PROLAPSE AND PREGNANCY.*

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Pregnancy apparently is not prevented, nor is abortion favoured by a mild degree of prolapse, though the malposition of the uterus with the cervix forwards and upwards undoubtedly militates against conception, and a secondary sterility may often be cured by an operation restoring the uterus to its proper position. How much of this cure is due to the relief of congestion, and how much to the position of the uterus is a moot question. But as soon as the prolapse becomes at all marked, whether it be a case of the so-called congenital variety where the cervix becomes elongated and the uterus retroverted; or the acquired form from damage to the pelvic floor with retroversion, the chances of abortion are very greatly increased and occasionally multiple abortions are due to this cause.

Take as an example the following case which exemplifies very well the course of events in some of these cases of congenital prolapse. Ma Chen Shih, aged 22, Chinese, (Hosp. No. 1869), was admitted to the Peking Union Medical College Hospital on March 15, 1922. Her past history was a clean one, no serious illness or accident. She married at 17 years of age. In 1919 she had a miscarriage at 3 months. In 1920 she had a miscarriage at 3 months. In March 1921 there was a 3rd miscarriage at 3 months. In September 1921 there was a 4th miscarriage at 3 months.

After the last miscarriage she became conscious of a protrusion of the cervix for about one inch at the vulva. It was pushed back but appeared at the vulva on straining. General conditions good. Wassermann test negative. Nothing abnormal was noted in either blood or urine. The uterus was retroverted but practically normal in size. The cervix was much elongated coming down to the vulva.

On April 15, 1922, Dr. E. C. Dudley amputated the cervix taking away the elongated vaginal portion. He then opened the abdomen and

*Contribution from the Department of Obstetrics and Gynecology, Peking Union Medical College.
Fig. 1.—Cervix five days after labour.

Fig. 2.—Baby’s head five days after birth.

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shortened the round ligaments by a Baldy-Webster operation. She became pregnant almost immediately and was admitted for examination when she had carried three months. The cervix then came down to about 1½ inches of the vulva, and there seemed to be no reason why the uterus should not rise properly. On May 3, 1923, she came in labour, and was delivered of a healthy male child weighing 4030 grammes at term, no vaginal examination being done; labour only lasted 4½ hours and the cervix dilating normally.

The subsequent history of the case is tragic. On the 3rd day she developed typical scarlet fever with sore throat and rash (it was epidemic at the time), and died on the 9th day after delivery.

Should the cervix actually protrude from the vulva, conception is rendered most unlikely, for the position tends to favour the occurrence of eversion, erosion and ulceration of the cervix; whilst the endometrium becomes hyperplastic and unhealthy. Coition has been accomplished in several cases, cited by Findley, through the gaping cervix.

What then is the true disadvantage of acquired prolapse in pregnancy? It undoubtedly makes the patient much more uncomfortable. Bearing down sensations and disturbances of the functions of bladder and rectum are intensified, compared to a normal pregnancy. Later on, if the uterus manages to rise, the state of affairs is much improved. But if cystocele and rectocele are present they give trouble all through the pregnancy. Added to this, during labour the elongated cervix may come down to, or protrude at the vulva, with the result that labour is impeded, and the elongated cervix may become oedematous from pressure between the pubic bone and the advancing head.

The whole matter is a question of degree and accident. In prolapse of a moderate degree the uterus rises out of the pelvis in the 4th month, and the prolapse is corrected; to return again during the puerperium after the patient gets up and about, or even earlier.

In prolapse of a more advanced condition, the uterus increases in size, becomes incarcerated, and abortion, usually incomplete, takes place. But as a rule the cervix remains in a mid position.

I was called one afternoon in Peking to a Korean woman, who had borne several children. I found her bleeding, with the cervix practically at the vulva, and the uterus pregnant and impacted.
Replacing the uterus with the patient in the knee-chest position failed, and the patient had to come into hospital and have the uterus cleared out.

If such a case is taken in hand early on, a pessary may be temporarily put in until the uterus has become sufficiently large to support itself above the pelvis. Should it only be met when bleeding has already begun, and the uterus cannot be easily replaced it is better to clear out the uterus, and subsequently place this organ in good position by means of a modified Gilliam suspension operation combined with a perineorrhaphy.

Should there have been no bleeding and the uterus refuses to go up with the patient in the knee-chest position, it would be good practice to open the abdomen, raise the uterus up, and shorten the round ligaments; using at the same time a pessary as an additional support for the time being and keeping the patient in bed till the uterus has become sufficiently large to maintain itself.

Solomons gives an account of a case of his treated by anterior colporrhaphy, perineorrhaphy, circular amputation of the cervix, shortening of the utero-sacral ligaments, and an Alexander-Adams operation. The patient went safely to term.

Sepsis of varying degree frequently follows these abortions, particularly if the cervix has already undergone inflammatory changes and ulceration is present.

Should procidentia take place with an early pregnancy, the event is nearly always terminated by abortion. Where the cervix is badly elongated it has been amputated during pregnancy without interrupting the pregnancy. Findley cites several such cases recorded by various authors.

Operations, however, performed during pregnancy on the pelvic floor, are not as a rule satisfactory. The operations are very bloody, due to the increased blood supply to the parts, healing is not always satisfactory and interruption of the pregnancy is the common result of such operations.

When one comes to the consideration of advanced pregnancy conjoined with prolapsus uteri, one approaches a very difficult subject. Is it possible to have a full term pregnancy with the whole uterus outside the vulva? Probably it has never occurred. The entire gravid uterus has prolapsed to the level of the knees.
during a miscarriage, as in a case recorded by Dufour, but in this case the mass became so deeply congested that the uterus was promptly emptied by incising the cervix. But the cervix may stay outside the vulva and in some cases the head may apparently develop in the cervix and lower part of the pelvis. Four such cases have come under my notice.

The first case was one attended by the late Dr. Eliza Leonard of Peking and, owing to the circumstances surrounding it, was perhaps the most dramatic of the four. About the last day before the siege of Peking, when the foreigners were expecting to be called into the Legation at any moment, Dr. Mackie and Dr. Leonard were called out to a case in the north part of the city. They found the woman in labour with a mass the size of two fists lying outside the vulva. It had been out for sometime, was very much swollen and laterally torn. The head was not actually in the cervix but lying at the vulva. With some difficulty and with a good deal of fear as to whether the lateral tears would extend upward, Dr. Leonard applied the forceps and delivered a living child. They came out of the house to find a large hostile mob awaiting them. Fortunately the word went around that they had saved two lives and they got through the mob without any interference.

The second case occurred sixteen years ago in the practice of Dr. G. Douglas Gray of Peking. He was called out one night to find a Chinese woman bedded on an earth floor, with the head of the child contained in the cervix and lying outside the vulva. This condition had lasted during the final two months of pregnancy. She was at full term and in labour. He was able to dilate the external os and extract the child. Mother and child made a good recovery.

The last two cases occurred during the year 1924, and both of them came under my care. Their case records are as follows:

Mrs. K. S. Wang; aged 26, a primipara, was admitted to the Peking Union Medical College Hospital on January 23, 1924. At 14 years of age she fell from a high wall and tore the perineal region. It healed by secondary intention, taking two months in the process. About 2 or 3 months after the perineum healed, she became conscious of a mass in the lower part of the vagina, and sometimes this mass appeared at the vulva. She was married on May 16, 1923, and the last monthly period occurred on May 19, 1923, so that labour was due to take place on February 29, 1924. During the first three months of pregnancy this mass, which was undoubtedly the cervix, appeared frequently at the outlet, but went in of itself on lying down. During the 4th and 5th months it could be pushed back with difficulty so that she did as little walking or standing as possible.

From the 5th month onward the mass could not be pushed back and at the beginning of labour the cervix with a large portion of the head was
entirely outside the vulva. She remained in this condition for four days and then was sent into hospital. On admission there was a mass outside the vulva which consisted of the cervix and part of the lower uterine segment containing the head, the vagina being completely inverted. The cervix was dilated to the extent of 4-5 centimetres in diameter, was dark red in colour, foul smelling pus was coming away from the cervix, and the foetal head was soft and oedematous and the foetus manifestly dead. The presentation was left occipito-anterior. Craniotomy was done and the foetus delivered, the cervix being very resistant to dilatation. The whole contents of the uterus were stinking, but it was impossible to say how long the child had been dead.

The uterus was washed out, pushed back so that the vaginal walls were again in place, and an intrauterine douche given. The patient, who came in with a pulse of 120, and temperature of 38°C. was manifestly septic. Her temperature fell to subnormal after delivery, but rose again the same night and remained high. A rigor occurred on the second day, and another couple of rigors on the third day. An intrauterine culture grew streptococcus haemolyticus, she went rapidly down hill, and died of septicaemia on the sixth day after delivery.

The Wassermann reaction of the patient was negative, sections of the placenta were normal in appearance and the death of the child appeared to have been due to difficulty in labour. The membranes ruptured 4 days before admission to hospital.

The second case was that of Mrs. T. S. Li, aged 30, a 3-para who was admitted to the Peking Union Medical College Hospital three days after labour. Five years ago she had a full term child which is still living and well. Three years ago she had a premature child of about 8 months conception which died on the third day after delivery. On that occasion she had an acute inversion of the uterus which was replaced by Dr. J. G. Cormack of Peking and did well.

Since that time she has been troubled by prolapse, and the cervix was frequently at or outside the vulva. For the last two months it has been entirely outside, the condition becoming worse when labour commenced. She then called in Dr. Cormack who found the cervix stretched over the head, the whole mass lying outside the vulva. The presentation was left occipito-anterior. He incised the cervix which refused to dilate and the incision subsequently tore a little to the left side.

She came into the hospital on the 3rd day after labour with the cervix protruding from the vulva to the extent of 10 cm. She was showing signs of mild sepsis. There was a wound in the posterior lip at the left side and a laceration in the anterior wall; both of these had been sewn up with catgut and the anterior wound had entirely given way. The os was covered by a greenish slough, but the anterior wall was pink and moist.

The os was painted with iodine and enclosed in gauze and cotton pads, and constantly irrigated with Dakin's solution. The patient after passing through a sharp attack of sepsis made a good recovery.
From the uterine cavity staphylococcus aureus and streptococcus haemolyticus were grown. The cervix gradually contracted but remained a large mass in the vagina, and at the patient's earnest request a panhysterectomy was performed two months later, the stumps of the broad ligaments being fixed to the anterior parietal peritoneum.

So far the result has been excellent. The perineum ought to be repaired, but there is no cystocele or rectocele, and the patient's general condition is excellent.

A watercolour drawing of the cervix was made on the 5th day after delivery and a photograph is reproduced herewith (Fig. 1). The baby was not in good condition. It did not feed well. On admission its weight was 2350 grammes. The head (Fig. 2) measured 3 days after birth as follows: Occipito-mental, 14 cm. Occipito-frontal, 10.8 cm. Suboccipito-bregmatic, 8.2 cm. Biparietal, 7.8 cm.

On admission there was a definite band about 6.5 cm. in diameter around the head, evidently the mark of the partially dilated cervix. The baby died on the 9th day. The salient points of the autopsy note are as follows: Weight, 2220 grammes. Length 47 cm.

Fig. 1.—Photograph of same baby (Fig. 1) taken after death on 9th day.

The skull (Fig. 3) measured 10.5 cm. antero-posteriorly, and 7.5 cm. laterally. There were signs of sepsis about the scalp and neck and the tissues of the scalp were infiltrated with blood. There was no subdural haemorrhage and the brain appeared healthy. The suprarenals were congested, and there had been haemorrhage into the right suprarenal. The lungs were markedly congested. Death had taken place from septicæmia.

DISCUSSION.

One of the points to which I would direct special attention is the shape of the child's head. This in both cases was of abnormal shape as is easily seen from the photograph reproduced herewith of a water colour drawing. Apparently due to the lack of even pressure afforded by the liquor amnii, the head as it developed moulded itself to the lower part of the pelvis, and to the strong prolapsed cervix which was closely apposed to the skull and pressed upon it. After birth the head showed but little tendency to recover itself, and when the child died on the 9th day there was little change from the appearance presented at birth. Even after death, when the autopsy was being performed, the head persisted in retaining its drawn out shape (see photograph).
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In the other case the child was already dead and somewhat macerated, but in this case also there were indications that if the pregnancy had persisted, and the child had lived, its head would have presented a similar appearance.

The second point to which I would direct special attention, is that in both cases there had been serious damage to the pelvic floor. The first case was a primipara, but the perineum had been damaged by an accident; whilst in the second case, in the preceding pregnancy there had been an acute inversion of the uterus with a bad rupture of the perineum.

There is another rare complication which must be mentioned although it is of an entirely different nature to the cases of prolapse which we have already mentioned. There are a few cases on record, cited by Potocki who himself adds a case, in which the non-gravid half of a uterus didelphys has prolapsed before or at the beginning of labour and blocked or hindered the delivery of the foetus. In one case Cesarean section was performed, in another forceps, in a third the prolapsed horn was reposed, and in a fourth version was performed.

In closing this short paper on prolapse in pregnancy it may be pointed out that provided proper antenatal care had been given to these patients, none of them should have got into difficulty, for the prolapse would either have been efficiently treated, or prevented from taking place, or the abnormal condition or shape of the uterus would have put the doctor on his guard against the possibility of the horn interfering with labour.

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ILLUSTRATIONS.

Fig. 1.—Photograph of a water colour drawing of the cervix taken 5 days after labour, the cervix and head having been mainly outside the vulva for two months before labour.
Fig. 2.—Photograph of a water colour drawing of the baby's head 5 days after birth.
Fig. 3.—Photograph of the same baby taken after death on the 9th day showing the persistent elongation of the head.

THE TRANS-UTERINE INSUFFLATION TEST FOR PATENCY OF THE UTERINE TUBES.*

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The problem of sterility, which is important in all countries, assumes an especial significance in China, where the begetting of progeny is considered vital by every family. Every gynecological practitioner in China is no doubt consulted for this condition. The first essential, of course, in the treatment is diagnosis of the cause. The estimate made by most writers as to the percentage of cases in which the cause is on the side of the male is from thirty to fifty per cent. So far as the writer is aware, sufficient study has not yet been made to know whether a similar percentage holds true in China.

It is obvious that of the causes of female sterility, closure of the uterine tubes is one of the most important. If this condition is present, the treatment of other possible causes for sterility such as endocervicitis, retroversion, prolapse, cervical stenosis, etc., will be useless. Therefore it is important in studying the cause of sterility in a given case, to prove or eliminate tubal closure.

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Closure may be due to atresia at any point within the tube, sealing of the fimbriated ends, or adhesions about the abdominal ostium. Of these, the second method is the most frequent. Closure by one of these means is caused by gonorrheal salpingitis, post-partum infection, or pelvic peritonitis from any cause, notably appendicitis.

The gas insufflation method of diagnosis of tubal closure was first reported by Rubin, of New York, in 1920. It consists in injecting into the uterus by way of the cervix, a gas, which, if the uterine tubes are patent, will enter the peritoneal cavity. It was first used by Rubin for the outlining of pelvic tumors by X-ray, and for this purpose large amounts of oxygen were injected, so as to distend the peritoneal cavity. Later, he found that small amounts were sufficient to establish patency or non-patency of the tubes. His technic was simple. The gas was passed from a tank, through a bottle of sterile solution, from which a rubber tube conducted the gas to a metal cannula which was inserted into the cervix. In his second series of cases, he introduced a manometer into the system, and noted the pressure, not allowing it to rise above 220 mm. of mercury. He has since used CO₂ gas instead of oxygen because of its more rapid absorbability with consequent less discomfort to the patient. The apparatus has been changed by the
use of a siphonometer, by which the amount of gas entering can be accurately measured. Many others have used the test, with some modifications, and several series of cases have been reported. One of the most interesting recent developments is the probability of its value as a therapeutic as well as diagnostic measure. The most extensive, and probably the earliest report on this aspect was made by Peterson and Cron in 1923, who reported that after insufflation tests in thirty-six cases, thirteen became pregnant shortly afterward, in the absence of any other means of treatment of their sterility.

Since the writer has found no record of this test having been performed in China, it may be of a little interest to report forty-five cases in which it was done in the Gynecology Clinic of the Peking Union Medical College Hospital, over a period of two years, most of the cases being within the last year. In the majority of these cases, the chief complaint was failure to become pregnant. The ages ranged from nineteen to forty-seven years, with an average of thirty. Twenty-one of these patients had had no pregnancies, and the number of years married varied from one year (one case) to seventeen years, with an average of 8.4 years. Twenty-one had had one or more pregnancies, though three of these had had an abortion only. The number of years since the last pregnancy ranged from one year (five cases, in all of whom the last pregnancy ended in abortion) to fifteen years, with an average of 6.6 years. All but three of the patients were Chinese. In only two cases were the spermatozoa examined. In thirteen cases (almost one-third) there was a definite history of venereal disease in the husband at some time.

The apparatus used was constructed by Dr. L. M. Miles. It consists of (1) a tank of oxygen; this was used because of the difficulty in procuring CO₂. (2) Two graduated 500 c.c. bottles, one of which contains 400 c.c. of a weak bichlorid solution. Any sterile fluid can be used. These bottles have air-tight rubber stoppers with only two openings, through which glass tubes pass. One tube extends to the bottom of each bottle; these two long tubes are connected by rubber tubing and through them the fluid passes from one bottle to the other, thus displacing the gas in the second bottle. This tends to prevent too rapid passage of the gas, and serves to measure the rate of flow and amount of gas.
In the dorsal position, with the legs supported by leg-holders. The cervix is exposed by the speculum, cleansed and painted with iodine. In the meantime, the solution has been forced into the second bottle and the connections then re-made so that the bottle containing the solution is next to the oxygen tank. The second bottle in the series now contains oxygen, mixed, of course, with some atmospheric air during the manipulation. The cervix is then seized with the volsellum, and the cannula, attached to the system, inserted. It will usually enter the internal os without difficulty; sometimes the preliminary introduction of a sound is necessary. The foot of the table is then tilted slightly upward, and a small amount of sterile water introduced into the vagina, so that gas escaping from the cervix may be detected by bubbles. The oxygen tank is then opened, very little at first, so that the pressure, as shown by the manometer, rises very slowly. An assistant listens through a stethoscope placed over the supra-pubic region.

The pressure is allowed to rise to 200 mm. mercury or a little more. If, after the flow of gas is stopped, it remains at this level for two or three minutes, and no sound is heard on auscultation, the tubes are considered closed. If the tubes are patent, the pressure, after rising to a variable height, ceases to rise or actually falls, although gas is still being introduced, as shown by the rise of the fluid level in the second bottle. The average maximum pressure in our patent cases was 147, with, as a rule, a rapid drop. The
amount of gas introduced varied from 175 to about 400 c.c. This is read off on the bottle by the amount of fluid displaced.

The criteria of patency, in the order of their importance, are: (1) fall of pressure in the system, when there is no leakage from the cervix. (2) X-ray in the standing position, showing gas below the diaphragm. This is used only in doubtful cases, because of the expense, and because, in many cases it is unnecessary, the other criteria being sufficiently definite. It was used in eight cases in our series, three being positive for gas and five negative. (3) Pain in the shoulders, especially the right, shortly after sitting up or standing, following the test. This is a reflex pain from pressure of the gas on the diaphragm. Sometimes there is a feeling of abdominal distension, especially if much gas has been injected. (4) Bubbling sounds heard on auscultation over the supra-pubic region. This is variable, owing probably to the position of the tubes, but is usually heard distinctly in patent cases.

Contra-indications to the test are a profuse or purulent vaginal discharge, menstruation and the pre- and post-menstrual state. It is usually of no value if there is extensive laceration of the cervix, as it is impossible to plug the external os tightly and prevent escape of gas around the cannula.

In very few cases were there unpleasant effects. In some cases where the tubes were non-patent, there was pain in the pelvis during the test. One patient, who on examination showed a probable left adnexal disease, had pain in the left iliac region after the test. In two cases, the shoulder pain was annoying and persisted several days. In both of these, a larger amount of gas than usual was injected. In two cases, which were carried out postoperatively, nine and sixteen days respectively, there was syncope, in one case accompanied by dyspnea and profuse sweating. In the former case the tubes were found patent, in the latter closed.

Of our forty-five cases, thirty were found patent, thirteen non-patent, one doubtful, and one was thought probably patent but proved at operation the next day to have sealed tubes, both tubes containing air. The fall in pressure was slow in this case, and probably if a larger amount of oxygen had been injected, a correct diagnosis might have been made. The sound heard on auscultation was no doubt the gas passing from the uterus into the dilated
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The doubtful case also proved at operation to have closed tubes. Therefore we have a total of thirty patent and fifteen non-patent cases.

Of the thirty patent cases, fifteen had a retroversion or retroflexion of the uterus, five of these having also an endocervicitis. Four additional cases showed endocervicitis. These conditions may have been the cause of sterility in these cases.

Comparison of the findings on bimanual palpation with the results of the Rubin test is interesting. Of the fifteen non-patent cases, only seven showed evidence of adnexal disease on examination, while six of the thirty patent cases showed masses or tenderness in the adnexal regions.

