we suggest that small articles, particularly those on which diagnosis is desired, be sent by parcel post. Chinese parcels express may be found convenient. If such instances the cases should be marked "museum specimens, no commercial value." Large specimens that have been thoroughly preserved in formalin can be removed from this fluid, wrapped in cloth wet with glycerine and packed closely in tin containers. The lids should then be soldered; this obviates the difficulty arising from leakage in transit.

We would urge that you cooperate with us in this effort to develop a large museum of material, to which all who desire to study will be cordially welcomed.

Yours respectfully,

RALPH G. MILLS.
One morning a woman came to the Hospital. She had a far advanced case of cancer of the neck, absolutely inoperable. The situation was explained. Turning to an assistant, she said, "Is this the doctor who opens the abdomen for operating purposes?" When being told that it was, she said, "Well then, why can’t he take away this growth which is in plain sight?"

The number of in-patients so far this year has exceeded that of any other year. The encouraging feature has been the patients who have come from hitherto inaccessible villages. Another encouraging feature has been the number who have come to the hospital to be cured of sickness in its earlier stages. We sincerely hope that this class will continue to come. Of course, it is only here and there that such people are to be found. All too many still delay till all hope of cure is past. This is especially true of eye cases. The number coming to the hospital totally blind who could have been easily cured is appalling.

The leper situation in Kachek has been of unusual interest. Lepers in Hainan still roam at large except for a form of semi-restraint in Hoihow. Their means of sustenance is begging, not only disgusting, but dangerous as well. The military authorities who came to Kachek last April were unusually progressive. They were making plans for roads, good streets, and a model market in place of the insanitary way in which food is now sold. Naturally the presence of the lepers on the streets, in the stores handling things, and on the highways did not escape attention. Something had to be done. Either the lepers had to be taken care of properly or else they should be done away with. The latter suggestion was quite in favor with some of the officials, who advocated putting all the lepers on a boat, towing her out to sea, and then sinking her.

The proposition was unfavorably received by the Chinese merchants, and we protested strongly against it. The chief official, who himself was not in favor of this method, suggested that the merchants feed the lepers. We were invited to partake in this plan. An agreement was reached whereby the lepers were to stay in their village upon pain of execution by the soldiers if caught on the streets, the food for their maintenance being guaranteed. We were asked to receive and distribute the funds and food. The scheme worked admirably for about ten days. A sudden call came at that time for all the soldiers to leave in order to assist in the fighting around Canton.
No sooner had the soldiers left than the merchants refused to feed the lepers, and now things are as they were before. We had hopes of a better day, but the merchants were unwilling to contribute thirty cents a month apiece to keep the lepers off the streets. However, if any sort of a stable government is ever established here we intend to attempt to have the officials repeat the plan.

A Hainanese who has been studying medicine in Changsha returned to his home near Kachek for the summer vacation. He was given a microscope and equipment with medicines and in the course of five weeks examined and treated about one hundred and twenty-five patients in his own and surrounding villages. For the first three weeks he had to spend considerable time teaching the people about hookworm, but in the last two weeks large numbers came to him for treatment. He said that if he had stayed there two weeks longer probably three hundred people would have been treated. Infection in this district averages more than ninety per cent of the people.

The ex-Taoist priest, now Kachek hospital evangelist, is doing splendid work. His experiences in meeting people while a priest stand him in good stead in approaching the patients. He is very earnest in his work, spending some time each day with each patient.

The hospital must have a new plant to meet the expansion of the medical work here. There will also have to be more workers. There should be two American doctors in the hospital and two or three Chinese doctors. As soon as possible full advantage must be taken of our many opportunities, not only in the hospital in Kachek, but also in the whole immense field for which we are responsible.

N. Bercovitz, M.D.

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**Book Reviews.**

**New Books Received.**

**Practical Physiology,** Dr. R. Burton-Opitz. W. B. Saunders Co. A concise, well arranged manual of fifty lessons for laboratory instruction of medical students.

The book contains descriptions of a great many interesting experiments illustrative of both normal and pathological physiology, good illustrations, and has blank leaves at the end of each lesson for note taking. Looks like a mighty good book for the purpose.