Ten of the cases were operated on abdominally. Of these, four had the Rubin test before operation, while six were only tested after operation. Of the pre-operative tests, two were found patent. In these cases, only suspension of the uterus was done the appearance of the tubes at operation proving their normal condition. One case was the doubtful one above. Both tubes were found sealed, one was removed, and a salpingostomy performed on the other. The fourth case was the one mentioned above, in which the gas was found in the tubes. The same procedure was carried out as in the last case.

Of the cases tested shortly after operation, five had had salpingostomy performed on one or both tubes. Of these, three were patent and two closed. One of the negative cases had the test twice, six and seven days post-operative. One case having had salpingectomy on one side and only the separation of adhesions on the other, had a negative Rubin test sixteen days after operation. In this case, a test carried out during the laparotomy would have been valuable, as we do not know whether the tube was closed at the time of operation, in spite of its appearing to be normal, or whether adhesions re-formed in the sixteen days between the operation and the test.

So far, only one insufflation has been carried out on the operating table. In this case, oxygen was injected while the tubes were under inspection, and the gas was found to come through on both sides. In the future, it is hoped that this practice may often be carried out, as it is sometimes difficult to diagnose tubal closure on inspection. We plan to repeat the test more frequently.
in cases which appear to have closed tubes, and also to carry out frequent repetition in the follow-up treatment after salpingostomy.

Unfortunately, most of these cases have not been followed up, so that we do not know whether there has been any therapeutic effect of the insufflation.

CONCLUSIONS.

1. The trans-uterine insufflation test is an important aid in diagnosing the condition of the uterine tubes.

2. In a series of forty-five patients, most of whom complained of sterility, one-third were found to have tubal closure.

3. It is valuable in checking up the results of salpingostomies.

4. The apparatus and technique are simple and do not require the advantages of a large institution.

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COMPUND PREGNANCY: WITH REPORT OF CASE.*

E. M. EWERS, M.D., WEEHSIEN, SHANTUNG.

The first case of compound (extra-uterine and intra-uterine) pregnancy reported in the medical literature is that of Duverney, who in the year 1708 while performing an autopsy on a twenty-one year old woman, found a three months' foetus in the uterus, also a ruptured gestation of similar duration in the right tube, the latter condition being the cause of death. A hundred years then elapsed before mention of a similar condition is met with. In the early years of the nineteenth century, cases were reported by Lachepelle, Goessmann, and Whinnery; in these instances attention was directed to the condition by the ectopic pregnancies ulcerating piecemeal either through the rectum, the posterior cul-de-sac, or the abdominal wall, the rupture taking place either during or shortly after a normal uterine pregnancy. In 1870, Beach and Sale each reported a case in which they discovered a compound pregnancy upon abdominal section. This represents probably the earliest surgical treatment of this condition.

COMBINED AND MULTIPLE PREGNANCIES

Parry states in his monograph that twenty-two out of the five hundred cases of tubal pregnancy collected by him were complicated by a co-existing intra-uterine pregnancy. He designated the condition, "combined pregnancy." The condition occurs quite frequently, and has been investigated by numerous writers. Straus, in 1898, was able to collect only thirty-two reports of cases, while Weibel in 1905, had increased the number to 111, and Newgebauer, in 1913, collected many more.

In rare instances twin tubal pregnancy has been observed, both embryos being sometimes found in the same tube, while in other cases there was a foetus in each tube, both showing the same development. Hardouin, in 1919, collected thirty-six instances of the former type. Arey has also considered the subject in detail, and makes the surprising statement that single ovum twins occur many times more commonly in tubal than in uterine pregnancy. He explains the phenomenon by supposing that in

*Read before the Section on Obstetrics and Gynecology, Joint Conference of B.M.A. and C.M.M.A., held in Hongkong, January, 1925.
view of the difficulties experienced in becoming implanted the rate of growth of the ovum is so retarded that two embryonic areas develop instead of one. Combined extra-uterine and intra-uterine pregnancy presents a very serious prognosis. Abortion of the uterine ovum precedes or follows the rupture of the ectopic sac, but death from internal hemorrhage may occur before abortion takes place. Rarely the woman goes to term and then labour is usually spontaneous, but death frequently follows from internal hemorrhage, or sepsis starting from the abdominal mass. The extra-uterine foetus seldom obstructs the passage of the intra-uterine. If the ectopic pregnancy is successfully removed, the patient may go on to term with normal expectancy.

The diagnosis of combined pregnancy is exceedingly difficult. It is rarely made before some complication presents itself. The uterine pregnancy is usually recognised first, and ectopic gestation is the last thing thought of, although the presence of symptoms pathognomonic of ectopic gestation are present. This complication is so rare that textbooks seldom mention it and only do so to say that it is one of the possibilities of pregnancy.

**Terminology and Classification**

The term "compound pregnancy" is used by Simpson to mean all varieties of combined extra-uterine and intra-uterine pregnancies. He divides them into four groups:

1. The woman becomes pregnant while carrying the dead products of an ectopic gestation.
2. The ectopic and intra-uterine products are both living at the same time. Such cases are naturally divided into three groups:
   (a) Ectopic gestation precedes the uterine.
   (b) Ectopic conception follows the uterine.
   (c) Ectopic and uterine conception occur coincidentally.

Commenting on this classification, Schumann writes: "Class 1 includes all of the cases of lithopedion and the end products of tubal gestation, in which the woman later is normally pregnant. Obviously such cases are in no sense combined pregnancy."

The case reported here is one of this class and so the term "compound pregnancy" is used to designate it. The term should be limited to this class, and the term "combined pregnancy"
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confined to those cases in which there is a foetus in the uterus and also one outside of the uterine cavity of approximately the same development.

REPORT OF CASE.

Patient, aged 34, wife of a small farmer. She entered hospital on May 22, 1924, complaining of pain and of a mass in abdomen. Family history and her own history previous to marriage, negative.

History.—Patient was married at the age of twenty and at twenty-three gave birth to a full-term child, which died at birth from injuries received during labour which lasted five days. Three and a half years later she again had a very difficult labour, and the child died as soon as born. She was sick with fever for a month after this birth. Three years later she again became pregnant. This time the pregnancy was not the same as before. Pain was felt in the right side from the very first. Later she felt foetal movements and every ten days she had terrific pains which prevented her from either sleeping or eating. She vomited during these spells and had fever; her face swelled at times from the violent vomiting. At the end of six months she felt that the tumour had gone to the right side and was much harder. The pain became less but movements were felt for eleven months. During the eleventh month the pain was worse but not as bad as during the early months. For a year or so she had intermittent pains, and during the second year the menstrual periods were established again; the flow was quite scanty, lasting but one day; color and periodicity normal. The tumor on the right side felt heavy and was painful at times. Six months previous to the patient entering our hospital menstruation ceased. She was without appetite and felt that the tumor was growing very rapidly. The pain was excessive; sometimes for two or three days at a time she could neither eat nor sleep. After three months her periods again appeared for two months. She came to the hospital for relief from the pain. No foetal movements had been noticed. She thought that she had lost a good deal in weight and she was very weak.

Examination.—Patient was a small, poorly nourished woman, evidently in pain. The routine examination was negative, except, for a round tumor in the abdomen, the size of a football, easily movable, painful when touched; in the midline another tumor was felt about the size of the double fist. Both tumors were hard; no foetal movements were felt. Vaginal examination showed that the tumor could be easily moved without disturbance of cervix, while the central tumor seemed attached to the uterus or was inside it. The cervix was hard, and appeared normal except for slight discoloration which we took to be from pressure. Temperature, pulse, respiration and excreta were normal. Patient asked for an operation for the relief of her pain.

Diagnosis.—Encysted foetus and fibroid.

Operation.—This was performed on May 23, 1924. The abdomen was opened and a large tumor with a few dense adhesions presented. N
excessive fluid in the abdomen and no other adhesions. The uterus was hard and no movements were felt. The tumor was attached to the lower end of the uterus with a pedicle about 5 cm. in diameter. It was decided to remove both the tumor and uterus at once as it seemed impossible to divide them. Amputation through the middle of the cervix was done with little loss of blood and no fluids from either tumor. Both ovaries were left; the stumps were covered and supported. The wound was closed and the patient was returned to the ward in good condition. There was a perfect convalescence and she left the hospital two weeks later, rejoicing in the fact that she was not liable to be pregnant again.

**Examination of tumors.**—On opening the tumors it was found that the larger contained a perfectly developed foetus. No fluid present. No evidence of maceration or lithopedion formation. The foetus seemed to be completely mummified. The covering membranes measured 6 mm. in thickness while the whole tumor mass was 50 cm. in circumference. The cord appeared to be attached at the pedicle and in direct contact with the uterus. On manipulating the uterus, much to our surprise another foetus popped out. No liquor or blood appeared. It measured 18 cm. in length and weighed 270 gm. No maceration or destruction apparent. We judged it to be a fifth month foetus. Both foetuses were female.

**Remarks on Operation.**—While there was a mistake in not making a complete diagnosis, I still think we were justified in removing the whole mass. The pelvis was somewhat contracted and the history of these cases shows that a patient who has had one ectopic gestation may expect another. The case is reported that attention may be called to the fact that compound pregnancy does occur. The menses appearing after their cessation for a time led us to think of a pathological tumor instead of the tumor that was actually found. A partially detached placenta due to the presence of the tumor added to the difficulty of diagnosis. I have no explanation to offer of why there were no fluids in either tumor.
Compound Pregnancy.

Discussion.

The literature is abundant on combined pregnancies and there are many case reports. These pregnancies offer possibilities in speculation as to superfecundation and lend themselves to spectacular diagnosis and treatment. On the other hand, there is a distinct scarcity of reports of cases similar to mine. A request to one of the large consulting literary agencies in U.S.A., received the reply, not wholly correct, that there were no reports or other literature bearing on cases like mine and suggesting that I report the case. I do not believe the references to the subject are scanty because of the rarity of such cases, but rather because it seems to be taken for granted that a certain number of these patients may become normally pregnant again, though carrying for many years the dead products of ectopic gestation. Zinke mentions only ten cases and describes their termination as follows: the ectopic foetus passed piecemeal by ulceration through the rectum twice, through the abdominal wall twice, through the posterior cul-de-sac four times. In one instance the extra-uterine foetus was delivered by abdominal section after being retained for four years, and in another instance the extra-uterine foetus was carried for thirteen years, the woman giving birth to three children and having two miscarriages during that time. As to the termination of ectopic gestation, Williams says that the "foetus always dies with (a) maceration of parts and ulceration through the rectum, vagina or abdominal wall; (b) mummification; (c) lithopedion formation; (d) adipoceration, or (e) putrefaction with fatal septicemia." According to early textbooks there could be no expectation of saving an extra-uterine foetus, but with improvements in diagnosis and delivery by Caesarean section there can be a certain degree of expectancy. Zinke mentions four successful cases. Undoubtedly in my case the extra-uterine foetus would have lived if an expert obstetrician had been consulted at or near full term.

Lithopedion formation is regarded as the most favorable of the possible eventualities, as in many cases the calcified product may be carried for years as a benign foreign body and give no trouble unless a subsequent pregnancy occurs, and then it may give rise to pain during pregnancy, or dystocia at parturition. Williams states that in several instances lithopedions have been known to remain
for thirty or forty years, one even for fifty years, before removal at operation or autopsy.

Note.—The lantern slide which Dr. Eastman made for me at the Peking Union Medical College shows the details of the tumor. I wish to thank him for all his help. Without it this report would not have been written, and what worth there is in it belongs to him, the faults are mine.

REPORT OF CASE WITH UNUSUAL INDICATION FOR CAESAREAN SECTION.*

MARY LATIMER JAMES M.D., Wuchang.

Mrs. T., aged 24 years, was first seen in the Out-patient Department of the Church General Hospital, Wuchang, in May 1920. She had traveled several days, overland and by boat, and came hobbling into the office leaning forward on a low stool which she used as a sort of anterior leg. She was a primipara, six months pregnant, and had come to ask us to terminate pregnancy at once because she realized that she could not give birth to a full-born child in the ordinary way.

On examination I found that, for the upper third, her thighs were bound closely together by a very dense, gristly cicatrix, continuous anteriorly with the skin of the abdominal wall. The deformity was the result of a burn suffered at least ten years previously. Evidently she had lain for months with the adjacent burned surfaces of her thighs in contact, while the healing process slowly proceeded. Anteriorly there was not even a pin-point aperture between the cicatrix and the abdominal wall, which was pulled tensely down by the retraction of the scar tissue. Posteriorly the trouble had not extended to the buttocks and perineum, nor had it involved the posterior portion of the labia. The thighs could not be sufficiently separated, however, to permit the passage of even a moderate-sized infant. Hence the vaginal route was quite obviously out of the question for the delivery of a viable foetus, even several weeks before term.

*Read before the Section on Obstetrics and Gynecology, Joint Conference of B.M.A. and C.M.M.A, held in Hongkong, January, 1925.
Since the patient's general health seemed good and the child was apparently developing quite normally I naturally refused to terminate pregnancy then, but advised her to wait and return at term for Caesarian section. She accepted this advice and went back to the country. I did not see her again until October first, when she re-appeared on exactly the day I had told her to return. She was then, by the usual calculations, just at term. The following day I performed the Caesarian section and delivered a healthy-looking male infant weighing 6 lb 2½ oz.
The mother made an uneventful recovery from her laparotomy. Fortunately she did not require catheterization, which would have been an almost impossible procedure. The baby, I am sorry to say, did not thrive. The mother's milk, though apparently sufficient in quantity, did not seem to agree with him, and I finally had to resort to artificial feeding. Eventually I discovered that the mother had been worrying seriously over financial matters. She wished to stay on for a plastic operation on her thighs and did not know how she could meet even the small charge we make for board. When I learned this, of course, I saw that she had a free bed and tried to put her mind at rest. She was quite neurotic, and the worry had evidently a serious effect reflexly on her milk.

In the beginning I told her I thought we should wait a month after the Caesarian section before operating to correct her deformity, since the latter procedure was not likely to prove exactly a simple matter. We kept to the schedule, and on November 3rd, 1924, I performed a plastic operation, freeing her thighs from each other and building up to normal, as nearly as possible, the anterior portion of her vulva which had been involved in the cicatrization. While I was operating, the infant suddenly developed convulsions and died before the mother had fully recovered from her anaesthesia. In spite of her grief, which was very distressing, she made a good, though somewhat prolonged, recovery from the second operation. In the later weeks of convalescence she incidentally developed tertian malaria which refused to yield to quinine treatment by mouth, but subsided rapidly as soon as the drug was given intramuscularly.

Before she left the hospital she was able to walk about like any normal individual and was in good general health. So far as her vagina and vulva were concerned there seemed no reason why she should not give birth to future children in the normal way. The pelvic measurements were: anterior superior iliac spines, 24 cm.; iliac crests, 26 cm.; bi-trochanteric, 28.5"; external conjugate, 18". These measurements, though somewhat under normal, especially antero-posteriorly, are not so seriously shortened as to make spontaneous delivery improbable if the infants born later should prove no larger, at term, than her first child. Yet her pelvis was sufficiently flattened to make me somewhat apprehensive about her first delivery by the vaginal route. Hence I urged her to try to
come to the hospital, near term, if she should become pregnant again. However, she seemed to feel that it would be impossible to persuade her family to let her do this. What may have happened since, I do not know, for I have never seen nor heard from her again.

THE FINDING OF MILIARY TUBERCLES IN THE CHOROID OF AUTOPSY SPECIMENS.*

T. P. Lee, M.D., Peking.

Since the opening of the new hospital of the Peking Union Medical College many cases of advanced pulmonary tuberculosis and miliary tuberculosis have been examined ophthalmoscopically for tuberculous lesions in the fundus. They have almost invariably been advanced cases of pulmonary tuberculosis. In none of these cases has any lesion of a tuberculous nature ever been found in the fundus. The persistently negative results of these examinations led naturally to the supposition that tuberculosis of the choroid associated with a general tuberculosis is extremely rare in this part of the world. Recently, while making an histological study of the eyes of a patient who died of carcinoma and tuberculosis of the lungs, miliary tubercles were unexpectedly found in the choroid of both eyes.

REPORT OF CASE.

P.U.M.C. Hosp. No. 7030. A Russian adult male, aged 45 years, was admitted in January, 1924, to the medical ward complaining of difficult breathing and a feeling of pressure in the cardiac region. His family history is unimportant and negative. He noticed shortness of breath for the first time while stopping at Sinkiang in April, 1923, i.e. nine months prior to admission. About the same time he began to have a cough with expectoration and fever. A month later the patient went to Hankow where he was taken ill with an attack of pleurisy with effusion in the left chest. Paracentesis was performed twice by a physician in that city and a slightly yellowish turbid fluid was obtained. About the same time the patient

*From the Department of Ophthalmology, Peking Union Medical College, Peking, China. Presented before the Section on Ophthalmology of the Joint Conference of the China Medical Missionary Association and the Hongkong Branch of the British Medical Association, January 22, 1925, Hongkong, China.
began to have an insidious pain in the axillary region of the left chest. Gradually this pain became diffuse over the entire left side of the chest. The pain was sharp, constant and aggravated by coughing and deep respiration. These symptoms steadily grew worse. In October, 1923, he had hemoptysis. Since that time he has had blood in his sputum every few days. Because of this the doctor believed that the patient had tuberculosis and sent him to a hospital in Peking. An examination of the sputum there proved to be negative for tubercle bacilli. A small tumor made its appearance on the left side of the chest wall about this time. During these months (April to October) the patient did not have, as far as he could recall, any night sweats or afternoon fever. Loss of weight was insignificant. There was no disturbance of vision. After being a patient for three months in the hospital referred to, he was discharged and subsequently came to the Peking Union Medical College Hospital where he was admitted as an in-patient.

The physical examination made upon admission showed the patient to be only slightly under-nourished. The cervical glands were moderately enlarged but not tender. The thorax was barrel-shaped. There was no expansion of the left chest during respiration. A tumor was present at the latero-posterior aspect of the chest 4.5 cm. below the inferior angle of the scapula. It was firm in consistency, tender on pressure, slightly movable and apparently attached to the ribs. It measured 9 cm. x 5 cm. x 7 cm. The left chest was generally flat on percussion and no breath sounds were heard below the fourth rib. The right chest was slightly enphysematous; otherwise normal. An X-ray examination of the thorax showed the left lung to be homogeneously dense; no fluid or tumor could be made out; the ribs were visible, and the heart was slightly displaced to the right.

Ophthalmoscopic examinations of the fundus were made several times and were always negative. The last examination of the fundus was done about a week before the patient’s death. The blood Wassermann was negative. The blood was normal except for a mild secondary anemia. The patient succumbed about four weeks after his admission and a complete autopsy was performed.

Autopsy Findings.—Extensive carcinomatosis was found in the left lung with metastasis to the left chest wall, right lung, mediastinal lymph glands, thyroid gland, axillary and cervical lymph glands, spleen, liver, pancreas, kidneys, adrenals, bone marrow and retro-peritoneal lymph glands.

The lungs revealed extensive lesions of chronic pulmonary and miliary tuberculosis. In some places the lung showed only marked caseation, while in other places miliary tubercles and carcinomatous infiltrations were seen intermingled.

There were also found a chronic passive congestion of the liver, slight general anasarca, external hemorrhoids and a decubitus ulcer.
Microscopic examination of the tissues revealed miliary tuberculosis in the spleen, liver, adrenal (cortex), renal glomeruli and bone marrow of the ribs. Gross and microscopic examinations of the brain and meninges for carcinomatous metastasis and miliary tubercles were negative.

Immediately after death both eyeballs were removed, fixed in Müller's fluid and prepared for serial section study.

**Histological Report on the Eyeballs.**—Right eye. The cornea, sclera, lens, iris and ciliary body are normal. The retina is normal except for moderate cystic degeneration near the ora serrata. In the choroid of the right eye there are five miliary tubercles, all located in the posterior part of the fundus near the macular region. The largest tubercle is about 0.75 mm. in diameter. The adjacent pigmented layer and Brücke's membrane are not broken through. The retina immediately overlying the tubercle is not detached. The tubercle itself is fairly well outlined. The cells are of the lymphoid and epithelioid type. Those in the centre of the tubercle stain very poorly while the peripheral cells stain much better. No giant cells are found but acid-fast bacilli are present in large numbers. The other tubercles are smaller. They appear to arise as small lymphocytic infiltrations around the veins of the middle-sized vessel layer. It is observed that the smaller the focus of periphlebitic infiltration the better are the staining qualities of the cells.

Left eye.—Sections of the left eye show the condition to be similar to that of the right eye. There are also five small tubercles in the choroid, all located in the posterior part of the fundus. Three of these are near the macula. All of the foci are minute and none could possibly have caused any change in the contour of the overlying retina. In the sections of this eye the origin of the foci is better defined than it is in the right eye. The periphlebitic infiltrations begin in connection with the medium-sized veins of the outer layer of the choroid. All of the cells of the tubercles stain well. There are no giant cells but acid-fast bacilli are found in the two larger foci. There is no change in the pigmented retinal layer. No evidence of detachment or inflammation of the retina is present. The other structures of the eye are normal.

**Discussion.**

To general pathologists this case is of special interest because of the association of pulmonary tuberculosis and carcinoma in the lungs. To ophthalmologists it is of particular interest because of the unexpected finding of miliary tubercles in the choroid of both eyes, which were removed at the autopsy performed immediately after death.

As far as can be ascertained not a single case of miliary tuberculosis of the choroid has been seen in our new hospital or its
predecessor during the past nine years. The finding of tubercles in this case points to the fact that the disease does occur. However, the fact that this patient was a Russian prevents us from making deductions regarding what may occur in the Chinese. The fact that tubercles have not been seen in the fundus of cases examined may be due both to the late appearance of the focal lesions in the fundus and to the minuteness of the tubercles which renders them invisible by the ophthalmoscopic method of examination. It is a well-known fact that miliary tubercles of the choroid usually appear very late in the course of a general miliary tuberculosis and that sometimes they are found only just before death; also when miliary tubercles do appear in the choroid that they apparently grow rapidly in size. It should be noted that in the present case only one lesion, the largest tubercle in the right eye, could have been seen in an ophthalmoscopic examination. But the patient's fundus oculi was last examined a week prior to death so this tubercle, even though it may have been present, was evidently too small to be seen at that time. Our knowledge therefore that the choroid finally became involved is determined only by a very painstaking study of the autopsy specimens. One is justified in wondering whether most of the fatal cases of pulmonary tuberculosis would not show tubercles in the choroid if an histological examination of the eyes was made in every such case.

COLLYRIA.—An investigation of the osmotic pressure of eye-drops has been carried out by Oguchi (A. von Graefe's Arch. f. Ophthalmol., abstr. Ophthalmol. Year Book, 1923, 19) He found that the tears contained sodium chloride in the strength of from 1 to 1.4 per cent. Solutions of salt which are either stronger or weaker than this cause pain and irritation. Distilled water likewise causes pain when instilled in the eye. The author observed that zinc sulphate and other drugs caused more irritation when mixed with distilled water alone, and were practically non-irritating when the proper amount of salt was added. The astringent action was not altered. A saline solution (one per cent) should be used in mixing bichloride of mercury for instillation in the eye. The sodium chloride does not alter the antiseptic properties of the bichloride, and renders the solution less irritating. This also applies to the oxycyanide of mercury. Cocaine, esorine, and pilocarpine are not altered by one per cent salt solution, and it is preferred as a menstruum for these drugs. The action of atropine is lessened by sodium chloride, and distilled water must be used in this instance. Salt hastens the deterioration of adrenalin, and should be used as a diluent only when the solution is to be used at once. Boric acid in 2.5 solution is isotonic with the tears.—Medical Annual, 1925.
GASTRIC SECRETION*

By Robert K. S. Lim, Peking.

The field of gastric physiology has been so extensively investigated, that our knowledge of the actual phenomena associated with gastric secretion has long been regarded as fairly complete. Within recent years, however, results have been recorded which call into question several conceptions and some few facts, which were apparently indubitably established. Some revision of current conceptions becomes necessary, although any restatement must for the present be regarded as largely tentative. In the present paper, no attempt will be made to survey the entire field as a review of this nature has recently been made available by Carlson. It is hoped, however, that the following account will in a measure serve as a supplement to his review. Where possible, the significance of recent observations in relation to medicine will be discussed.

THE GASTRIC MUCOSA.

The only feature of note is that at the dome (fundus) of the stomach, the mucous membrane is thinner than in the body of the stomach. The area occupied constitutes about one fifth of the surface of the stomach in dogs, and about one tenth, in man. It is sufficiently demarcated from the remainder of the stomach as to suggest a correlation with the "air cap" described by roentgenologists, and should this be the case, the presence of few glands may be explained by the absence of contact with food.

THE SECRETING CELLS.

The gastric secretory apparatus consists of rather simple gland tubes, (except at the cardiac orifice and within the pyloric antrum, where the glands are somewhat racemose), in the walls of which one or more of three types of cells may be found. Heidenhain distinguished only two kinds, to which he gave the terms, parietal and central, according to their position relative to the gland tubule. Langley preferred to apply a functional description to the parietal cell and suggested the term "oxyntic".

*From the Department of Physiology, Peking Union Medical College, Peking. Read before the Physiological Section of the Joint Conference at Hongkong, January, 1925.
(acid secreting), chiefly on the ground that few or no oxyntic cells occur in the pyloric antrum, the secretion from which is alkaline. These acid (HCl) secreting cells are present in every gland tube between the oesophagus and a line drawn across the stomach a little below the level of the incisura angularis. (The description applies to the higher mammals).

The central or chief cells of Heidenhain were found by Bensley to be divisible into two further groups which may conveniently be described as superficial (or neck cells, Bensley) and deep, the former being situated nearer the lumen of the stomach. The staining reactions of the superficial group are similar to those of mucus-secreting cells. This feature, along with the fact that the glands in the pyloric region are composed wholly of similar cells, led Bensley to believe that the superficial or neck cells found in the body of the stomach (so-called fundus region) were identical with those occurring in the cardia and pyloric antrum, and to suggest that their sole function was to secrete mucus. Bensley's observations have been confirmed by Cade and Lim. Since these mucous-like cells occur not only in the neck region (of the fundus gland tube) but frequently throughout the greater part of the fundus tubule, as well as in the cardiac and pyloric glands, I suggested that they be termed "mucoid" cells.

Klemensicewicz, Heidenhain, Akermann, Schemiakine, and others had found that the pyloric secretion possesses weak proteolytic activity, but Ivy and Oyama failed to detect the presence of any ferments in the pyloric juice. Lim and Dott, however, had no difficulty in finding a feeble proteolytic enzyme in the secretion of the pyloric antrum (histological examination of which proved the absence of any but mucoid cells). They were unable to ascertain the presence of rennin, but since the ferment content of the secretion was obviously low, the negative finding may possibly be due to technical deficiency. Likewise, Ivy's failure to determine the enzyme may have been due to his method of estimation (Mett) being insufficiently delicate. Carlson has suggested that the pyloric ferment may be in the nature of a transudate from the blood; it may be mentioned that Ivy and myself found on one occasion that the blood drawn at the time when the pyloric secretion was collected, exhibited about the same degree of proteolytic activity (Hata's method) as was observed in...
the pyloric juice. Pressure of other work detained us from continuing the observation, which in itself has, of course, no other significance than that it places the above suggestion within the realm of probability.

The "deep" group of central cells have all the characteristics of zymogen secreting cells, and are without doubt responsible for the pepsin (rennin and lipase?) of gastric juice. It is obvious that these "peptic" cells may only be found in the fundus region, their distribution being somewhat smaller in extent than that of the oxyntic cells.

In the course of development, the first type of cell to differentiate from the entoderm is the mucoid, next comes the oxyntic, and last of all the peptic. In the cat, the peptic cells are not completely developed until one or two weeks after birth (Lim7); in the human all three types are present before birth. In connexion with the function of the mucoid cell, it is interesting to note that Hammarsten, Zweifel, Morrigia and Sewail have found that extracts of the newborn cat's stomach contain no ferment until about three weeks after birth. That the mucoid cell of the newborn secretes no pepsin does not necessarily indicate that the adult cell may not have some ferment secreting function. Should a parallelism between the proteolytic ferment concentration of the blood and the pyloric juice be established, however, the former view may prove to be correct. At any rate, it is necessary to remember that mucoid cells are found throughout the whole stomach, and that their quota of secretion, be it mucus alone or mucus and ferment, may not be neglected in any consideration of the physiology of gastric secretion.

The surface epithelium composed of columnar mucus secreting cells, must also be mentioned. Apart from mucous secretion, these cells may play a part in secretion or diffusion and absorption, thereby modifying the composition of the gastric juice.

Much might be written regarding the relation between tumours of the stomach and the normal cell types. Thus in colloid carcinomas, the cells which have not undergone autolysis are indistinguishable from mucoid cells, while the cells in encephaloid carcinomas resemble the embryonic entodermal epithelium in structural character and staining reactions. Further, the normal occurrence of islets of intestinal epithelium in the human foetal
pyloric antrum (Weber, Lim) is more than interesting, since it has been found that cells of the intestinal type, viz: columnar cells with striated borders and goblet cells, are sometimes present at the growing edge of some adenocarcinomas; in the vicinity of tumours (Warburg, Hammerschlag); at the edge of tumours (Lim and Dott). Attention must also be drawn to the work of Dragstedt on the implantation of living organs (kidney, intestine, spleen) into the gastric lumen; in no case was the implanted organ digested. This has an obvious bearing on the pathology of gastric ulcer. These observations are of the greatest interest and value, but space forbids further discussion in a paper dealing with physiology.

TECHNIQUE OF GASTRIC SECRETORY OBSERVATIONS.

Methods of obtaining and observing gastric secretion in experiments on animals remain, in principle, those initiated by Heidenhain and Pavlov. In the case of human beings, the only method which ensures any accuracy is the double intubation technique employing continuous aspiration (Lim, Matheson and Schlapp; McBaird, Campbell and Hern). Two Einhorn tubes are passed, one into the stomach and the other into the duodenum. Both tubes are connected with a suction pump and the contents of stomach and duodenum continuously evacuated under a negative pressure of about 50 mm. Hg. In this manner the passage of gastric juice into the duodenum and regurgitation from the intestine is largely prevented, and when such does occur, estimation of the loss or gain is possible. At least, the factors which influence the experimental conditions can be adequately controlled. The secretory response is tested by injection of histamine acid phosphate (0.02 mgrm. per kilo) subcutaneously. Heyer employs hypnotic suggestion, but not all individuals are responsive to this. Test meal (or water) observations are unsuited to the double intubation technique, although they may be carried out if intermittent aspiration (fractional analysis) be applied to the gastric tube and dye be previously added to the test meal, as suggested by Gorham.

It is important to note that gastric analysis may afford three different kinds of information. Firstly, as to whether the stomach is able to secrete or not; secondly, as to the nature of the secretion (e.g. concentration of pepsin and HCl); and thirdly, as to the tone of the pylorus (resulting in regurgitation or retention). The histamine test permits the evaluation of the first and second, and
also of the third, if the gastric contents are only removed in
fractions. This last procedure obscures information number two,
since the samples withdrawn after regurgitation has occurred are
contaminated. Test meals, given by stomach tube, may also give
all the information desired but rarely do so. For example, the
admixture of food with gastric juice obscures the volume of the
response, while the real acidity is masked by the neutralizing
and diluting power of the food mass, evacuation into the duodenum,
regurgitation and retention. Apart from inaccuracy, there appears
to be little or no significance to be attached to variations in the
concentration of pepsin or HCl. Carlson\textsuperscript{15,16} has pointed out that
a healthy individual (e.g., Mr. V.) may show extreme variations
both in the quantity of secretion and the concentration of HCl, i.e.
achlorhydria and hyperchlorhydria, without exhibiting symptoms.

The only information of value which the test meal does afford
is on emptying time and retention (as furnished by the presence of
a peak or plateau in the gastric secretory curve plotted from frac­
tional observations), so that routine test meal examination can
hardly be regarded as a gastric secretory test at all. It is question­
able whether any method of gastric analysis serves a useful purpose
in the diagnosis of gastric disorders, excepting perhaps in the
observation of the basal or unstimulated secretion (see later). It
is also true that the finding of achylia may be of some assistance
in the diagnosis of gastric carcinoma and of interest in other condi­
tions but refined methods are unnecessary, if this be the only
information required. In nine cases of suspected carcinomas,
Matheson, Schlapp and myself\textsuperscript{77} found that eight did not respond
to histamine and one did. Excepting the last mentioned case,
which turned out to have no tumour, the others were found (either
at operation or autopsy) to be frank carcinomas. This example is
quoted, not to demonstrate that achylia is invariably present in
gastric cancer (for this is by no means the case) but rather to show
that in one of the few instances in which a pathognomonic sign of a
specific gastric disturbance is available, the findings are of insuf­
ficient importance to outweigh the significance of clinical history and
symptoms. One cannot but feel therefore, that the practitioner
will lose nothing by continuing to rely upon these evidences for his
diagnosis, and that he will supplement these with radiological
examination when he wishes information on pyloric tone or
motility. On the other hand, gastric analysis still remains an important method, both for the clinical teacher and investigator.

The Composition of the Gastric Juice.

Apart from HCl, pepsin, rennin, lipase and various salts, it is interesting to note that Loeper and Marchal have found that leucocytes constantly pass into the gastric juice and may do so during psychic secretion. Besides leucopedesis, it would seem that substances of not too large molecular dimensions (e.g. chlorides, iodides, urea, certain dyes, viz: neutral red, methylene blue, etc.) pass readily into the gastric juice. Further, the blood gases have been shown to diffuse through the gastric mucosa, the tension of CO₂ in the gastric lumen being sometimes as high as that in the venous blood (Nora Edkins, Dunn and Thompson). The stomach may therefore be regarded in part as an excretory organ, while the presence of gas, especially CO₂, may influence secretion, or at any rate play a rôle hitherto unsuspected. There is some evidence that the action of certain diuretics in increasing the elimination of chlorides in the urine may lower the acidity and chloride content of the gastric juice (Heilig).

Concomitant Changes During Gastric Secretion.

Accompanying gastric secretion there are changes in the blood, which are reflected in the alveolar air and urine. The most important is the decrease of blood chlorides. Zavadski, employing dogs with gastric and oesophageal fistulae, found that on sham feeding (psychic gastric secretion), there was a diminution of chlorides in the red blood corpuscles and little or no change in the plasma. Recently, Salomon has demonstrated that if a fatty meal is given, there is no alteration in the blood chlorides (fats inhibit gastric secretion). Collip has shown that when the stomach is resting, the oxyntic cells contain abundant phosphates and probably carbonates, but no chlorides; it is only when the gastric glands are active that chlorides accumulate in the cells. These two facts, lend support to Maly's conception of the mechanism of HCl secretion, which in turn affords us a hypothesis for the interpretation of the changes occurring in the blood itself. Maly considered that HCl was formed by the interaction of NaCl + NaH₂PO₄ = Na₂HPO₄ + HCl, the acid being immediately evacuated and the basic phosphate reconverted into the acid salt in
the presence of CO$_2$ (arising from the activity of the cell?), viz.,

$$\text{Na}_2\text{HPO}_4 + \text{CO}_2 + \text{H}_2\text{O} = \text{NaH}_2\text{PO}_4 + \text{NaHCO}_3.$$   

The bicarbonate formed would in consequence raise the CO$_2$ combining power of the blood. That the CO$_2$ content of whole blood is raised during meals was noted by Porges, Leim dorfer and Markovici$^{99}$ and associated by these authors with the secretion of HCl. Dodds and McIntosh$^{25}$ have apparently shown that the whole of the increase of CO$_2$ after meals is to be found in the corpuscles, the plasma p$_H$ and bicarbonate being unaltered. Towards the end of first hour, however, the plasma has a sufficiently high CO$_2$ content to cause a temporary migration of Cl ions (HCl) into the corpuscles, bringing their chloride content above the normal value (Dodds and Smith$^{26}$). Van Slyke, Stillman and Cullen$^{107}$ had observed some slight variation in the plasma CO$_2$ which they did not consider to be of sufficient magnitude to be significant.

Kestner and Plaut$^{61}$, on the other hand, have recently reported that the p$_H$ (arterial blood used, others had employed venous blood) is definitely increased during gastric secretion. Whether, however, there exists a distinct alkalosis or whether such is invariably compensated effectively, the changes in the alveolar air and urine are those which are usually associated with alkalosis. The CO$_2$ tension of the former is increased (Higgins$^{10}$, Erdt$^{33}$, Van Slyke, Stillman and Cullen$^{107}$, Dodds$^{23}$). Higgins, however, was of the opinion that the rise in CO$_2$ could be attributed wholly to a diminished irritability of the respiratory centre, such as occurs when a person adopts a recumbent posture. On the other hand, one of the means of compensation in alkalosis is a diminution of respiration, and it is to be noted that Kestner and Schlüns$^{66}$ have actually found the frequency of breathing to be a little smaller during gastric secretion (observation on dogs with gastric fistula). Lim, Matheson and Schlapp$^{76}$ attempted to determine the alveolar CO$_2$ after injections of gastrin and histamine (both powerful gastric excitants), but they were unable to obtain consistent results, partly on account of the fact that the subjects were discomf orted by the presence of a tube in their mouths (for gastric analysis) when blowing out their alveolar air (Haldane-Priestley technique), and partly because pancreatic secretion followed soon after some of the gastric juice had entered the duodenum, thus neutralizing the gastric effort.
The urinary changes after meals were first discovered by Bence Jones in 1849, and definitely associated by Schumov-Simanovski, 1894, with gastric secretion, in experiments on a Pavlov pouch dog. The diminished excretion of acid and ammonia, or alkaline tide which occurs, is again suggestive of alkalosis. Leatkes held that the change was a diurnal variation, but his observations have not been confirmed (Campbell, Fiske, Dodds, Hubbard, Munford and Allen). The last named authors could detect no alkaline tide in the urine of achlorhydriacs, nor in their normal fasting controls.

The question of potential alkalosis as a normal concomitant of gastric secretion is of considerable medical interest, since this condition, if sufficiently severe, gives rise to hyper-excitability of the peripheral nerves or tetany. It has been noted that any interference with the pyloro-upper-intestinal region leading to obstruction, is frequently followed by "gastric tetany" (Newman, Kussmaul, Mayo-Robsin, Cunningham, and many others). The work of McCann, MacCallum et alia, Hastings, Murray and Murray, and Haden and Orr, have shown that the blood changes consist of a marked increase of CO₂ tension, marked fall of chlorides, affecting both cell and plasma and a slow rise in pH. McCann, and Youmans and Greene advocate the administration of ammonium chloride in the treatment of gastric tetany, while Haden and Orr have found that sodium chloride is equally efficacious. While disorders of the different abdominal viscera not infrequently cause gastric disturbance (viz., inflammation of the appendix, gall bladder, etc.,) there is no experimental evidence that in obstructive conditions of the upper alimentary canal, gastric secretion is actually stimulated.

When this has been established it still remains to be proved that increased gastric activity will alone give rise to the marked symptoms, now called gastric tetany. Further work is desirable, although the available evidence is suggestive.

With regard to the changes associated with the secretion of pepsin, Pavlovsky puts forward an interesting hypothesis, namely, that the proteolytic enzyme of the lymphocyte is the source of pepsin. He found that the injection of an extract of pancreas produced a lymphocytosis and an increase of more than fifty per cent in the proteolytic activity of the gastric juice. On the other
hand, a polymuclear leucocytosis has no influence on the gastric juice. It would seem to follow therefore that alimentary leucocytosis (lymphocytosis) is correlated with activity of the peptic cells. Alimentary lymphocytosis according to Bath', may follow ingestion of NaHCO₃ or dilute HCl or even psychic stimulation (sight and smell of food). According to Racchiusa¹⁰° and Cipriani¹⁸, the leucocyte count is directly proportional to the quantity of HCl secreted, leucocytosis being associated with hyperchlorhydria, and leucopenia with achlorhydria.

**The Nature of Gastric Secretion.**

It might be said in general that the stomach never stops secreting, not even during starvation lasting a week or more (Boldyreff⁹, Carlson¹⁶, Kunde⁶⁶). This incessant flow exhibited by the empty and apparently resting stomach has been termed the "continuous" secretion (Carlson), but as the term does not designate any particular phase of gastric secretion the term "basal", indicating these conditions, would seem more appropriate. Since there are four kinds of cells in the stomach, whose periods of activity do not always coincide, the composition of the gastric juice is necessarily subject to variation.

The basal juice (i.e., that secreted during fasting or normal abstinence from food) is usually scanty, viscid, containing little or no free acid but always some total acid (?) and ferment (Breskin and Bykoff¹⁰). When a meal is taken, or following other means of stimulation, there is a copious secretion of watery, strongly acid, highly proteolytic juice. These two extremes represent the general composition of the juices secreted during "rest" and "activity," but they may on occasions be met with under basal conditions alone. It is, therefore, clear that the basal secretion is not invariably a minimal secretion, and even though the (cause) stimuli responsible for the basal secretion are as yet unknown, it is not inconceivable that they may, under certain conditions, be enhanced or diminished. The question naturally arises as to what differences or similarity exist between an enhanced basal secretion and the normal active (say meal) secretion. It has been found that the volume of juice secreted under either basal or active conditions increases proportionally with the secretion rate (measured by the amount of HCl secreted per unit time) and that the percentage acidity increases according to the ratio of secretion rate to volume.
Thus from "zero" secretion to a rate of about 30 mgsm. HCl per hour (Pavlov pouch dogs) the acidity rises rapidly, but thereafter, further increase of secretion rate is accompanied by a progressively slow rise in acidity. The differences in the character of basal and active secretions are thus quantitative rather than qualitative, the chief difference being the greater increase in the amount of juice secreted in the latter case. With regard to the pepsin of gastric juice, it is only known that the output (not necessarily percentage) of pepsin increase at the same time with that of the acid, when the resting stomach is stimulated, but whereas the secretion of HCl is apparently indefatigable (Bergeim, Rehfuss and Hawk*, Rothlin and Gundlach**, Ivy**, and Lim***), there is reason to believe that pepsin formation cannot go on indefinitely, without periods of rest, since the peptic cells require time to elaborate thezymogen precursor. This leads us to think that the pepsin content is liable to greater variations than the acid. At any rate, it is probable that irregular fluctuations in the (percentage) acidity of the gastric juice are due to variations in the amount of non-acid bearing juice (composed largely of pyloric and fundus mucoid cell secretions) rather than to variations in the secretions of HCl itself. This implies that HCl is secreted at constant concentration and that the increase of concentration with the secretory rate is due to the relative diminution of the non-acid portion of this juice at the higher secretory rates. In support of this contention there, is the fact that, under certain conditions, the stomach may secrete only a very small amount of juice (0.5 c.c. per hour from Pavlov pouch) with as high an acidity (e.g. 0.4% HCl) as is found when the secretion is forty times or so greater. It is necessary to correct the impression, which may be gained from the foregoing, that acid secretion is incessant and pepsin secretion intermittent. On the contrary, the opposite is observed. Under basal conditions there are times when there seems to be no acid secreted at all (if the fundus juice alone is examined), but there is always some juice (fluid) secreted by the stomach as a whole, the juice being apparently composed entirely of mucus (chiefly pyloric).