An extensive, interesting, but somewhat gruesome treatise on a subject on which the average medical man knows very little.
**Book Reviews.**

**Maniac-Depressive Insanity and Paranoia,** Professor Emil Kraeplin, Munich. Translated by R. Mary Barklay, M.B., and edited by George M. Robertson, M.D., F.R.C.P., Professor of Psychiatry in the University of Edinburgh. E. & S. Livingstone, 17 Teviot Place, Edinburgh. 21/- net.

A well arranged, concise text-book, good illustrations and charts, convenient size. The unusually well classified index makes it a useful reference book.

**Types of Mental Defectives,** by Martin W. Barr, M.D., and E. F. Malony, P. Blakiston's Son & Co. Philadelphia.

A series of photographs of selected typical cases, with brief histories attached. Convenient size, interesting and instructive.


A very neat little manual with blank interleaves for notes. Would be especially useful for medical students or interns.

**Pyorrhoea Alveolaris,** by D. A. Crow, M.B., Ch.B., Edinburgh. 6/- net. Bailliere, Tindall & Cox, 8 Henrietta St., Covent Garden, London.

A very dogmatic discussion of the still debatable treatment of an exceedingly troublesome disease, by a dental surgeon who believes only in extraction.

**Introduction to General Chemistry,** by Professor H. Copaux (France), translated by Henry Leffman, M.D. 51.75 net. P. Blakiston's Son & Co.

A very readable little volume of about 200 pages. Written, as the author states in his preface, with the purpose of clearing up some of the misconceptions of the physical laws underlying chemistry so often misunderstood by beginners in the study of that science, and also sets forth the newer conceptions of the science that have come to be generally accepted during the last twenty-five years.

**American Journal of Physical Anthropology,** Editor: Dr. Aleš Hrdlicka, U. S. National Museum, Washington, D. C. Published quarterly, subscription $5.50 gold per annum.

Residents in the Orient are always keenly interested in racial problems and will welcome this journal which was started in the critical days of 1918 and has now subscribers widely distributed the world over. It contains concise original papers on anthropology, using the word in the broadest sense. Contributions from authors living in China are especially invited. Reviews of current literature are given which enable those interested in anthropology to become acquainted with the most recent advances without having to consult complete libraries. And, finally, the section on notes and current news is of particular interest since the personal element is introduced and information is given regarding work actually in progress and plans for the future.—E. V. C.
Correspondence.

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

To the Editor, C. M. J.

Dear Sir:—I have had a small electric-light plant installed at my house near the Peking Racecourse for the past year, and I want to dispose of it, as electric light is now being laid on from the main current. Dr. Douglas Gray, Medical Officer to the Legation, suggests that it would be very useful for an up-country hospital, providing light at night and X-ray facilities by day. The engine is run on gasoline and is economical in working. For the last eighteen months it has run twenty-four lights, some of which are a considerable distance off at the end of a long garden, and in the stables; but it is capable of carrying forty lights continuously and eighteen extra from the batteries for about four or five hours. The installation has been run successfully by one of the village boys with no experience. The initial cost with accumulators was $586. I am willing to dispose of it to a Hospital as seen and inspected for any reasonable offer, say half price, $290. As I shall be leaving for home in a few days I am asking the head of the Engineering Department, Messrs. Jardine Matheson & Co., Peking, to be good enough to dispose of it for me. He kindly offers to see that it is despatched to any purchaser, suitably equipped for immediate working. Application may be addressed to Messrs. Jardine, Matheson & Co. Ltd., Peking. Would you be so kind as to give publicity to this?

Yours sincerely,

Archibald Rose.

British Legation, Peking. February 14th, 1921.

The Anatomical and Anthropological Association of China, Peking.

To the Editor, C. M. J.

Dear Sir:—In pursuance of its policy of aiding in the development of the science of Anatomy in the broadest sense, the Wistar Institute of Anatomy and Biology at Philadelphia, through its Director, Dr. M. J. Greenman, has offered to send either the American Journal of Anatomy or the Anatomical Record to each member of the Anatomical and Anthropological Association of China who does not already subscribe to them, free of charge for a period of two years. This is a courtesy which the Association greatly appreciates.