In this mucus there is always some ferment to be found (see beginning of this paragraph). To summarise, then, acid secretion may cease spontaneously while pepsin secretion is normally continuous, but if the stomach is stimulated excessively the
secretion of acid cannot be fatigued or even diminished to any great extent, while it is suspected that pepsin secretion would show a very marked diminution if not absolute fatigue.

**The Relation Between Stimulus and Response.**

When the stomach is stimulated, it matters not in what way or from what particular region, the response is on the whole remarkably similar. That is to say, there is a standard response (consisting of a simultaneous increase of juice, acidity and ferment), to a variety of stimuli. Of course, the quantity and the concentration may appear to differ with different stimuli, but if the composition of the juices secreted be referred to the rate at which the juices were secreted (i.e., output of HCl), it will be found that the difference is due mainly to differences in the intensity of secretion, and therefore to the strength of the respective stimuli, more especially as a constant stimulus calls forth a tolerably constant output of HCl. For example, psychic stimulation may call forth a larger and more acid secretion than the application of 50 mgrm. of histamine directly to the stomach, the former being the stronger stimulus, but by increasing the quantity of histamine, the response values may be reversed. A standard response means that all stimuli must act on the different cells in the stomach simultaneously, or at least on some centre or central mechanism which will call the four types of gastric cells into action. Just what occurs is not known. It is yet to be determined whether a submaximal stimulus excites all the gastric cells to partial activity of whether only some cells are excited to maximum activity. It may be said, however, that if the stomach be divided into two unequal portions, a submaximal stimulus will invariably excite secretion in both parts, and according to Pavlov the amount secreted is proportionate to area of the divided parts. This may be taken to be approximately true and would point to either submaximal activity of all the cells or "all or none" secretion by a few cells in each gland tube. Histologically there is evidence that neither the oxyntic nor the peptic cells are all at the same stage of activity when examined (Edinger, Fitzgerald, Hammett, Collip, Ivy and Dawson). The question, however, requires further investigation. Nevertheless, enough is known concerning the relation between stimulus and response to make desirable the
employment of the HCl output as the criterion of secretory activity, not to the exclusion of, but as an addition to the usual figures relating to the quantity of juice and percentage acidity.

The sites of stimulation.

Pavlov was the first to demonstrate the existence of psychic stimulation of gastric secretion. He found that the taste and chewing and even the sight and smell of food would give rise to gastric secretion provided the vagi were intact. He also showed that a dog could be trained to secrete on hearing a bell; this he termed a "conditioned" reflex. Carlson and subsequent observers have failed to note any constant stimulation from the mere sight and smell of food, but since conditioned reflexes are possible, it may be that the stimulation of the senses, other than those directly concerned with the intake of food, require training or "conditioning" before becoming effective in eliciting a gastric response. It seems, however, that after all a psychic element is not essential (Zeliony) in evoking gastric secretion from the mouth region, for a decerebrate dog will respond to sham feeding. This would point to the mechanism being a simple reflex, although it has been found that the chewing of indifferent substances have no effect on gastric secretion (Pavlov, Carlson). To avoid laying undue stress on the psychic nature of the reflex, it is convenient to employ the term "cephalic" stimulation (Lim, Ivy and McCarthy).

Since local stimulation of the stomach itself is efficacious in eliciting gastric secretion, the teleological aptness of the stimulus has led many investigators to neglect the possibility of stimulation from other sites. Thus the work of Beaumont, Khizhin, Lobasov and many more recent investigators only show the effect of mass or total stimulation of the stomach. The earliest exact experiments on local gastric stimulation were carried out by Heidenhain, and Sokolov.

That gastric secretion may also be excited from the intestine was first demonstrated by Pavlov, when he showed with Piontkovski that soaps applied directly to the duodenum had this effect. Others who have demonstrated intestinal secretion are Lobasov, LeConte, Sokolov, Cohnhein and Dreyfus, et al. The recent work of Ivy, McIlvain and Javois, however, has
shown that intestinal stimulation is of considerable physiological importance; they describe the activity of many substances known to be present in the intestine after meals (e.g., peptone, some amino-acids and amines).

In addition to the natural sites, it may be added that hypnotic suggestion (Heyer\textsuperscript{49}, Luckhardt and Johnston\textsuperscript{84}), sleep (Johnston and Washeim\textsuperscript{59}), and cold bath (Weitz and Fischer\textsuperscript{111}) may also give rise to gastric secretion.

**Effective Stimuli.**

Mechanical stimulation was formerly considered to be an effective means of gastric stimulation \cite{vide Magendie\textsuperscript{9}, Beaumont\textsuperscript{19}, Heidenhain\textsuperscript{41}}, but later became discredited as a result of Pavlov's teaching. Heidenhain had found on introducing a balloon into the stomach and distending with air, that the flow of gastric juice increased in amount and acidity. On deflation and subsequent inflation, an increase was again obtained. Pavlov apparently repeated these experiments but failed to obtain any response, except when the animals were hungry. He concluded that the response in these instances was purely psychic and that mechanical stimulation had no effect whatsoever. Recently, Lim, Ivy and McCarthy\textsuperscript{77} have proved conclusively the adequacy of the mechanical stimulus, in dogs whose entire stomach was formed into a pouch, the vagi severed below the diaphragm, and the duodenum anastomosed to the oesophagus. The introduction of a balloon into the isolated stomach, and its inflation with 200 c.c. of air for a period of fifteen or more minutes, sufficed to induce a copious flow of gastric juice containing a high degree of acidity and some ferment. Since all except the sympathetic nerve connexions had been severed, and Pavlov and Schumov-Simanovski\textsuperscript{97} had previously shown that the sympathetic nerves played no part in the "psychic" reflex, psychic stimulation was excluded. In other experiments it was found that even section of the vagal, sympathetic and enteric nerve fibres (i.e. all the nerve connexions) did not abolish the mechanical secretion. Continuous distension of the stomach is followed within one or two hours with a marked diminution in the amount of secretion. This is due to fatigue of the intermediary mechanism and not to fatigue of the cell, as an injection of histamine will again raise the rate of secretion. If
distension is applied gradually, a much greater volume of air has to be introduced to evoke secretion, than when air is introduced rapidly.

The mechanical stimulus has been found to be effective in the entire stomach, in the isolated pylorus (confirmatory of Zeliony and Savitsch\(^1\)) and in the isolated fundus. Distension of the pylorus which is anatomically severed from the remainder of the stomach, gives rise to a secretion in the fundus.

The mechanical secretion is readily inhibited by atropine, and by the introduction of fats into the intestine.

Chemical substances acting directly on the stomach have long been supposed to be the most important stimuli concerned in gastric secretion. As much of the work along these lines was conducted by the Russian physiologists (Lobasov\(^8\), Sokolov\(^16\), Lönnqvist\(^8\), and others) who followed Pavlov in ignoring the possibility of local mechanical stimulation, the quantity of test substances applied to the stomach by these investigators was invariably sufficient in amount (200 c.c.) to act mechanically. For example, Lim, Ivy and McCarthy\(^7\), found that if 200 c.c. or more of water be applied to the stomach and any escape prevented, stimulation of secretion was frequently obtained; but if the same quantity be applied in such a way that any overflow is led into a reservoir and is permitted to return automatically when the stomach ceases to contract—the stomach being thus subjected to little or no internal pressure—no secretion occurred. It was therefore necessary to repeat the older experiments employing such quantities (less than 100 c.c. usually 20 c.c.) as would absolutely obviate any mechanical effect. Dogs with the "entire stomach pouch" employed for the experiments on mechanical stimulation, were again used. Since the small amount used contained high concentrations of the test substance, it was ascertained with NaCl that only saturated solutions had any influence on the secretion of acid, i.e. hypertonicity in itself, unless extreme, does not stimulate secretion. The method of application was to irrigate the stomach (or pouch) with the 20 c.c. of test fluid, the overflow being repeatedly collected and returned for a definite period. In this way, the older observations have been amply confirmed; raw meat, meat juice, meat extracts, B-alanine (200 mgrm.), histamine (50 mgrm.), being found to excite secretion by their action in the stomach alone. It.
was noted, in part confirmation of Gross\textsuperscript{39}, Krshyschovsky\textsuperscript{40}, and Zeliony\textsuperscript{114}, that chemical applications to the fundus mucosa alone, were on the whole negative. In the case of histamine, however, applications to the fundus (pouch) mucosa gave rise to marked secretion even after all the nerves (vagal and sympathetic) had been cut. Irrigation of the isolated pylorus with meat extract causes a stimulation of the fundus secretion.

Atropine injections and fat in the intestine inhibit according to the strength or quantity of the chemical stimulus applied.

In the intestine, only chemical stimuli are effective. By employing dogs with the entire stomach pouch (oesophagoduodenostomy) it was possible to give the test substances by mouth and to observe the resulting effect on the isolated stomach (Ivy, Lim and McCarthy\textsuperscript{17}). It was found that raw food (e.g. meat) only caused stimulation after a long latent period, while peptone, B-alanine and histamine (confirmatory of Ivy and McIlvain\textsuperscript{33}, and Ivy and Javois\textsuperscript{16}), gave rise to a more immediate response.

Water in the intestine excites gastric secretion, especially when the dog is thirsty and when given along with an existing stimulus, e.g., a meal. To avoid water stimulation when trying out the effect of the above substances, only 50 c.c. or at most 100 c.c. of water were used as solvent. NaCl, and HCl, did not give constant results, while saponin, although not an absorbable substance, caused distinct stimulation. Atropine and fats have the same inhibitory influence as that previously observed. The important feature regarding the nature of the intestinal excitants is that they are mostly intermediate or end-products of digestion.

The Mechanism of Gastric Secretion.

The mechanism of "psychic" or "cephalic" stimulation, was proved by Pavlov and Schumov-Simanovski\textsuperscript{72} to be nervous and to involve the vagi alone.

Concerning gastric and intestinal stimulation, there are three possible mechanisms:

1. Nervous (enteric reflex).—The vagus and sympathetic nerves were ruled out by the extirpation and section experiments of Schiff\textsuperscript{184}, Heidenhain\textsuperscript{16}, Popielski\textsuperscript{77} and others, consequently it was thought that the reflex might conceivably take place through the
enteric plexuses. Heidenhain's pouch experiments as well as those recently conducted by us, (Lim, Ivy and McCarthy76), however, seem to eliminate this possibility as well. We found that both mechanical and chemical (histamine) stimulation was effective after all nerve connexions have been cut, but the response was much less than normal. Besides, Zeliony and Savitsch116 have shown that atropine (injections) and cocaine (locally) will prevent the secretion to chemical substances applied to the pylorus (the enteric connexions between pylorus and fundus being intact). The enteric reflex may therefore play a part under normal conditions, but it is obviously not an essential mechanism.

2. **Humoral.**—Edkins"' and others found that pyloric extracts stimulated gastric secretion on injection. Edkins and Tweedy31, Gross19, Zeliony and Savitsch116 found, as we have fully confirmed, that applications of chemical substances to the pyloric mucosa resulted in a stimulation of gastric secretion.

It was therefore supposed that the stimulating substances caused the pyloric glands to secrete a hormone, (termed by Edkins, "gastrin"), into the circulation whence it was conveyed to the fundus. Popielski88 enunciated a more general theory which assumed that the exciting substances ("vasodilatins") in food are absorbed either in the stomach or intestine, and after reaching the blood stream cause gastric secretion by lowering blood pressure, diminishing coagulability and increasing the permeability of the vessels. On Dale and Laidlaw's52 discovery of the pharmacological actions of histamine, which closely resemble those of "vasodilatin", Popielski88 accepted Dale's suggestion that the two were identical, and further emphasis was laid on histamine, after Barger and Dale4, and Abel and Kubota1 had described it as a normal constituent of the upper alimentary tract. Lim and Ammon77 have shown that if histamine is absorbed from the alimentary tract some would be removed by the liver: Koessler and Hanke64 state that histamine is largely detoxicated by the intestinal mucosa. At all events, Edkin's gastrin theory does not explain intestinal stimulation, while both theories utilize the circulation as the intermediary mechanism. The fact that we have not found nerve connexions to be essential, in the mechanism of gastric secretion, lends support to a humoral hypothesis. To test the humoral conception, Lim72 withdrew blood from fed cats
at various intervals after feeding with different diets, and
transfused the blood (both by direct and indirect methods) into
unfed animals. The experiments were carried out under light
anaesthesia; two doubtfully positive results were obtained through­
out the series of over twenty cats, in spite of the fact that
injections of "gastrin" (pyloric extract) in the same animals
elicited the usual gastric response, and that the blood group
reaction was not responsible for the failures. Ivy, McCarthy and
myself⁷⁹ have again tested out the humoral possibility by carrying
out similar blood transfusions in Pavlov pouch dogs, without
general anaesthesia, and also by anastomosing the carotid arteries
of pairs of Pavlov pouch dogs, and observing the gastric secretion
of one after the other had been fed. These experiments are as yet
incomplete, but so far purely negative results have been obtained.
The cross circulation was tested by methylene blue injections in
one animal and found to be patent both ways (methylene blue
appeared in the gastric juice of the injected animal and of the other
as well.) It is difficult to account for our failures* in view of the
fact that gastric secretion (fundus pouch) may be elicited from
both the stomach and intestine after all the nerves have been
severed. There remains, however, one other possibility.

3. Blood flow.—Since a humoral mechanism apparently
does not exist, and an enteric reflex is not essential, it
seems possible that gastric secretion may occur as the result of
increased blood flow in the gastric vessels alone. That gastric
secretion occurs on sudden exposure to cold (Teitz and Sterkel¹¹⁰)
and is inhibited in a hot, moist atmosphere (Fischer ³⁴,
Lim, Ivy and McCarthy⁹⁹) renders a purely circulatory explanation
not improbable. Friedrich³⁵ states that heat or cold therapy has no
influence on gastric secretion. In his and many other clinical
workers' observations, however, the after-effect of temperature
therapy on the test meal (active) secretion was studied and not the
immediate effect of temperature on the basal or unstimulated
secretion. Burton-Opitz¹¹ has shown that distension of the
stomach momentarily increases the volume of blood flowing from

*Since this review was written, Ivy and Farrell have found that a
transplanted gastric pouch responds to meals, showing that a humoral
mechanism must exist (Proc. Amer. Physiol. Soc., Amer. Jour. Physiol., 1925,
Ixxi; 203).
the gastric veins, but his experiments were of such short duration that the results cannot be properly applied to our discussion. He believed that the increase was due to the squeezing of the blood out of the vessels; he observed a subsequent diminution due to arterial constriction. Burton-Opitz also found that vagal stimulation only increased the blood-flow when the stimulus was also strong enough to cause pyloric contractions. Ivy, McCarthy and myself frequently observed, both with mechanical and chemical stimulation, that pyloric motility was considerably enhanced just before the appearance of secretion.

We think the reason why the pylorus is more excitable than the fundus is because it is more sensitive to changes in tone and is very much more motile. If motility and blood-flow are the means by which mechanical stimulation gives rise to secretion, it is easy to see why continuous distension is not accompanied by a continuously heightened secretion. The pylorus or entire stomach would in time adapt itself to the extent of the distension and become "quiescent", and hence the blood-flow would return to "normal", or the initial rate. That the action of chemicals in the intestine may indeed increase the blood-flow in the gastric area has also been demonstrated by Burton-Opitz[12], who showed that the applications of dilute HCl to the duodenal mucosa increases the blood-flow in the gastro-duodenal artery.

The blood-flow explanation, however, must for the present be considered a negative hypothesis. The possibility of a combination of an enteric reflex with increased blood flow seems to accord best with the available experimental facts but the mechanism of gastric secretion is still largely unsolved.

Conclusion.

In the present paper, reference to many topics in the field of gastric physiology and physiopathology have been purposely omitted, in view of the excellent account published by Carlson[16], to whose article the interested reader should refer. The application of some of the recent findings in connexion with the technique of gastric analysis and the value of such analysis in medical practice (as contrasted with clinical investigation) has been discussed.

The importance of mechanical stimulation is suggested here, especially in such conditions as pylorospasm, from reflex or local
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causes, and in acute dilatation of the stomach. One is tempted to imagine that in obstructive conditions of the upper bowel, accompanied by hypermotility and hyperexcitability of the stomach, there is a constant stimulus to secretion, partly mechanical, partly chemical, due to the over-production of amino-acids and particularly amines. The possible relation between this type of pathology, increased gastric secretion (i.e. secretion prolonged beyond the normal meal period) and gastric tetany has been mentioned.

The discovery by Ivy that end-products of digestion acting in the intestine, may give rise to gastric secretion, may explain the cause of the continuous secretion occurring outside the digestive interval. It suggests a closer study of stasis, and over-activity of the bowel in relation to gastric secretion and motility. The question of whether the bacteriological flora of the intestine plays a physiological rôle from the view-point of gastric and other glandular secretions is also worthy of investigation. It seems certain that the inter-relationship between different parts of the bowel is more intimate than at present recognised.

With regard to the newly described constituents of the gastric contents, viz: the leucocytes, the blood gases, the mucoid cell secretions, the various substances which may at times diffuse into the gastric juice, there is much to be made clear, not only as to their function within the stomach but possibly lower down the alimentary canal.

Lastly, it is of interest to note that in spite of the great advances which have been contributed to the physiology of gastric secretion within the last decade, we may yet conclude without sacrificing scientific accuracy, with the following droll lines from Pope:

"A tomb of boil’d and roast, and flesh and fish,
Where bile and wind and phlegm and acid jar,
And all the man is one intestine war."

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CHILD LABOUR IN CHINA.

By the nature of their calling missionary physicians are deeply interested in all that concerns the health of the people to whom they minister, and particularly so in the welfare of little children. Hence at our recent Biennial Conference in Hongkong, papers were read on "Health in Modern Industries in China" by Dr. C. T. Maitland, in which special reference was made to the necessity of prohibiting or regulating the employment of children; on "Child Hygiene" by Dr. Iva M. Miller, and on "Co-operation in a School Health Programme" by Mr. E. W. Wallace, who urged that physicians and school principals should cooperate more closely in taking the utmost care of the health of the scholars in our mission schools. Appropriate resolutions were passed on these subjects.

In China the weakness of the Central Government, the selfishness and cupidity of employers, the ignorance and dire poverty of the vast mass of the people, and—so it often seems to Westerners—the seeming indifference of the Chinese to human suffering, are very great obstacles to the introduction of measures for the protection of children. Fortunately, the subject of child labour in all countries is receiving the attention of the League of Nations. Its Health Committee, at its Session in Geneva, September—October, 1924, endorsed the declaration of the rights of children commonly known as the "Declaration of Geneva", and it invited the States which are members of the League, China included, to be guided by its principles in the work of child welfare. The Declaration is as follows:

"By the present Declaration of the Rights of the Child, commonly known as the Declaration of Geneva, men and women of all nations, recognising that mankind owes to the child the best that it has to give, declare and accept it as their duty that, beyond and above all considerations of race, nationality or creed:

1. The child must be given the means requisite for its normal development, both materially and spiritually;

2. The child that is hungry must be fed; the child that is sick must be helped; the child that is backward must be helped; the delinquent child
must be reclaimed; and the orphan and the waif must be sheltered and succoured;

"3. The child must be the first to receive relief in times of distress,
"4. The child must be put in a position to earn a livelihood and must be protected against every form of exploitation;

"5. The child must be brought up in the consciousness that its talents must be devoted to the service of its fellowmen."

The standard set by this Declaration is very high. How are we to attain to it? Shall we insist on the highest at once and accept nothing less, or ought we to introduce reforms gradually, here a little and there a little, and in this way gradually reach the standard? This is a very practical question. The China Christian Conference unanimously endorsed the following standard for industrial labour:

(a) no employment of children under twelve years of age; (b) one day's rest in seven; (c) the safeguarding of the health of the worker by limiting hours, by improvement of sanitary conditions, by installing safety devices.

The subject having been brought to the notice of the Municipal Council of Shanghai, which has control over the International Settlement with its population of 26,800 foreigners and 830,000 Chinese, a Commission was appointed in January, 1923, "to inquire into the condition of child-labour in Shanghai and the vicinity and to make recommendations to the Council as to what regulations, if any, should be applied to child-labour in the foreign settlement of Shanghai, having regard to practical conditions and to local conditions generally."

In July, 1924, the Commission presented its report which was unanimous. The industries in which children were employed, and the conditions of their employment were well described and several recommendations were made: (1) Children under ten years of age should not be employed and four years hence the age limit should be twelve years; (2) for children under fourteen the hours of labour should not be more than twelve; this period of twelve hours to include a compulsory rest of one hour, and there should be a day of complete rest once every fourteen days; (3) children should be protected from dangerous machinery, and (4) they should not be exposed to dangerous or hazardous conditions without proper protection for their safety being taken.

Previous to the annual meeting of the ratepayers of Shanghai on April 15, 1925, it was officially announced that the foregoing
recommendations in the form of resolutions would be presented to the meeting for discussion and decision. Great public interest was manifested and numerous letters on the subject appeared in the newspapers. There seemed to be unanimity concerning the third and fourth resolutions for protecting children from injury, and if these only had been before the meeting undoubtedly they would have been passed. But they were linked with the preceding resolutions which provided that children should not be employed at all under the age of ten or twelve and upon this point there was sharp difference of opinion. Probably all were agreed that, if things were as they ought to be in China, children of tender years should not be employed for long hours every day; but it was argued that to pass such resolutions in China at the present time would be futile, or would do more harm than good: that if forbidden to work in the factories or mills of the International Settlement, the children would be sent to work in the neighbouring Chinese settlements where the conditions would be very much worse, or they would remain idle in the home or roam about the streets, uncared for, and uneducated unless the Municipal Council should provide schools for them. But the argument which apparently carried most weight against the resolutions was advanced by one who supported them, the Director of the Ricsha Mission, a very earnest Christian worker. He publicly explained that in connection with the Ricsha Mission there was a school for the children of ricsha coolies, but very few of the children ever attended it because the desperate poverty of the parents, made it necessary for the children to earn wages, and there was the same difficulty with all other poor Chinese. In the goodness of his heart he suggested, therefore, that the Municipal Council should pay $4-$5 per month, the equivalent of the wages earned, to every child now in actual employment until it was fourteen.

Possibly this suggestion of doles frightened many of the ratepayers for it meant a charge on the rates of hundreds of thousands of dollars per annum, and at the present time, among the British particularly, doles of any description are not very popular, at least not among those who have to pay them.

Consequently, not caring to oppose the resolutions which had for their object the welfare of Chinese children, yet doubtful as to the wisdom of voting for and enforcing the particular resolutions
presented, many ratepayers preferred not to be present when the
time came for the discussion of the resolutions. At any rate, a
quorum was not present and the meeting ended. However, the
Municipal Council has consented to the holding of another meeting
in June, and has assured the public that the resolutions or by-laws
will not be enforced in such a way as to be open to unfavourable
criticism, nor will doles be given. It is to be hoped that the
resolutions will now be passed. From the experiences thus far
obtained there are obvious lessons: (1) that before bringing forward
measures of reform they should be thought out very carefully,
every reasonable objection should be anticipated and public opinion
enlisted in their favour; (2) that the "all or nothing" policy may
not always be the best; (3) that if it is not very easy to effect
reforms in Chinese industries in the International Settlement of
Shanghai, which is on the whole almost as well governed as a very
mixed community can be, it may require much education of the
Chinese public and a great deal of patience to carry reforms
through in a purely Chinese community.

Medical Reports

MARGARET HOSPITAL, LONDON MISSION, HANKOW.
Physician-in-Charge, H. M. Byles, M.R., R.S.

The year 1924 was a red-letter year for the Margaret Hospital
as it witnessed the removal from temporary and cramped quarters
in the native city to a spacious building more in the "country",
with a wide view and plenty of room for development. The new
operating room is so cool and convenient that very important
operations can be performed in the hot weather with much greater
ease than formerly, with the result that the operations under
anesthesia have risen from 287 in 1923 to 356 in 1924. The
obstetrical cases numbered 504; of these, 31 were delivered in the
hospital and 473 in the homes of the patients. The year has also

8 A meeting of the Shanghai ratepayers was held on June 2nd, as
appointed, but again there was no quorum; perhaps this was owing to
many of the ratepayers serving as volunteers to preserve order in the
International Settlement after the serious Chinese rioting which had
occurred on May 30th, 1925.
Medical Reports.

seen a new venture in the training of nurses. For a dozen years or more the Central China Medical Missionary Association has conducted examinations in nursing, having instituted such examinations before there was any organization of nurses extant in China. "Now that the Nurses' Association of China is a going concern our nurses covet its diploma and we, of the Medical Missionary Association, decided this year to cease examining in nursing, and to prepare our nurses for the N.A.C. examination."

The evangelistic side of the work is most encouraging. Several pathetic incidents are recorded of the illtreatment which girls and women receive, evidence of the great necessity of Christian work among the people. The "weight of it all is sometimes oppressive and yet the opportunities offered for service are so great as to be exhilarating."

MUKDEN MEDICAL COLLEGE AND HOSPITAL.

Staff of College and Hospital: eight foreign doctors, nearly all from Scottish Universities, and five Chinese doctors. Nursing staff: Miss Smith, Miss Grantham, S.R.N. and 29 Chinese male nurses.

This is a well illustrated and very interesting report. The foreword describes briefly what has been accomplished in the four decades since the founding of the Hospital. "In 1882 we alone were available to help the suffering poor, and it was they, the 'down and out', who crowded our gates. We now cater in part for the middle class and the wealthy. It is inevitable that we should be criticised for doing so. Our object, however, is to get the rich in Manchuria to see and feel for the diseased poor, in the hope that they will express their sympathy in the support of philanthropical medical work." "One of the important by-products of Christian charities, such as ours, has been to stimulate philanthropy in non-Christian circles. The increase in subscriptions on the field, compared with thirty and forty years ago, is very marked. Naturally, the daughter institutions, being under purely Chinese control, benefit most."

"The increasing number of highly trained Chinese colleagues whose salaries fall to be paid from our local budget, is a feature of our specialised development in recent years. It amounts to this, that our aim to be self-supporting and at the same time to bring ourselves up to the standard of a hospital with facilities for clinical
teaching, is a difficult one to realize. It may be that in the not far distant future, we must needs fall back on the Medical College for financial backing."

The medical work of the year is divided into three periods: (1) January to August, when more patients came than ever before in the history of the hospital; (2) September to October, when the number of patients, owing to the outbreak of war, was reduced by 60 per cent; (3) November to December, when the wards overflowed with wounded from the Shanhaikuan battle.

The in-patients numbered 1,319; the majority belonged to the agricultural class. In all, 1,535 operations were performed. The work of the Moukden Women’s Hospital and of the Nursing Department is also presented. The main report contains many valuable comments on the various departments of medical missionary work, which our limited space prevents us from quoting.

The evangelistic work is carried on very earnestly and it is hoped that in time all the nurses in the hospital will be Christians, as it is felt very strongly that a Christian hospital can only be regarded as such when the nurses are Christian.

**WILEY GENERAL HOSPITAL, KUTIEN, FUKIEN.**

Hospital staff: Dr. E. Merrill, with three Chinese medical assistants. Superintendent of Nurses, Serene Loland, with two graduate nurses and 7 student nurses.

The work in mission hospitals has its own peculiar difficulties, as very often non-Christians have to be employed, and even the Christian assistants are not always above the severe temptations which assail them in a hospital. At the beginning of the year it was necessary in the Wiley Hospital to dismiss the two men doctors, also three out of the four student nurses and a coolie; but it was for the good of the hospital and progress has since been made upon more scientific principles than had been previously attempted.

To add to the difficulties of this hospital, the financial appropriation from home was cut down about thirty per cent owing to the diminished receipts of the Mission Board. The problems presented by the “one man” hospital in China are very serious and should receive the very careful consideration of the Home Boards. The doctors in charge of these hospitals deserve sympathy and praise for carrying on their work under extremely difficult circumstances.
Encouraging features of the work are the reconstruction of the old hospital and the arrival of a foreign nurse who will train Chinese nurses, in addition to her other duties. The total number of in-patients was slightly greater during 1924 than in any year since the hospital was founded in 1893. The proportion of casualty cases has also been higher, partly owing to the collapse of a building in which fifty women were present at a mother's meeting. In the hospital the majority of the cases are surgical: gun-shot wounds, abscesses, chronic ulcers, bone infections, eye infections, tumors, hemorrhoids and fistulae. One case which caused much excitement was that of a young man who was brought to the hospital plastered from head to feet with dry mud, and who had a long eight-inch dagger so firmly lodged in his back that it had to be cut out. He had been assaulted by robbers. The dagger was removed and the patient, after a hard struggle, finally recovered.

It is noted that despite all the changes that have taken place during the last two or three decades in China, the people in country districts still hold to the old superstitions and prejudices, although the tendency to associate sickness with the influence of evil spirits is perhaps not quite as strong as it used to be in the past. An interesting account is given of some of the methods of doctors of the old style.

SEVERANCE UNION MEDICAL COLLEGE, SEOUL, KOREA.

The College Announcement for 1925-1926 contains full particulars concerning the medical courses offered in the Severance Union Medical College, with a description of buildings, equipment and clinics. There is an interesting historical sketch of the development of the college. Connected with the college is a large hospital with a School for Nurses and Midwives. In the Medical School matriculants must be graduates of a "Higher Common School" or "Middle School" or have passed the Government "Examination to qualify for Special School Matriculation". The entrance examination is given in the following subjects: Japanese, Chinese, mathematics, chemistry, physics, botany and zoology. The medical course lasts four years and graduates receive the degree of Bachelor of Medicine.
The subject of evangelistic work among hospital patients is of vital importance to all those working in mission hospitals, and I trust is one of real interest also to physicians at this Conference who are not directly working for any missionary society, but who have the highest interests of the Chinese people at heart, and who are seeking to give them the best possible service in modern medicine and surgery and to uphold the noble traditions of the profession to which we belong.

My only excuse for introducing this subject myself is that it is one which has specially interested me during the past twenty years, and because I have had some experience in various methods, none of which has been entirely satisfactory. But I would like to record some of these experiences and offer a few suggestions to others who are facing the same problems along this line, as I have been facing in the Fukien Province.

At the outset I would like to recall once again, that the work of Jesus Christ on earth was a threefold ministry, namely, preaching, teaching and healing, and that we as humble followers of His should endeavour to follow as far as we can His ideals and the practice He employed during His earthly ministry, and that the success of our work depends to a large extent on how closely we follow in His steps.

The work of our Lord in this wonderful trinity of service was unique and perfect. As regards his preaching we are told "never man spake as this man". That His teaching was perfect also is proved by the fact that his thoughts and ideals for the world were transmitted by his little band of followers and carried on from one generation to another, till to-day they are the ideals and hopes and inspiration of those people of every nationality who have the highest welfare of the people at heart and have learnt what the brotherhood of mankind means, and who are working for the peace

*Read at the C.M.M.A. Biennial Conference, Hongkong, January, 1925.
Evangelistic Work in Mission Hospitals.

and unity of all nations. His service of healing was equally perfect: he healed all manner of diseases, without prolonged preliminary treatment or weary after-treatment, and no case was too bad for his healing powers. Such is the noble example and high standard that has been set for us, and we must do our best to approach it and not fear it because of its perfection.

How are we to Make the Preaching Side of Our Work Effective?

It is not out of place here to impress on one and all, and especially those who have more recently joined our ranks, that the mission hospital offers a unique opportunity of preaching to the Chinese; an opportunity in my opinion unrivalled in the whole range of missionary enterprise in China. I have on many occasions enquired and recorded the number of villages represented by the patients attending an Out-patient Clinic in a prefectural city, and have found as many as 36 villages represented out of a total of about 200 patients. Such a fact speaks for itself, and when one thinks of the work it would mean for any individual to try and reach the same people in 36 villages, the fact is more impressive. And we have this opportunity always waiting for us; so it is ever a pressing question as to how we can make the most of it.

Daily Services in Hospital.

As to regular hospital meetings, most, if not all, mission hospitals that I know of have daily services for what are called Out-patients, and those resident patients who are well enough to attend. The nature of the services varies but it should be brief, never exceeding half an hour, as experience has shown me that longer services are not an advantage and patients absent themselves. Our own method is to sing a hymn from a small book specially prepared for hospital use. The patients buy these readily, and we find they value them more if they buy them than if distributed gratuitously. A passage is then read from one of the Gospels, and this is followed by a brief address and a short prayer at the end to close the service. We have no difficulty in getting patients to attend such a service. This leads naturally to the question as to who should conduct the services, and here I know there is room for many suggestions and there is likely to be divergence of views.
Should the Foreign or Other Doctors on the Staff Take A Part in the Religious Services?

If foreign doctors are able, and have a thorough knowledge of the language and a special gift in this direction, I would certainly advise them to take part in the services occasionally, but I do not think it is absolutely necessary that they should do so, and very often the services can be better taken by others. But though the foreign doctor does not actually take the service, I feel strongly that he ought to be present and by his presence and in every way possible help this side of the work. The Chinese staff will do very much as the doctor himself does. If the doctor stops his work and goes to the service regularly, they will do the same; and if he absents himself and takes no interest in it, they will usually do the same; so the doctor cannot shelve his own responsibility by having others take the service; his own example counts considerably and this is a fact we cannot ignore.

Should There be a Paid Preacher or Catechist for Evangelistic Work in Hospitals?

I am now fully convinced that each hospital should have at least one well trained preacher for the evangelistic work of the hospital. I would lay great stress on the point that his full time is to be given to that work alone, for I have seen many instances where there was such a preacher in a hospital but he was burdened with other duties, financial, business manager, general factotum, with the result that as his duties increased and extended—as they always seemed to do—the preaching and teaching side of his work was the part that suffered and his work became ineffective as regards his main duty. I would therefore urge that a hospital preacher or catechist be given this one thing to do, so that he can do it with all his might.

Supposing a hospital has such a man, should he be responsible for each morning service? Some years ago I should have said 'Yes'. But after longer experience I now certainly say 'No'. Variety is needed in hospital services more than in any other, not only variety in matter but variety in presenting the truth, for what one individual may say or want to say may not appeal to a patient, whereas the same truth presented in a different way by a different person may appeal strongly to the same patient. If, however, the
**Evangelistic Work in Mission Hospitals.**

hospital preacher has the gift of preaching and presents the truth in an attractive way, he ought certainly to have a share in the morning services.

**Should Outside Help be Secured for the Hospital Services?**

This question I would answer with an emphatic 'yes'. I believe that here lies a partial solution of this problem, not only in the help the Hospital can get from outside, but in bringing closer co-operation and co-ordination between the hospitals and the churches in making the most of the opportunity the hospitals offer for preaching. I have four suggestions to make along this line, all of which I have tried and found most helpful.

1. To invite the Chinese pastor or pastors in the town or city where the hospital is located to be responsible for one morning service per week. Several hospitals I know have tried this plan and in every case the Chinese pastors responded to the appeal, attended regularly, have done excellent service, and by this means the clergy and the doctors are brought closer together, the benefit is mutual and the church recognizes its responsibilities for the preaching work of the hospital. In my work this has proved a very helpful and most satisfactory plan.

2. To invite groups of church members to come one afternoon a week to read to the patients in the wards, teach them hymns and to read the Bible, and have personal talks with those who are ready and willing for such conversations.

This I have found a very good plan and on Sundays, in the churches, the list of the members comprising such a group is read out, a leader is appointed and he is responsible for the work done in the hospital that afternoon. As different groups are appointed it does not come hard on any individual to help in this way. Again, the advantages are mutual; it is splendid for the patients and in my humble opinion a very great help and benefit for all taking part in this work, and it links the hospitals and churches more closely together.

3. To invite groups of students from theological colleges or other institutions to help in the hospital, either by appointing one of the seniors to take a morning service, give them definitely one or two services a week for which they are responsible, and let them make their own nominations as to who is to do the duty; or
ask them to send a group, say of ten students, to come one afternoon a week, and go into the wards for teaching or preaching if they feel so inclined and have the opportunity. Personally, I have combined these two methods, getting the cordial co-operation of Bible school students and their teachers. This method is not available for all hospitals but where it is I would strongly recommend it, for it keeps the doctor in touch with other work apart from his merely professional work.

4. To invite former hospital graduates, Christian doctors, and Christian business men to come and take the hospital morning service. Keep one day a week for such men and get as many as possible helping in this way. I believe the larger the number of people helping in the evangelistic work the better for the hospital in every way. Not only are these methods beneficial for the hospital, they are helpful to all the church members participating in the service and a strength to the whole Christian community.

Afternoon Services.

Is it advisable to have an afternoon service for resident patients as well as a morning service? This is a question I feel should be decided in each hospital according to local conditions. For my own part after an extensive trial I think it is not advisable, and better results can be attained by personal work in the wards, to be spoken of later. If enough outside help can be obtained, however, and it is found that patients are willing to attend a second service and that it does not interfere with the ordinary routine of the hospital, it may with advantage be carried on; but if there is only a small staff to run the hospital and little outside help, a poorly conducted afternoon service is not worth while in my opinion.

Personal Work in Wards.

Experience is teaching me more and more that the most effective, most permanent, and most important work is personal work. Most of the people who have been permanently interested in the Gospel message, and who later have joined the Church, have in my experience been those where the personal factor has been at work and personal teaching has been done during perhaps a long stay in the hospital.

This is a work that nearly all members of the staff can take part in, and in which people outside the hospital can come in and.
give valuable help, and yet it is a branch of the work which to do effectively requires more skill, patience, experience and wisdom than any other.

For the foreign doctor it is in my opinion the one way he can help most, and yet the most difficult for him to do by a long way. Almost any patient is willing and anxious to have a personal talk with the doctor, but it is not for the purpose of learning or hearing what he has to say about religious questions. The patient thinks this is a fine opportunity to tell the busy doctor something more about his complaint, something the doctor has not had time to hear, or to get some concession for himself or his friend, and so is willing not only to listen but willing to promise anything, believe anything, or do anything, in order as he thinks to get a special amount of interest and help from the doctor. I should say in nine cases out of ten where I have tried to do this personal work, before five minutes are up the subject has been gradually switched on to the patient’s illness and the treatment employed for his recovery. The doctor therefore needs special tact and patience, and yet in spite of the obvious difficulties I think more good is done by personal talks than in any other way and I would urge every doctor to give the method a trial and believe he will find the method beneficial and helpful in every way.

The well qualified full-time worker, spoken of earlier, should in my opinion devote his entire afternoons to this side of the work. He ought to teach some of the illiterate to read, and this can be done in some hospitals in ten days or less, if there is a good system of Romanized Chinese, as fortunately there is in Formosa, Amoy, and other places. He ought to get to know all the patients personally, and learn from where they come and get into a real personal relationship with them, concentrating specially on those likely to be in hospital a long time, and here help and guidance can be given by the doctor. Once in this friendly relationship with the patients his work becomes easy and not till then does it become really effective.

From the purely missionary standpoint, the crux of the whole problem of evangelistic work lies, I believe, in the quality and the quantity of personal work attempted; the better the quality and greater the quantity, the more surely will the hospital completely
fulfil its aims and ideals; and the less the personal work done, the more certainly will the hospital fail and be a negligible factor in the work of evangelising the Chinese.

THE USE OF LITERATURE.

At first sight this might appear to some to be a most important method of doing evangelistic work, but personally I have found its scope rather limited, and it can only be used as an adjunct to the methods already enumerated.

The class of patients in hospitals varies greatly but in the ordinary hospital most of the people are illiterate, and so teaching by literature in the ordinary sense is of little value. Where, however, the class of patients is of a higher and better educated type, the use of literature then becomes of great importance, and is a valuable aid, and strongly to be recommended, and there is abundant material of the right type available for this work. As far as I know, the tendency in most hospitals is rather to ignore this department of work, but as education spreads the opportunities for using it are increasing and we must be prepared to use this method much more extensively than we have done in the past, and nothing but good can come from a wise and judicious use of suitable literature.

We must never forget that literature is taken home by the patients and often reaches people and places we can never reach or ever come in contact with, and for that reason it is worth while fostering the use of literature in our hospitals.

USE OF LANTERN LECTURES OR CINEMATOGRAPH PICTURES IF AVAILABLE.

The use of lanterns and cinematographs in evangelistic work is thrown out more as a suggestion than as a method tried and found satisfactory. No one can doubt the value of teaching by using the eye as the point of entrance to the mind and heart, and if that is true of teaching in general, it surely is true also of religious teaching. It opens up a comparatively new method that may be one of real importance. Where lantern lectures have been tried, they have proved very attractive, and a change and recreation for the patients. I feel sure a cinema with Bible stories would be still more attractive and it is now possible to
have a small plant without any very great expense, so that we may find this a valuable aid in our work. It would not be necessary to have a very large supply of films, as the patients change so frequently the same ones could be used again and again; and I would suggest this method be given a larger trial than has yet been attempted, and believe it will be found a real help.