If you will be so kind as to let me know which of the two journals you would like, I shall immediately send your name and address to Dr. Greenman, so that it may be sent to you.

I remain,

Yours sincerely,

Charles Packard.

December 15, 1920.

To the Editor, C. M. J.

Dear Sir:—In the C. M. J. (Anatomical Supplement) July, 1920, page 15, the author of the article on Anthropometric Measurements of Chinese says: "It would be interesting to have statistics from West China, Szechwan in particular, . . ."

So I take the liberty of presenting the following measurements of students of the C. M. M. dormitory, Union Middle School, West China Union University, Chengtu, Szechwan:—

Number of students examined 70
Average age ... ... 18.28 yrs.
Average height ... ... 5'5.4'
Average weight ... ... 101.05 lbs.
Chest:
Inspiration ... ... 31.25"
Expiration ... ... 28.71"

Yours sincerely,

E. C. Wilford, M.B.

Chengtu, West China, December 28, 1920.

Editor, China Medical Journal.

Dear Sir:—In view of an impending Typhus Fever, or in other words, Famine Fever Epidemic, the Red Cross and other famine organizations have pressed the Council on Health Education to get out a small booklet upon the subject. This has been done by Doctors Howard G. Barrie and W. W. Peter. We enclose a
Correspondence.

Dr. E. V. Cowdry has already sent out to the profession in China numerous appeals for aid in the work of establishing our Embryological Collection, with the result that this part of the work has been successfully inaugurated. It is yet, however, in its infancy and it is for this reason that in the enclosed circular opportunity is once more taken to ask for the aid and co-operation of the profession in the furtherance of this branch of the work.

It will of course be thoroughly understood that all material and information of whatever nature that may be received will be given full acknowledgement as well in the records of the collections as in any subsequent publication based on the study of such material.

Yours truly,

CHARLES PACKARD,
Secretary.

Dilute Sulphuric Acid in Furunculosis.

To the Editor of The Lancet.

SIR,—I have read with much interest the "Dissertation upon Carbuncles" by Dr. Sidney Phillips in your issue of January 8th, and agree with much that is contained therein; but when I read that among other internal remedies for this complaint he has found "dilute sulphuric acid" of no good to him I can only suppose that either he has not given it a sufficient trial, or that he has not used dilute sulphuric acid of the right strength. The proper strength is 10 per cent of the strong acid, and the dose is 25 to 30 minims of this mixed with two ounces of water every four hours. I have now been in practice over 50 years, and have used this remedy with 100 per cent successes for the last 40 years. If Dr. Phillips cares to know what this remedy can do I would refer him to a communication to The Lancet of March 15th, 1913, also to the British Medical Journal of August 15th, 1908. Letters received from all parts of this country, and also reports from India, confirm my statements regarding this treatment. Lastly, the ordinary B.P. acid sulph. dil. is too weak to be of any use, unless given in 40 minims doses.

I am, Sir, yours faithfully,

J. REYNOLDS, M.D. Brux., etc.

Brixton, S. W., January 10th, 1921.
Dr. Richard A. Bolt, formerly College Physician at Tsing Hua, has been made General Director of the American Child Hygiene Association, formerly the American Association for the Study and Prevention of Infant Mortality, with headquarters at 1211 Cathedral Street, Baltimore, Maryland.

The American Child Hygiene Association is organized to assist all public and private agencies doing, or intending to do this work, and to educate the public to the necessity for a nation-wide extension through Federal, State and Municipal channels.

Child Hygiene teaches the health, care, and education of the expectant mother, the care of the infant, and the care of the child before and during school age.

Child Hygiene is taught by physicians and by welfare centers under the direction of physicians, assisted by public health nurses who visit homes.

Child Hygiene should be a function of the Health Department of every state and city because it can prevent more sickness and death among mothers and children than any other health activity.

Dr. Bolt will be glad to welcome any medical missionary and others from China who happen to be passing through Baltimore, Maryland.

DEATH.

De Vol.—Mrs. Isabelle F. De Vol, M.D., a missionary of American Friends Mission at Luho, Ku., died December 22, 1920, at Marengo, Ohio.