**Definite System Necessary.**

I have briefly outlined the above methods of doing evangelistic work in mission hospitals. Other methods will doubtless occur to your mind, perhaps better than these, and I would only add as regards methods, one should try and establish some definite system of working to make the work practical and effective and would urge each doctor to take some definite share in this department of the work, and be in touch and sympathy with all who are helping in the evangelistic work, for thus only will any plan or system work efficiently and be of real benefit to the patients. Whilst it is good to have a definite system of work, we must avoid getting into ruts and staying there. We should be ready to adopt new methods and adapt ourselves to ever-changing conditions.

I have made no distinction in the work to be done in Men's and Women's Hospitals or in the Men's and Women's Wards in General Hospitals. What applies to the one applies equally to the other, only the outside help obtained will be from women workers in the one case and from men in the other case. A Bible woman giving full time to teaching and preaching in the Women's Wards is as much a necessity as a fully trained preacher or catechist in the Men's Wards.

**How are we to Conserve the Results Obtained?**

To follow up the good work done in the Hospitals is by far the most difficult of our problems, and I must frankly confess that after trial of various methods I have found none to be satisfactory; indeed this problem has still to be solved.

It is not necessary to insist on the importance of this side of the work—that is obvious—but how to accomplish it is a problem that can only be solved by united effort and painstaking experiments, that may at first spell failure but will ultimately lead to success by giving us some means to follow up patients who have shown special interest in religious matters during their stay in hospital.
One method that I have tried was sufficiently successful to make it worth mentioning, though it could not be called a success. A special enrollment book was kept, each page of which was divided into two by a perforated line. Each patient's name, sex, age, address, length of stay in the hospital, nearest church, and a space for special remarks, was entered in duplicate, one portion being kept at the hospital for reference, the other portion being sent to the pastor or preacher or catechist nearest to where the patient lived. A letter was also sent asking if the individual had been visited, had he attended church, what progress he had made with reading, etc., and a reply was asked for.

Theoretically, this sounds ideal. Practically, it often failed. Very often patients gave wrong names and wrong addresses and sometimes pastors and others spent weary hours looking for an imaginary person and at times looking for an unknown village. If a pastor has done that sort of thing once or twice without any result, naturally his interest in the follow-up work becomes lukewarm and many letters are never answered. Another cause of failure was lack of co-operation and enthusiasm on the part of church workers in some districts. Some pastors and others thought the hospital staff should do this work themselves, and that it was adding too much to their own already heavy load to ask them to make considerable journeys looking after these people and so our requests for help did not always elicit a response. However, in spite of the large percentage of failures, some success was secured. Patients were found, brought in touch with the Church, and finally became earnest church members and in some cases church workers.

Later, I tried to get one of the foreign missionaries who did country travelling to help in this work and he gladly helped in the task with some measure of success; but with a plan of visiting a certain number of stations in a definite time he was not always able to go off a regular track to find these isolated cases, often in rather remote places. Still, in certain districts this plan might with advantage be tried, failing something better.

I am beginning to think that the only way to do this work at all successfully, is once again for the hospital to employ a full time worker to get in touch with the patients in hospital part of his time, and the rest of his time to follow them up and get them into touch with the church and church leaders near their homes. A
worker to fit into such a post would be hard to find as it would require tact, wisdom, patience, perseverance, and above all a keen desire to win men and women for his Lord and Master. He would need also to be in touch with the church leaders of a large district and have their help and co-operation; but given the right man I believe this would be the best way to attempt to do the follow up work, which is so much neglected, owing to its difficulties and to the lack of time and finance necessary to do such a work successfully and I commend this suggestion for your consideration.

Medico-Evangelistic Tours as a Means of Evangelizing The People.

In earlier days I believe medico-evangelistic tours were more common than they are to-day and perhaps more necessary. It was my good fortune some years ago to take part in such work accompanied by two clerical missionarics, a band of Chinese medical students and some Christian workers who went with us. Notices were put out beforehand of the dates we proposed to be at certain places, and we certainly had a wonderful welcome in every instance. A dispensary was opened, patients were seen and services were held. The numbers coming far exceeded our most sanguine anticipations. Working under great difficulties from early morning till dusk we often saw over 300 cases a day. The patients as they waited for their turn to be seen, had an opportunity of hearing the preaching, and the service went on from early till late, various helpers taking turns, one after the other. Crowds who never came for treatment came also to hear. On two occasions the numbers treated were so large, that our fairly large supplies were exhausted in half the time we expected, and we had to leave quietly at night, as we could not face the hundreds of disappointed patients the next morning with nothing to give them.

That such work was valuable there can be no doubt. The Church was made known, strengthened and helped and one of the places frequently visited in this way has grown to be one of the largest and most important centres in South Fukien; and those in charge consider the medico-evangelistic tours did more than anything else to interest the people and get them to come to the regular church services. Such work also helped the hospitals, for cases seen requiring prolonged surgical treatment came long jour-
neys afterwards to the hospital because they had come in contact with the doctor and Western methods of healing and were no longer afraid of the rumours then current about foreign doctors and their methods. In the early days it was difficult to fill our hospitals and this method partly at least overcame that difficulty. Conditions are changed, however, and in very few places now is there difficulty in filling our hospitals. Very few doctors have time for such work now-a-days and in the "one foreign doctor hospitals" which I have the honour to represent, it seems impossible to do this kind of work. Further, the hospitals are more widely known and their reputation much greater than formerly, and methods of transport are improving with railways, steamboats, motor roads, etc., so that the need for this kind of work is not so pressing. If, however, any doctor can be spared for short spells to do such work, I can say with conviction, that it is a most wonderful opportunity, that great good will be done to the whole Church and Christian community, and that multitudes will be reached in this way that our hospitals will never touch by any other means. To the younger members especially who have never tried this method, I would heartily commend it and believe that they will find it, as I did, not only a great opportunity for useful service but a stimulating and helpful experience that will be helpful to them throughout their missionary and medical career in China.

The whole subject under review is a comprehensive and important one and will repay the time and thought and labour we give it, and to do it effectively it must be done whole-heartedly for the sake of Him who came "not to be ministered unto but to minister and to give His life, a ransom for many."

**EVANGELISTIC WORK AS RELATED TO MEDICAL SCHOOLS.**

F. H. Mosse, M.R.C.P., Shantung Christian University, Tsinan.

"Evangelistic work as related to Medical Schools." Does this mean as related to our students or to ourselves. I imagine it includes both, but as the students present the most important and the most promising field for evangelistic work, it will be well to confine ourselves mainly to them. When I was asked to take over this paper for Dr. Shields I fell heir to an interesting questionnaire
which he had sent to the principal medical schools in China. I do not propose to go into the questions and answers in detail, but will give a rough summary. As far as organised evangelistic agencies are concerned, we find that most of us follow along fairly similar lines; most of us do not include the Bible as part of our curriculum, at any rate during the later years of the course. I may mention in passing that this has been and still is a subject of endless discussion with us in Tsinan. Nearly all of us have Y.M.C.A.'s and nearly all have Bible classes conducted by members of the staff. Most of us encourage our students to do definite evangelistic and social work in the hospital and outside. Most of us have a daily chapel service which is usually of a voluntary nature, and all of us have Sunday services which in some cases are voluntary and in others compulsory.

It will perhaps clarify our discussion at this point if we classify it a little. In discussing this organised religious work it is obvious that it falls into two groups, which, however, shade into each other:

1. Work done by members of the staff for the student, i.e. work directed at the student from above, such as Bible classes, Chapel services, etc.

2. Work done by the student himself, such as discussion groups, addresses and meetings which the student takes himself, etc.

When we look back to our own student days there can be no question which of these two types of work meant most to us. If you have to give an address, you have got to endeavour, in common decency, to live up to your message. I am not decrying the first method. It is essential if you are to keep your staff Christian, which is extremely important; but its value to the student is not so great as the second.

1. As regards the first method, I would without any question put first in order of importance the method of holding Retreats, provided you have men of the right calibre and training to conduct them. Bible classes are very valuable if they can become guided discussion groups in which the students take a free part. Chapel services are valuable for the instruction they give—or should give—in worship; sermons and addresses are of great value to the
person who gives them, and of value too to the person who hears
them if they send him away to think things out for himself and
inspire him to act. The question of compulsory attendance is a
very knotty one; personally I am inclined to question whether the
majority of our chapel services are of sufficient value for us to
insist on students attending them.

(2) This is a large group and I cannot attempt to tackle it
exhaustively; it includes all religious work for which the student
is himself responsible. Evangelistic bands, perhaps, come first
in order of importance; the conducting of hospital ward and other
services and meetings can also be exceedingly valuable. I believe
there is nothing more valuable than a prayer-meeting which
is really spontaneous, one that is called, almost inevitably, for
some special need; but the old type of routine prayer-meeting
is very apt to become stereotyped and formal, and is largely giving
place at home to what we were pleased to call "Quaker meetings;"
these were intimate discussions, by small groups of people, of
vital religious topics and experiences, and were often far more
truly prayer-meetings than the older type, even when, as might
sometimes happen, no prayers, in the strict sense of the word, were
offered. Retreats, again, are of great value if the student is
encouraged to take his full share in them. In Tsinan our Chapel
Committee is composed half of students and half of members of
staff, and the students take their full share in the discussions; I
have never served on a more interesting Committee.

There is much here that we might discuss with profit; but
when we have decided on the best types of organised activity, the
hardest part of our problem is still to solve. To make my meaning
clear, let me have recourse to another classification, this time of
our students. These fall naturally into two groups, those in the
Pre-clinical stage, and those in the Clinical stage.

(1) Those in the Pre-clinical stage do not present any very
special problems, at least none that specially concern us as doctors.
The Y.M.C.A., and Y.W.C.A., experts have covered their problems
ably and admirably, and our medical students at this stage in their
careers are little different from students in other faculties; all the
organised evangelistic agencies are available at this period and
should be used to the full, for there will be small opportunity for
them later.
(2) When we come to the Clinical group, however, it is a very different matter. I wonder if you all realise what a problem you were yourselves at that critical period. Your spiritual sponsors tore their hair over you. They got up a meeting specially for you on the "Problem of Pain." "That will be just the thing," said they, "for men in hospital work;" but you had neither the time nor the inclination for pain in the abstract; you were busy pulling teeth at the moment. They got a famous surgeon down for an evangelistic meeting. "All these fellows are crazy on surgery," they said, "and he will be a big draw." But your own Chief was operating late that day, and you did not go to the meeting; and your spiritual sponsors shook their heads and said, "I don't believe Bill will ever get out to the mission field; he used to be keen enough, but he never goes to anything now," and there was a real danger. Dr. Balme and I once presented a memorandum to the Student Volunteer Missionary Union in England giving some statistics about the leakage of student volunteers that occurred during their time in hospital. The reasons were varied. Many of us—if you will forgive the metaphor—had acquired the habit of putting our school studies into one test tube, to be poured out again at examination time, and of putting our religious energies into another test tube to be poured out in various forms of religious service. During our hospital years our medical work was so pressing that very little went in or out of the religious test tube and its contents grew stale and were in danger of drying up. Perhaps, also, a man had got engaged or married and after his long and expensive medical course the question of finance began to assume a new aspect. Still another reason lay in the all engrossing nature of his work. There at home were men doing the finest of all philanthropic work often with no apparent Christian motive at all; there at home, right at a man's hand was great work, interesting work, altruistic work, satisfying work; and then just at the critical moment the chance of a good job opened right up for him and he took it, and did big work indeed, but missed, perhaps, the biggest. Here in China the problem is, I believe, essentially the same, the financial aspect being especially acute; how is it to be met? I would again put my answer into two pigeon-holes:

(1) Teach the students to Christianize their work. Do not let them keep their school studies in one test tube and their
religious energies in another. Let them take the two test tubes with all the enthusiasm of the old Chemistry Professor and mix them, and then see what a pretty colour they get: teach them to pray for their patients, to pull teeth and wash out bladders and all the rest of it to the Glory of God; work yourself in that spirit, and they will be quick to see and follow your example. In all your contacts with patients let the students see that you are not dealing with cases merely but with men, and not with men merely but with immortal souls; the students may smile at first, but they will soon begin to copy. Here again ward services will play a big part in giving students the Christian attitude; this is one at least of the organised activities that should be kept on at all costs into the Clinical period.

(2) Personal contacts of Staff with students, what we may perhaps call, for want of a better word, the rôle of the "Father Confessor". The more I see of men the more I realise how big a part is played in our lives by the counsel and advice of some older friend; again and again, and often in the most unlikely places, we find that the "Father Confessor" has been there before us laying a foundation upon which we can build. We can have no more important function than to play this rôle ourselves with our students. How is it to be done? We must be prepared to pay the price; we must be continually thinking and re-thinking and living through the problems that beset our students and ourselves alike; no ready-made answers from books are going to meet the case; they must be honest and true answers, forged, maybe, in sweat and blood upon the hard anvil of our own experience; and we must pay the price of prayer, we must be praying continually, not just in the morning and at night but all the time; we must be living continually in the "Practice of the Presence of God"; then, and only then, will men see and know that we can give them the help they need.

One word of warning: let your first contacts with your students be natural ones; they may come out of a Retreat or Bible class or out of some social or other work that you and your students are doing side by side, but they should never be forced. We in Tsinan worked out a tutorial system by which men were assigned to certain members of staff; it was only a partial success because the students were quick to sense a certain underlying artificiality.
CONFERENCE DISCUSSION.

The following letter from an anonymous Chinese doctor was read to the Conference by the President, Dr. Kirk.

Dear Dr. Kirk,

I am returning to Canton to-night and thus shall be unable to attend the Conference to-morrow. I am interested particularly in the discussion on evangelistic work and I am sending you a few thoughts which may help the discussion.

Medical Schools.—Aim to make every graduate a 'missionary'. Judge our fruits by the percentage that go into 'mission' service or into the country districts. Endeavour to know each student and invite them singly or in small groups into our homes. Are we living too much of our off-times with ourselves? We are more than mere teachers; we are missionaries.

Hospitals.—Aim to make every patient a "Christian", or at least to go away not entirely empty. Do not leave all the preaching to the paid preachers. Set an example to our assistants and nurses. From a missionary point of view, the patient is 'bigger' than the nurses and doctors in all matters of dispute. With the development of big teaching hospitals, we 'chiefs' may get into the way of those of our institutions at home—rather haughty and dignified in our manners in the wards. The patients will listen to us when they will not listen to the preachers. I am at present trying to make, in addition to my official medical round in the morning, a private round by myself or with my wife in the evening, when the toil of the day is over; there I do not preach, because I do not know how to preach, but just get into fellowship with my patients and endeavour to show them Christian love. Some may conceive this plan to be beyond their time but I at any rate have found it workable.

DR. F. W. GODDARD, SHAOHING.—In hospital evangelistic work (1) have a service of song for nurses and employees every Sunday evening and teach the songs by use of manual signs; (2) have a care that the
religious work done in hospital does not separate the Christians in the hospital from the general church community. Encourage all to attend church at least once a week.

DR. DUNCAN D. MAIN, HANGCHOW.—In hospital evangelism the Sabbath School is very important. It should be for students, nurses, servants and patients. There should be a regular, definite subject and the teachers should be well prepared. Follow-up work is most important. Catechists should live for days and weeks with patients in their villages. (3) There should be weekly staff meetings to hear reports from evangelists and Biblewomen, to ask questions, make plans and have prayer together. (4) There should be a special, well educated evangelist to get into personal touch with the students and seek to lead them to Christ.

DR. JAMES L. MAXWELL, SHANGHAI.—As to the value of follow-up work I wish to call attention to the unique work being done by Dr. A. G. Fletcher of Taiku, Korea. Dr. Fletcher's plan is to have three evangelists attached to the hospital. Each spends a month in rotation in the hospital, and during that month the evangelist gets in touch, for example, with a patient who has been deeply interested in the gospel but comes from a district where there is no church or organised preaching station. At the end of the month the evangelist leaves the hospital and goes to the patient's village, a Biblewoman going at the same time, and they spend a month there organising a centre in the place. The evangelists work in rotation. The first month is spent in the hospital; the second in a selected village; the third in going the round of the centres formed in connection with this work. I hope to be able to distribute copies of an article on "Hospital Evangelism" by Dr. Fletcher before the close of these meetings.

GEORGE W. LEAVELL, WUCHOW.—One of the most effective methods of evangelistic work is for the staff to hold a staff prayer meeting for doctors, nurses, and evangelists every morning, for about fifteen minutes, at a regular definite hour, each meeting to be led by one of the staff. Another important meeting is the arrangement for a "decision hour," each week, led by the evangelist and attended by staff and patients. This meeting should be conducted in the hospital chapel and special music and other attractions arranged. Decision for Christ is emphasized. We find it most important to have all evangelists and Bible women live in the hospital. In this way, personal contact with patients is possible. Follow-up work for patients living at a distance is done by sending a letter of introduction to the nearest preacher or chapel in the patient's locality. A copy is given to the patient to present to the chapel or preacher and one is retained at the hospital for further follow-up work.

DR. A. C. HUTCHESON, NANKING.—A special feature of evangelistic work is to have the Christian nurses in training take a definite time each day to talk and interest the patients in the wards in the message of Christ. At Nanking each morning, from 7 to 8, the nurses so employ themselves. They also hold classes for the employees at night.
DR. NELSON BELL, TSINGKIAO.-In the Outpatient Department many hopeless cases of disease are seen. Instead of sending them away, hastily, have them wait until the end of the clinic, then personally explain why their cases are hopeless and at the same time tell them of the hope for their soul's salvation through Christ. Send them away with a testament, tracts and your prayers. In doing personal work we must know Jesus Christ as our own Saviour before we can successfully show Him to others.

DR. E. R. WHEELER, TSINAN.—Personal evangelistic work with its contacts is of far more importance than organized work. It is important that the doctor should identify himself with ward meetings, etc., and take his turn in leading the service. Missions or individuals sending students to colleges should not lose touch with them but follow them up by letter as well as by prayer.

DR. L. FORCE, TSINGTAO, PEKING.—I am not a regular medical missionary as my work is at Tsing Hua College, a government institution, but as my contract was made through the National Committee of the Y.M.C.A., I may be classed as a "near missionary". The College authorities forbid any religious propaganda in the class rooms, and the same regulation applies to the hospital. Necessarily, therefore, our evangelistic efforts must be by indirect methods. But often indirect methods are more effective than the direct, especially in making early evangelistic approaches, because then the religious and spiritual subjects come up for discussion, and appointments for discussion outside of the hospital may be made in quite a natural manner.

I need not emphasize here the subject of faithfulness in attending to one's strictly professional duties, nor the cultivation and manifestation of a real personal interest in one's patients, especially when they are students, for all classes of people are more frequently won to an acceptance of the Christian faith more by a demonstration of it in deeds rather than by a proclamation and explanation of creeds.

As my patients are mostly students, and as I do not have so many as most of you in mission hospitals, I have considerable time for visiting them in the private rooms and wards of the hospital, especially the convalescents. In thus getting acquainted with them, I am always on the lookout for an opportunity to turn the subject of the conversation to two themes which have been favourite studies of mine for several years, viz., the laws of spiritual life, and the mutual relations of body, mind and spirit.

My attention to the subject, the laws of spiritual life, was aroused by that epoch-making book of Henry Drummond's, "Natural Law in the Spiritual World." It gave me my first conception that there was such a thing as law in the spiritual realm. My studies as a medical man of the laws of physical life prepared me for the idea that there must be laws of life of the spirit just as certain and reliable as those of the body, and therefore there could be a true science of the spirit, a real Christian science in the proper meaning of those words.
To say there are laws of spiritual life, means that under similar conditions, the same causes always produce the same results and that we can realize them in experience.

For several years I have been trying to formulate these laws as I have studied various phenomena of the spiritual life as given in the Bible, also in general literature, in my own experience, and in observing the spiritual life of others. I have even dared to prepare outlines of these laws for my Bible classes, taking the Bible, with the many spiritual truths taught there through the revelations of the Holy Spirit, as our chief book of reference.

As the students know of this Bible class, brief references in our conversations to these laws and to the mutual relations of the laws of the body, mind and spirit, lead some of them to join the class. After they have joined, I then take the initiative for more direct methods of personal interviews with each member.

In conducting these interviews, I have been greatly helped by a pamphlet, also by Henry Drummond, on "Spiritual Diagnosis." Reprints of this pamphlet have been made and can be secured from the China Sunday School Union at 5 Quinsan Gardens, Shanghai.

Another method which I have pursued systematically, and which is somewhat indirect because I get the students to do most of the work, is that of establishing a little "loan library" of my own. I selected over a hundred books and a few pamphlets which I felt sure students would like to read, and which they could not read carefully without being helped spiritually. On the inside of the cover I paste a slip stating the conditions under which the book is loaned, which are that the person receiving the book agrees to read it within a month, sign his name and the date, and then pass it on to some one else who promises to do the same. The tenth person is requested to return the book to me.

I would like to emphasize one of the many practical points in the splendid address of Dr. Mosse. I was much pleased to note the emphasis he put upon the devotional life of the medical missionary, especially as to the practice of the presence of God. Instead of using my prayer time chiefly in making requests for myself and others, I was led in my first year in China, to begin a practice which was new to me, that of "Waiting on God." I would say, "God, my Heavenly Father, is there anything you want to say to me? What do you want me to do? What is it you want to do through me?" In thus waiting on God in behalf of others, especially some student whom I hoped to win, I found it very helpful in a definitely practical way. Are we not taught that the Holy Spirit, the Spirit of Truth, is given us to be our guide and that He makes no mistake, also that He will work in us and through us? We certainly need to be taught by the Spirit and to expect Him to do the work.

DR. F. F. TUCKER, TEB CHOW, SHANTUNG.—Though we try to conserve investment by all manner of plans, let us not be discouraged if our bread cast on the waters does not come back as frosted cake. We cannot tabulate in foot-pounds of spiritual energy what the results may be, but for the sak
of our aim and for the sake of the example to our associates, we need to keep everlastingly at it. Hence the need for courage and faith that we faint not. Use a variety of plans, and, though the results be meagre, God give us glue that we keep everlastingly at it.

Dr. H. M. McCandless, Hoihow, Kuangtung.—At a convenient time, usually about the closing of the morning hours, those who can be spared step into the prayer room. No one sits down, no hymn is sung, no passage is read from Scripture, just a series of impromptu prayers for the urgent things of the day. This is aside from the four regular meetings of the day.

Dr. P. F. Greene, Changsha.—In regard to the clinical period of the medical student’s life, the Christian aspect of medical work in its service for others offers an outlet of expression which the medical student cannot fail to see is akin to Christ’s own life, whatever he may think of church work, and this has led students from a “humanitarian” to a religious interest. Dr. Neville has taught me that a most valuable plan is to keep in touch with our students after graduation by writing to them.

Dr. Mary L. James, Wuchang.—For some years we have followed in our hospital a custom which has proved very helpful to us all. In the early morning we set apart two fifteen-minute periods, just before and just after the morning ward prayers respectively. During each of these periods the pupil nurses, staff, etc., are free to go into the chapel for personal meditation and prayer. No service is held. Such use of the chapel proved so helpful that in building our new Nurses’ Home we included a room set apart just for meditation and prayer. In the busy life of a hospital it seems to me especially helpful to have some such quiet spot to which both Chinese and foreigners may retire, and feel free from any but essential interruptions.

Dr. E. C. Machile, Canton.—The Bible should be taught regularly during the entire premedical and medical course, devoting to it at least one hour a week. The non-Christians should be placed in a separate class for the elementary teaching. Our outside work consists of a Ragged School and a Sunday school conducted by the medical students. In the hospital the follow-up work is done by the Bible women and a lady missionary.

Dr. N. Bercovitz, Kachek, Hainan.—Medico-evangelistic work is of very great value. During a campaign against hookworm disease in Kachek, we treated medically and preached to 5,000 people. There ought to be close co-operation between the medical and the evangelistic forces of the station.

HOSPITAL ESPRIT.

Our objective in a mission hospital is admittedly the human heart. True, the heart of man is within, or rather is part of, his body, so long as he is mortal. It is, therefore, most essential that no pains be spared in ensuring efficiency and excellence in the professional treatment afforded to each patient. But, while the professional treatment of the patient may be a brilliant success, the
personal treatment meted out to him in hospital may be a ghastly failure. It is not so much the surgical and scientific treatment given to the patient that is going to touch his heart but the way he is treated socially. What is the attitude adopted towards the patient, when the doctor is not on the spot, by gate-keeper, nurse, dresser or coolie? Is the sick man welcomed as a "guest of honour," or is he regarded as an intrusive nuisance? Is he made to feel thoroughly at home in the wards, or does he long for the earliest opportunity of escape and even, perhaps, leave before he is physically fit to do so? It is possible for a patient in the wards to be in corporeal comfort and at the same time in mental misery owing to lack of kind thought and unselfish act in relation to the things which belong to his contentment of mind and peace of heart.

Three things are most potent in reaching the heart of the Chinese patient: (1) successful professional treatment; (2) adequate and appetising diet (the heart, forsooth, is in close proximity to the stomach); and (3) sympathy. We fail at times in the first of these, as is inevitable. We fail too often in the second, and it is a serious failure. But it is failure in the third which is really disastrous and which is not compensated for even by signal success in the two first-named. A brusque reception at the entrance, an all too hurried examination in the consulting-room, angry words at the window of the drug department, rough handling in the dressing-rooms, even "squeeze,"—these are the things that smash the spiritual efficacy of our work. And these things are not altogether infrequent, alas, although in some cases the busy doctor may be all unconscious of the mines that are being laid beneath the structure of his ceaseless labours and which threaten to blow it to bits, if not discovered and rectified. Unless all our hospital activities are vibrant with genuine sympathy and love that finds expression in deed, we shall fail in the primary and ultimate aim for which we have left home and friends in response to the Divine commission.

To obtain this Christian esprit in every department of the hospital is confessedly no easy matter. But we must rest content with nothing less. The following suggestions are offered as tending in the right direction and are based on experience, too often, alas, the experience of failure through lack of the use of such measures.

1. Let all your actions be the result of divine compulsion begotten of divine compassion.
2. Attempt to develop in all the members of your hospital staff "the mind that was in Christ Jesus," (a) by Bible exposition; (b) by affording them definite opportunity of personal work for individual souls.

3. Endeavour to employ none save proven Christians on the staff, especially the gate-keeper. In connection with the latter post it might be possible to give it the standing of the office of hospital evangelist by employing more than one evangelist and portioning out the gate duty amongst the evangelist staff. The fact that a man would be meeting the patient anent spiritual issues later on would surely be an incentive to courtesy and politeness.

4. Keep your men up to the mark by unquenchable enthusiasm, untiring example, and unrelenting vigilance.

5. Have one or more leading Chinese in your confidence, the man himself being deeply imbued with the "hospital esprit".

6. Make a point of getting to know your staff, all of them, by informal chats at odd times. Avoid the attitude of "rush". It takes time to learn the Oriental and much listening.

7. Have a smooth-running method of passing the out-patient along from the entrance to the consulting-room and on. Let this procedure be characterised by courtesy and consideration for the patient's defects, physical, intellectual and social.

8. Have a pleasant room, with plenty of tea, charts on the walls, and warmth in winter, in which the patients to be admitted to the wards can await admission time. When their turn comes receive them as "guests". This will take time but it will be time eternally well spent.

9. Have as few rules as possible and insist with courtesy on their being kept.

10. Keep the spiritual aim always pre-eminent and weigh all methods and problems in the light of proven or possible spiritual results.—Anonymous.

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The Sower and the Seed.—The saving of the world is not a question of mathematical formulae; it is a problem of spiritual agriculture; not the physical presentation of a certain dogma to the people of a country by a host of foreign agents, but the sowing of spiritual seeds which have the capacity of indigenous growth and of limitless reproduction. It is the quality of the seeds we plant that matters most.—Harold Balme, China and Modern Medicine.
INFECTIVITY OF THE SALIVA OF TUBERCULOUS PATIENTS.


Owing to the comparatively small number of systematic examinations which have been made of the saliva of patients suffering from tuberculosis of the lung, the author has undertaken an investigation of the content of tubercle bacilli in the saliva of 74 patients. Swabs were taken from the lips, teeth, oral mucosa, tonsils, throat, and carious teeth at various times of the day; they were then spread out on slides and stained by Ziehl's method and sometimes by a modified Spengler method as well. No animal injections were made. He found that in five instances only (6.7 per cent) of patients suffering from pulmonary tuberculosis were tubercle bacilli present in the mouth in sufficient quantities to be detected by a simple staining process. Of these 74 patients, 68 were relatively strong; in these, bacilli were demonstrated only once—that is, in 1.5 per cent. On the other hand, in the remaining six patients, who were nearly moribund, they could be demonstrated four times—that is, in 67 per cent. It was shown, however, that this was due to the presence in the mouth of unexpectorated portions of sputum, which the patients were too weak to get rid of. Tests were also made of the tubercle bacillus content of droplets expectorated during coughing; in 13 out of 27 patients tubercle bacilli were found. In 50 patients Hollmann removed and examined the tonsils; in 7 instances they were found to contain tubercle bacilli, which were situated in the depths of the crypts, inaccessible to the saliva. Summing up, he concludes that since tubercle bacilli are only present in 1.5 per cent of fairly strong and vigorous patients, and then only in small numbers, the saliva is of very little importance in the spread of tuberculosis. On the other hand, tubercle bacilli were found in about 50 per cent of cases in which the cough spray was examined. This then, would appear to be the most dangerous channel for infective material to take, and he concludes that it is against this source of infection that the most active measures should be directed.

THE SURGICAL TREATMENT OF CANCER.


1. The surgical treatment of cancer is based on the fact that cancer originates as a solitary neoplasm, and if operation is performed while the disease is still confined to a single area, the results will be very satisfactory.
2. Certain cases of cancer seem to be hopeless from the beginning, and surgery, or any other method of treatment, apparently does not influence the progress of the neoplasm.

3. In certain cases in which the condition seems to be very extensive and to involve surrounding structures, there may still be a chance of cure by complete eradication.

4. The most important development in our knowledge of cancer in recent years has been Broders' gradation of the malignancy according to the cell differentiation, which permits a fairly accurate prognosis, and prevents operating on a certain group of patients for whom treatment is of no avail.

5. No great claims are made for the surgical treatment of cancer, yet it is contended that surgery has done more for persons suffering from this disease than all other methods of treatment combined. Although the results are somewhat discouraging, every patient who has a malignant growth should be given the opportunity of whatever treatment offers the best results. It is not right to consider cases hopeless without first making a very careful estimate of the grade of the malignancy and of all other factors.

6. Operations on patients whose condition can be shown to be hopeless are a discredit to surgery. Even palliative operations, if the growth could not be removed under ordinary circumstances, should not be undertaken.

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**TREATMENT OF VARICOSE ULCERS.**


The author speaks very favourably of the following method of treating chronic varicose ulcers. Cleansing and disinfection of the skin is obtained by the use of rectified benzine and acidified alcohol (acetic acid, 20 minims; alcohol, 100), and a suitable anti-eczema ointment is applied. This preliminary preparation lasts three to ten days. The leg is then elevated and a layer of sterilized gauze placed over the ulcers; strips of diachylon plaster are applied from the toes up to the knee, and a firm bandage fixed over all. This is left on for eight days; when it is removed there is usually a free collection of pus, but beneath it healthy granulations appear. The author suggests that in the process of skin maceration which goes on under the dressing absorption of auto-vaccines takes place. Patients are encouraged to walk about whilst under this treatment, and the results are said to be better than with rest in bed and immobilization of the limb.

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**MERCURIOCHROME IN PLAGUE: A SUGGESTION.**


Anti-plague serum, commonly employed, is none too reliable. Occasionally it answers well, especially if given early in the
disease, but not infrequently it fails. The various drugs which have been used often prove inert. The best of them would appear to be tincture of iodine and novarsenobillon administered intravenously. The latter appears to have given the most satisfactory results, but here again early administration is necessary if any tangible effect is to be obtained.

Accordingly, Balfour wishes to recommend a trial of “mercurochrome 220 soluble,” in view of the fact that it has been given with very considerable success in such diseases as enteric fever and puerperal fever. In both a bacteremia is present, as in plague. Again, its intravenous administration has been followed by gratifying results in one case of Rocky Mountain spotted fever, as recorded by Greeley. Rocky Mountain spotted fever, whatever its cause, is a disease resembling typhus fever in its clinical symptoms, and typhus and plague possess many features in common. Indeed, typhus fever is one of the diseases with which plague is often confused.

It is true that occasionally mercurochrome, when given intravenously, causes rather a severe reaction; but as a rule the reaction is moderate and the drug can be administered with safety. Any risk of ptalism can be combated by a mouth-wash of turpentine used alternately with hydrogen peroxide, as pointed out by Bond and Barrier.

As regards dosage, Young and Hill state that, for intravenous use in puerperal sepsis and acute gonorrhoea, a 1 per cent solution in water may be employed and from 2 to 5 mg. per kilo of body weight administered. In Rocky Mountain spotted fever Greeley gave doses of 20 c.c.m. of a 1 per cent solution, while in typhoid fever Bond and Barrier found 15 c. cm. per 100 lbs. of body weight to be an average effective dose. In plague it would probably be advisable to begin with 20 c.c.m., and to push the dosage, especially in severe cases.

**PSEUDO-MALARIAL ATTACKS IN TYPHOID FEVER.**

_Caissade and Le Rasle, Presse Méd., September 13th, 1924._

The authors record six cases of the pseudo-malarial type of fever, first described by Jaccoud in 1884, which occurs during defervescence or the beginning of convalescence from typhoid. In most cases the attacks are quotidian, but in rare instances are bi-quotidian or tertian. The attacks may be of short, moderate, or long duration. The end of an attack is marked by sweating, and a fall of temperature which is sometimes very sudden and as low as 95.4° F., but occasionally the temperature may remain above normal at the end of an attack and oscillate for some days about the level of 100.4° F. Polyuria is frequent at the end of the attack, and may be as much as 5 pints in the twenty-four hours
Current Medical Literature.

for several days. Recovery is the rule. In the diagnosis cholecystitis, pyelonephritis, and a relapse of malaria must be excluded. If malaria is present, quinine will have a successful effect upon the attack, and all doubt will be removed by finding the malarial parasite in the blood.

LOCAL ANESTHESIA IN OPHTHALMIC WORK

At the request of the Council on Pharmacy and Chemistry of the American Medical Association, a committee, representing the Section on Ophthalmology of the American Medical Association, made a clinical investigation of the advantages and disadvantages of the various agents used for producing local anesthesia in ophthalmic work. In June, 1921, the committee made its report, devoting most attention to anesthesia produced by topical applications.

Following the presentation of the report, the section voted that the committee be continued for the purpose of making a study of the advantages and disadvantages of infiltration anesthesia in ophthalmic work, with the possibility in view of recommending a more general employment of such form of anesthesia. In accordance with these instructions, the committee has made the following report:

1. American ophthalmologists as a whole have not used infiltration anesthesia to the extent that its merit warrants.

2. Infiltration anesthesia furnishes a satisfactory anesthesia for most ophthalmic operations, and may supplant general anesthesia except in those patients whose co-operation cannot be obtained.

3. In those cases in which a satisfactory anesthesia is not secured from topical applications alone, infiltration anesthesia will be found to be a valuable adjunct and sufficient for any kind of ophthalmic work. Thus it will be found especially useful in cataract operations when used to paralyze the orbicularis muscle and prevent squeezing with possible loss of intra-ocular contents, and in advancement operations.

4. The anesthetic of choice should be procain in 1 or 2 per cent solution, and never exceed 4 per cent solution, of which latter solution 2 c.c. is sufficient, though 4 c.c. has been injected many times without toxic effects.

5. Epinephrin, 1:100,000 or 1:200,000 (two drops of a 1:1,000 solution of epinephrin to 5 c.c. of procain solution) should be added, not only for its ischemic effect but to prevent absorption of the solution, thus prolonging the anesthesia and lessening the toxicity of the procain.

6. The solution should be injected very slowly through a fine needle, and not less than ten minutes elapse before beginning
operation. From fifteen to thirty minutes is not too long to wait before beginning such operations as enucleations or advancement of ocular muscles.

7. From the standpoint of the general physical condition of the patient, there are no contraindications to the use of infiltration anesthesia for ophthalmic operations. The possible contraindications are as already noted.

S. For the technic of securing satisfactory anesthesia by infiltration, the committee recommends any of the late works on local anesthesia, such as the last edition of Braun ("Local Anesthesia"), and in particular the work of Duverger ("L'Anesthesie locale on ophthalmologie"), which is confined to anesthesia for ophthalmic work.

NEGLECTED CORNERS OF OTOLOGY

Dr. J. Kerr Love, who presided at the Otological Section of the Royal Society of Medicine on November 8th, 1924, made the striking statement that there had been scarcely any appreciable advance during the last 50 years in the cure of deafness—he was not speaking of surgical treatment. It was only recently that orthodox medicine was making any effort to prevent deafness, and in consequence the management of cases of chronic deafness had been left largely in the hands of the empiricist and the quack. Much deafness was due to infectious disease of the throat, and the more thorough treatment of enlarged tonsils and adenoids was already limiting the otologist's activities.

One neglected corner of the otological field was certainly in the hospitals for infectious disease, for otologists were rarely appointed to their staffs. Speaking for Glasgow, he was not aware of any aural specialist attached to the fever hospitals with several thousand beds. Many fever patients still had discharge from ear or nose when they left the hospital.

Another neglected corner Dr. Love finds in institutions for the deaf, which may have on their staff a physician, an ophthalmologist, an odontologist, a dermatologist, but no otologist. Deaf-mutes with middle-ear suppuration may require adenectomy to restore their health, although it cannot restore their hearing. Such institutions possess a store of clinical material which may be used for elucidating problems such as the influence of syphilis on congenital deafness. Dr. Love does not go as far as French authorities, who ascribe 25 per cent of cases of congenital deafness to inherited syphilis. He places the upper limit at 10 per cent but strongly holds that the effect of syphilis on the ear may extend not merely to the third generation, but beyond it. He does not regard a negative Wassermann as disproving the syphilitic origin in any particular case. Apart from this, the otologists, Dr.
Love thinks, have not made the most of their opportunity in guiding the public in the matter of aids to hearing. He hoped that some physicist would be found to make practical use of the fact that many subjects of middle-ear disease hear best in a noise. Unfortunately, many children did not respond to electrical aids; in a test which he had instituted at the hands of good teachers with abundant opportunity, out of 60 children tested only four definitely benefited. Dr. Love's review covered the whole period of his own recollection and deserves wide attention.—The Lancet, November 15, 1924.

THE EARLY DIAGNOSIS OF PREGNANCY.


The author has investigated the phloridzin test in connection with the early diagnosis of pregnancy. It consists of giving a minute dose of phloridzin (0.002 gram intramuscularly) on an empty stomach. The patient then drinks some water and three examinations of the urine are made at half-hourly intervals. Sugar should appear in the urine only in the case of a pregnant woman. The author quotes many statistics indicating that a positive reaction may be expected in 90 per cent of the cases. He then quotes his own figures, which are as follows: women pregnant less than two months, 74 per cent positive; non-pregnant women, 4 per cent positive. He found that menstruation sometimes altered the reaction: in one case the test became positive from four days before till ten days after the period. In eight cases of amenorrhoea (not due to pregnancy) he found five positive. He also made tests on men, and here he got positive results in 72 per cent of cases. He also gives figures for cases of complete and incomplete abortion and in women after the menopause. Accordingly, Bronnicoff comes to the conclusion that the phloridzin test is not reliable, and that the problem of the early diagnosis of pregnancy remains yet to be solved.

RESUSCITATION IN ASPHYXIA NEONATORUM.


The author describes a method of resuscitation of the new-born consisting in the insufflation of the vapours of aromatic spirit of ammonia, first improvised and used successfully by him in a case of asphyxia pallida neonatorum, which resisted all efforts at resuscitation by the standard methods. Eight cases have now been treated in this manner. On a piece of gauze, wrung out of warm water, three or four drops of aromatic spirit of ammonia are put, the gauze is placed over the mouth of the infant, and mouth
to mouth insufflation is practised at the rate of about thirty respirations a minute, being careful not to over distend the infant's lungs, and assisting expiration by slight pressure over the chest. More ammonia is added as insufflation proceeds, using only three or four drops at a time.

THE PREPARATIONS OF IRON AND ARSENIC.

MORAWITZ, Klinische Wochenschr., October 7th, 1924, p. 1886.

In a report made by the author for the German General Pharmacological Commission, he points out that the preparations of iron used in medical practice should be (1) absorbable, (2) they should produce no injurious effects in therapeutic doses, and especially no dyspeptic symptoms. To prevent the formation of astringent iron salts in the stomach, it is advisable that iron should never be given on an empty stomach, and that alkalis should be administered with these drugs.

The author divides iron preparations into two groups: (1) those easily decomposed; (2) those from which the iron is separated with greater difficulty. He recommends reduced iron, pills of reduced iron, saccharated carbonate of iron, Blaud's pills, saccharated ferric oxide, tinctura ferri pomata (prepared with ferrated extract of apples), liquor ferri albuminati, lactate of iron, and pills of lactate of iron, in private practice, and when a rapid effect of iron is desired. He thinks that the numerous haemoglobin preparations need not be considered amongst the active iron preparations, though they may be of service independently of the iron they contain.

Arsenic should be given by mouth in cachexia, nervous affections, lichen, psoriasis, etc., but by injection in parasitic diseases. When a powerful action of arsenic is required, and dyspeptic symptoms are not feared, the form of the "Asiatic pill," containing arsenious anhydride, is recommended. Arsacetin (sodium acetyl arsanilicum) is the preparation especially recommended by the author in pernicious anemia, leukaemia, and lymphadenoma. Atoxyl has produced injurious effects. Salvarsan preparations may, he thinks, be of service, in addition to their effects in syphilis, in recent cases of gangrene of the lungs, in alveolar pyorrhoea, in Vincent's angina, and periarteritis nodosa; they are very useful in recurrent fever and malaria (except in the malignant form) as an aid to the quinine treatment. Neosalvarsan and silver-salvarsan are the preparations recommended.
Reorganization of Branch.—After an interval of three years during which this Branch ceased to function, a meeting was again convened by Dr. Gillison on January 16th, 1924, in accordance with the expressed desire of a larger meeting of Wuhan doctors a month or two earlier. At this meeting it was decided to reorganize the Branch, and the following officers were elected for the year: President, Dr. Gillison; Vice-President, Dr. Wassell; Secretary, Dr. Chapman; Treasurer, Dr. Wolfe.

Revision of Constitution.—After being used for twenty-three years it was found that the Constitution of the Branch was in certain respects, particularly as regards its membership clauses, obsolescent; and the newly reorganized Branch, as one of its first duties, carried out a careful revision. The new Constitution now in the hands of the members is on a wider basis and brings the Branch into line with the parent Association.

Nurses' Examinations.—For many years this Branch has conducted annual examinations in general nursing and in midwifery, and scores of nurses from the Central China hospitals have gained the diplomas that are awarded on passing. During recent years the work and standards of the N.A.C. have been watched with interest as the organisation has rapidly developed to its present influential position; and another milestone in the history of medical missionary work here is marked by a resolution, carried unanimously at the inaugural meeting of the Branch this year, that the Branch’s examination in general nursing should be discontinued because the N.A.C. examination now covered the ground. For the present, however the Branch still continues its examination in midwifery.

Membership.—A survey has been made of the doctors in Hupeh province who would appear to be available for membership of the Branch. As far as has been ascertained there are thirty such, of whom twenty-three were members of the parent Association in 1923. Of the remaining seven, six have been elected as members of the C.M.M.A. or are in process of being elected. Of this total,
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however, only about two-thirds are available in the Wuhan cities for meetings, and these are so separated by their work and interests that much yet remains to be done to integrate and organize them under their local Branch of the Association. A beginning has been made this year, and it is expected that there will be a steady growth along these lines in the strength of the Branch during the coming year.

Meetings.—The Branch holds monthly meetings among the various Wuhan hospitals, and this year nine such meetings were held. Of these, one was the inaugural business meeting, one was the annual meeting, two were purely clinical meetings, and at five meetings papers were read and discussed. The papers read were as follows:—"Trachoma", by Prof. E. Fuchs of Vienna; "A case of Well's disease" by Dr. Wassall; "Problems in the Training of Male Nurses" by Miss A. Shackleton; "Hospital Evangelism" by Dr. Gillison and "A Traveller's Medical Notes", by Dr. Aird. Professor Fuchs' lecture was a masterly and lucid presentation of the subject, and of the greatest interest, especially as offering members an opportunity of comparing the methods in vogue in one of the greatest European clinics of the present day with those employed in various parts of China. Of the five papers, perhaps those read by Miss Shackleton and Dr. Gillison at two meetings at which members of the Local Branch of the Nurses' Association of China were present by invitation, were the most usefully and thoroughly discussed. Amongst the cases shown and discussed at the clinical meetings were a number of rare and interesting diseased conditions. The attendance at the meetings has averaged ten for the year with a maximum of seventeen, which may be considered very satisfactory for a new beginning in the activity of the Branch.

(Sgd.) H. OWEN CHAPMAN, Secretary.

CONSTITUTION OF CHINA MEDICAL ASSOCIATION.

FORMATION OF LOCAL BRANCHES.

Section 1. A local branch of this [China Medical] Association may be formed by any three active members, provided the constitution of such branch is in harmony with the Constitution and By-laws of this Association, and that it is formally recognised by the Association, or by the Executive Committee acting for the Association.

Section 2. Members of local branches may become members of this Association as provided for in Article 11, Section 2, and By-law 5.
The Action and Uses in Medicine of Digitalis and its Allies.—

In the very interesting introductory and historical chapter a brief description is given of the group of drugs, some of them very powerful poisons, which possess an action on the heart similar to that of digitalis. Among these is toad's skin, concerning which the author writes: "The toad has been credited with poisonous properties for many centuries in popular belief and story, while on the other hand preparations of its skin have been employed in medicine as diuretics, and even at the present day the Chinese make use of such a remedy under the name of Senso. In recent years the correctness of this popular legend has been shown by the isolation from the frog's skin or from its glandular secretion of bodies some of which possess the typical digitalis action. Toad's skin has not been used in modern European medicine, nor have its active principles been suggested for practical purposes. It is chiefly of interest as an example of the formation in the animal kingdom of bodies possessing the digitalis action, and its chemical principles also present some relationships which may give a clue to those of the glucosides." So toad's skin is one more of the weird Chinese medicines which science proves to have therapeutic value. Perhaps we should extend Shakespeare's well known reference to the toad, so that it should read: "Sweet are the uses of adversity, which, like the toad, ugly and venomous, wears yet a precious jewel in his head," by adding, "and carries in his skin a remedy for a diseased heart."

The volume is an elaborate monograph, with numerous graphs and charts, presenting what is known of the chemistry of the members of the digitalis group and something of their history, but the chief attention is paid to their effects when ingested in animals and man. The therapeutic effects are interpreted, as far as is possible, in terms of the changes seen in the experimental laboratory and the divergencies between them are reconciled where it may be done. This account of the pharmacology of the digitalis group will prove of service to the physician in practice in his treatment of heart disease, and may afford a foothold from which further advance may be made in the science and art of medicine. Dr. Cushny writes with authority and his book is a valuable contribution to the medical literature on digitalis.

Proceedings of the International Conference on Health Problems in Tropical America.—Held at Kingston, Jamaica, B. W. I., July 22 to August 1, 1924. By Invitation of the Medical Department, United Fruit Company. Published by United Fruit Co. Boston, Massachusetts.

The United Fruit Company owns plantations covering nearly 2,000,000 acres of land in Columbia, Costa Rica, Cuba, Guatemala, Honduras, Jamaica and Panama and employs about 67,000 people. It has created an extensive system of hospitals and dispensaries for the benefit of the employees and their dependents, as well as for other inhabitants in or adjacent to the plantations. It is estimated that 150,000 persons are dependent upon the Medical Department for medical and surgical service. At first the business enterprises of the Company were greatly handicapped by the unhealthy and insanitary conditions existing and the consequent prevalence of serious endemic and epidemic diseases, but there is now very great improvement.
Agricultural development and commercial activity on a large scale are impossible until medical science brings tropical disease under control, and sanitation transforms pestilential areas into healthy localities.

This volume is a record of the proceedings of the International Health Conference, to which prominent medical men from various parts of the world were invited, which met at Kingston, Jamaica, July-August, 1924, under the auspices of the Medical Department of the United Fruit Company. The purpose of the Conference was to consider sanitary and administrative questions, to discuss tropical diseases, to standardize practice and to promote preventive medicine and hygiene in tropical lands. As we should expect, the papers and discussions range over the whole field of tropical medicine. There are papers also on more general subjects, as the address by Dr. Vincent, of the Rockefeller Foundation, on "Tropical Hygiene, an International Adventure"; a paper on "The Needs of Publication in Tropical Medicine", by Dr. Henry J. Nichols, Editor of the American Journal of Tropical Medicine, which should be read by those who are interested in our own medical journal, and Dr. Pickering discourses on "What we know about Hurricanes," in connection with the practice of medicine in the tropics. The utmost harmony prevailed at all the meetings and the discussions were most profitable. The volume is commended to practitioners in China, for many of the diseases considered are common in this country. It has no index, which is the only fault we find.


The sanitary survey was first used as a method of instruction in the School of Health Officers of Harvard-Technology and met with such signal success that it was later introduced into the course in preventive medicine and hygiene at the Harvard Medical School. Each student working for a medical degree is required to make a sanitary survey of some city or town and to submit a report thereon. The report must consist of three elements: (a) collection of data; (b) interpretation of the facts; (c) criticisms and recommendations. In other words, the student is advised to consider the town he is surveying as though it were a patient. First, he is to take the history of the town, next make a physical examination to determine its present condition, and then do laboratory tests. After the results of these are brought together for a diagnosis, treatment is to be determined and prognosis vouchsafed.

This volume consists of a sanitary survey of the town of Rochester by a third-year medical student as an illustration of the value of this method of teaching. The only drawback to the adoption of the method in the medical schools of China is that nearly all Chinese towns, regarded as patients, are in a desperate plight from the sanitary point of view, and the students will not find it easy to find conditions justifying a hopeful prognosis.


For many years the author, a practising surgeon, has made the study of infection and the reaction of the tissues to irritants his special interest and hobby. He believes that the immunologic process, at least as it applies to the tissue reaction against colloidal proteins, depends on the digestive activity of the tissue cells, but he does not wish to obscure by the
discussion of the nature of the reaction which occurs between antigen and antibody the importance of the truth that hypersensitiveness, and the state in which the tissues are rendered insusceptible to tissue irritations to which he gives the name of "tolerance", are phenomena which are readily demonstrated both in animals and in man. The appreciation of the fact that the two states may, and often do, exist in the same individual is of the utmost importance, both in the study of clinical phenomena and in the treatment and prophylaxis of infectious disease. The subject of infection and immunity is considered in a broad way, but the discussion is limited to such facts and theories as are of importance to the clinical practitioner. One of the closing chapters is on the application of the principles of immunity, as expounded by him, to the prevention and treatment of disease by vaccines and serums; another chapter is on therapeutic guidance of the acute inflammatory reaction. The volume is a thoughtful and interesting contribution to the elucidation of a very difficult subject.

JOURNALS, PAMPHLETS AND REPRINTS.


League of Nations Health Organization—Statistical Handbook Series:

Further report on Tuberculosis and Sleeping-Sickness in Equatorial Africa, by Andrew Balfour, C.B., C.M.G., M.D., Director of the London School of Hygiene and Tropical Medicine; E. Van Campenhout, M.D., Director of the Public Health Service at the Belgian Ministry of the Colonies; Professor Gustave Martin, Chief Medical Officer of the Second Class attached to Colonial Troops and formerly Head of the French Sleeping-Sickness Mission in French Equatorial Africa; A. G. Bagshawe, C.M.G., M.B., Director of the Tropical Diseases Bureau, London; being the Expert Committee appointed by the Health Committee; League of Nations, in 1922. Submitted to the Health Committee at its Fourth Session. April, 1925.
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.

Death from injection of arsenical preparation.

To the Editor, C.M.J.

Dear Sir,—I have the very uncomfortable duty of reporting to the Medical Association a death from the administration of one of the standard arsenical preparations in the treatment of syphilis. I give the circumstances frankly, for the protection of others, and accept the blame which is due to lack of precautionary measures.

The patient, male, aged 40, merchant, came to the hospital clinic on April 12th, 1925, complaining of loss of appetite and generalized pains throughout the body over a period of two weeks. He came for the definite purpose of receiving salvarsan treatment, on the recommendation of a near neighbour then in the hospital who had been benefited by the same.

Without receiving a thorough physical examination, he came next morning, without having eaten breakfast, and received a primary injection of Novarsan, 0.9 gm. into the vein, by our regular technique, which is given below. There was no difficulty in getting into the vein, and no leakage, nor were there any symptoms to arouse suspicion during the injection, which takes about 2 to 3 minutes. The patient was transferred to bed on a stretcher.

About one hour later, while both doctors were in the midst of an operation, it was reported that the patient's pulse was very bad (weak and rapid), and his face cyanosed. This was verified and a hypodermic of strychnine, 1/60 gr. was given immediately. As soon as it was possible for the doctors to get away from the operating room (about 20 minutes later), it was found that the respiration was failing, and pulse was 160. Caffein sodium benzoate was given by hypodermic injection, followed shortly by 10 minims of adrenalin. The respiration failing completely, artificial respiration was carried on for nearly half an hour, during the greater part of which the heart continued to beat.

Novarsan is an arsenical preparation produced by the Synthetic Drug Co., Toronto, and has been in use by us for nearly two years with excellent results. The tube used was the first in a newly opened batch (No. F43). Of two other patients receiving Novarsan the same morning, one was likewise a primary injection of 0.9 gm. and from this same batch, but this patient had nothing more than the normal reaction.

Our technique is as follows: The tube is immersed for five to ten minutes in Ac. Carbolic Liq. then rinsed in cold boiled water and in alcohol, 70 per cent. The contents are emptied directly into a regular mixing cylinder containing a minimum of 20 c.c. of warm water (rain water which has been passed through a Berkefeld filter, and then boiled in a closed flask for 20 minutes on three successive days). After shaking till all the drug is dissolved, the contents are scanned carefully for any foreign matter by holding against the light. Contents are emptied into a warm sterile cup, and drawn into the syringe through a small calibre rubber tube one inch long, constricted in the centre, and containing a plug of sterile cotton in its distal half. This has been previously boiled. Examination is again made by transmitted light, and then the injection is made slowly in the usual way. The patient is lifted to a stretcher and again lifted into bed, where he is required to stay at rest for three to
Correspondence.

six hours, according to degree of reaction, and the temperature and pulse are taken every fifteen minutes for the first hour.

We were at fault (1) in not first giving the patient a thorough physical examination, especially of the heart; and (2) in giving so large a primary dose. We have no reason to believe the drug was at fault, as we have averaged 8 or 10 injections a month for the past year and a half, since we began using this drug. While we do not, as a rule, give so large a primary dose, it is not at all uncommon for us to do so with individuals of large build. A large proportion of these cases are either unwilling or unable to take a series of injections, beginning with small doses and raising the amount gradually, which is the standard and only thoroughly safe method of administration. This is the first case which has shown enough reaction to cause concern, with the exception of one woman who, during the injection, developed cardiac and nervous symptoms; the injection was stopped and the symptoms subsided almost immediately.

Very truly yours

CHAUNCEY F. BROWN.

Hengchow, Hunan,
May 13, 1925.

Remuneration of Chinese Physicians.

To the Editor, C.M.J.,

Dear Sir,—I am writing to ask you to insert this letter in the correspondence columns of your valuable Journal, because I would like to be enlightened in a matter of some historical and national interest. Perhaps some of the C.M.M.A. members may be able to inform me on some of the points to be brought up in the following paragraph.

It has been asserted, not only in conversation but in serious journals, that in China—and sometimes Japan is added—the principle of general practice is that the doctor should be paid by his clients while they are well, but render medical service to them when they are ill gratuitously. Is there any book written in French, German, Italian or English which describes such a system if it is in existence, indicating how the terms of agreement are drawn up? If such a system is not in existence, can you suggest in the least how the common belief has arisen in England?

Thanking you in advance for this assistance.

Yours faithfully,

J. W. H. CHUN.
Manchurian Plague Prevention Service-Harbin.

May 20th, 1925.

Clinical Notes in the Journal.

To the Editor, C.M.J.

Dear Sir,—Even the uniform excellence of the China Medical Journal may perhaps be improved on. A suggestion made by Dr. James L. Maxwell in the course of a conversation a year or two ago impresses me as being well worth carrying out. He made a plea for more liberal reporting of methods which had been found of clinical value; not formal papers, but brief page or half-page accounts of small "stunts" the individual doctors about China had found useful. This department of the Journal might be similar to the "Clinical Notes, Suggestions and New Instruments", in the Journal of the American Medical Association, and would serve as a clearing house for the various methods, which, while useful, do not justify a special paper. Then, too, an important side result of such a department is the interest it stimulates in the men who send in such reports. Once a fellow has seen the publication of his own article, however small, for all time afterward he has a peculiar alliance and affection for the journal in which it is printed. So I feel it would stimulate interest, and help to unify the medical profession. Also it might serve eventually to get some worth-while papers from men who have something to say,
but yet hesitate to break into print. After sending in a “stunt” or two to such a department these men would feel encouraged to submit more exhaustive papers, based on their experience. It might be well to precede the institution of such a department by a circular letter calling for contributions. Believing that such a special department would do much to make the average missionary feel that it is really his paper, and that it would help to remove the impression some hold, though I do not hold it myself, that the Journal is rather too much the mouthpiece of the present regular and frequent contributors, I submit the suggestion for your contribution.

Sincerely yours,

E. D. S.

* * All suggestions are thankfully received. In regard to “Clinical Notes,” probably every editor since the Journal was founded in 1886 has appealed for them. Certainly the present editor did so in one of the first editorials written by him, (C. M. J., 1915, p. 255), in which it is said: “To a certain extent brief reports of this kind have always been appearing in the Journal, but a beginning has been made in this issue to group them under the heading, “Clinical Notes”, in the hope that hereafter they will form a distinct, regular and interesting feature of the Journal.” Off and on further appeals have been made. The editor will be only too glad to comply with our correspondent’s suggestion if the “stunts” are sent in. It rests with contributors to make “Clinical Notes” a success. We sincerely hope that all members of the Association regard the Journal as their own particular Journal, in which they feel a special interest. Though some may write more frequently than others, contributions from all are very welcome.

—Ed.

NEWS AND COMMENT.

DEATH

MERRITT.—In Canada, N. Y., February 15, 1925, Charles Phelps Williams Merritt, M.D., aged 72 years, 7 months. Dr. Merritt was from 1885 till 1893 a member of the North China Mission, located at Paotingfu. Because of impaired health he was not able to continue work in China. He was for thirty years a practising physician in Clifton Springs, N. Y., and for fifteen years on the medical staff of Clifton Springs Sanitarium. He was closely connected with many religious activities and was deeply loved by a wide circle of friends in foreign lands as well as in America.

LABORATORY WORKERS: POSITIONS REQUIRED.—Mission hospitals interested in securing qualified men for ward or laboratory service may often learn of suitable candidates by writing to the Peking Union Medical College. The Director this year can recommend one fully qualified and experienced laboratory man, specially trained in the chemical side of medicine.

INDEX TO CHINA MEDICAL JOURNAL.—An index to the thirty-seven volumes of the Journal, 1886-1923, has been prepared by Dr. J. L. Maxwell, the Secretary of the C.M.A. and is now being printed. The great need for such an index is evident to all. Some time ago Dr. Skinner of Hankow kindly volunteered to compile one, and Dr. George Y. C. Lu, of the Hunan-Yale College of Medicine, has actually indexed the first thirty-five or thirty-six volumes. His work should have been handed in a couple of years ago, but it was not until last March that it was sent to Dr. Hume for publication. The index prepared by Dr. Maxwell will be the one adopted, but it is desired to express hearty appreciation of the good
work done by Dr. Lu, with regret that it did not arrive in time to be of service. The preparation of such a large index must have required much painstaking and often tedious labour.

The Medical Missionary Association of India was formed at a meeting in Bombay in 1909, so that it is now sixteen years old.

Graduates of Union Medical College, Peking: Positions required:—In reply to a recent questionnaire, several of the graduates of the Union Medical College, Peking, under its former administration, have expressed a desire to be informed of professional openings whenever these come to the notice of the college. The Registrar's Office has, therefore, agreed to circularize these men when positions are reported vacant, sending as full details as possible to the men interested. The Office does not undertake to conduct any correspondence on behalf of the candidates, but asks them in each case to write directly to the persons who offer the position. Hospitals who wish to get in touch with candidates should send as full information as possible to The Registrar's Office, Peking Union Medical College.

Dr. Peter C. Kiang, a medical graduate of the University of Pennsylvania, now Professor of Biochemistry in Shantung Christian University has been made Advisor to the Civil Governor of Shantung Province. We are not informed of the duties which this appointment involves. Dr. Kiang is well known in Peking, and was at the P.U.M.C. in 1922 doing special work under the direction of Dr. Van Slyke.

Two Mistakes of Medical Missionaries.—In his presidential address at the recent Calcutta Conference of the Medical Missionary Association of India, Dr. E. Muir said, "If the older members will forgive me, I should like to speak a few words to the younger members who are here. There are two mistakes which missionaries, and especially medical missionaries, are apt to make. The first may be illustrated by the man who settles down in a place and does the work in front of his nose without thinking out the future. This is the unimaginative man without any vision. His work may grow in extent, but it will lack unity of purpose and design. He blunders along and gets something done, but not nearly as much or as good work as he might have done. This fault is a typically British one. The second is, I think, a typically American fault, viz., that of planning out everything and putting up large buildings before the work has had time to develop. Doing this must always cramp and hinder the natural development of the work. It is like having a large pair of trousers made for a slender youth and insisting that he should wear them now, because he may grow to be large enough for them some time.

"Surely there is a wise and safe path somewhere between these two extremes. What we want is wide and distant vision of the great work which has been done, is being done and may be done for India, and that will give the faith to work patiently and thoroughly, not dependent on quick returns or flashy statistics for heart and courage, but content to be like the microscopic leucocyte in the great human body a necessary, though not conspicuous, part of the whole."

Text of Sermon by Missionary Physician.—"Though I have the gift of prophecy (prognosis), and understand all mysteries (diagnosis), and all knowledge; and though I have all faith so that I could remove mountains (confidence and operative skill), and have not charity, I am nothing."
The China Medical Journal
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EDITOR.—Edward M. Merrins, M.D.
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