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SPONTANEOUS HEALING OF SYPHILOMA OF THE CILIARY BODY*

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In 1904 Ewetzky[1] collected from medical literature the reports of sixty-seven cases of syphiloma of the ciliary body, and summarized their chief clinical features in tabular form. None of these cases had been studied histologically. To this series Ewetzky added four cases of his own, all of which he described in detail clinically, but only two of them histologically. From 1904 to 1925 twenty-three additional cases were reported, of which Wachtler's[2] case is the last one published. In 1924, Dr. T.M. Li[3] of Peking reported two cases of syphiloma of ciliary body—the first to be reported from China. The object of this paper is to report another Chinese case :

On January 22, 1923, I enucleated the right eyeball of a Chinese soldier, aged 21. The eye had become blind (light perception with poor projection) as a result of a severe iridocyclitis which had persisted for five months. About one year previous to the onset, the patient contracted a chancre on his penis, associated with gonorrheal urethritis. He developed no secondary symptoms, except an enlargement of cervical glands. He received no antisyphilitic treatment. Local examination showed that the right eye was extremely inflamed and tender, accompanied by a diffuse keratitis. A small pigmented area, 3 mm. by 3 mm., slightly elevated, was visible beneath the ocular conjunctiva, about one millimeter from the lower limbus. Tension of the eye was normal. The left eye was normal (vision, 6/6). His blood Wassermann was strongly positive.

PATHOLOGICAL REPORT

A. Macroscopic examination :

The eyeball was fixed in Müller's fluid. Its shape is slightly irregular. The anterior-posterior diameter measures 23 mm. ; the horizontal, 23 mm. ; the vertical, 24 mm. The cornea is opaque, dark brown in color, and measures, horizontally, 10 mm. ; vertically, 9 mm. The sclera is normal in appearance except for a pigmented area, 3 mm. by 3 mm. in size, close to the lower limbus.

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Upon sectioning the eyeball vertically, in a sagittal plane, into two equal halves, the anterior and posterior chambers are found to be scarcely distinguishable. The iris is thicker than normal, and is adherent both to the cornea and to the lens capsule. The pupil is occluded by a membrane. The lens is cataractous. Both the iris and the lens have been pulled forward from their normal position. The ciliary body in the lower part of the eye, about 3 mm. by 3 mm. in area, is thickened and is yellowish in color. The sclera adjacent to this part of the ciliary body appears to be ruptured. The retina is almost entirely detached, being thrown into many folds. The choroid is partly detached, but no lesions are visible.

B. Microscopic examination :*

The cornea is flattened and somewhat wrinkled. It is thickest at the lower limbus (1.5 mm.). The epithelial layer and Bowman's membrane are thrown into small folds in several places but retain their normal structure and show no loss of substance. A few lymphocytes are seen between the epithelial cells. The deeper layers of the corneal stroma are invaded by many newly formed blood-vessels, which are more abundant in the inferior corneal segment. In the interlamellar spaces there are many lymphocytes and polynuclear leucocytes, and a few plasma cells. These cells are more numerous in the deeper layers of the cornea adjacent to Descement's membrane, but are almost equally distributed in the upper and lower segments of the cornea in these particular layers. Descement's membrane is markedly wavy in appearance. A portion of this membrane near the mass in the sclera below has been detached from the cornea, and is markedly curled up. The narrow space thus produced between Descement's membrane and the cornea is occupied by a connective tissue membrane and a small amount of granulation tissue. This connective tissue membrane is infiltrated with lymphocytes and plasma cells. In one place a piece of the detached portion of Descement's membrane has been broken off from the main structure, and lies embedded in the granulation tissue. The endothelium is largely intact.

In the sclera the most marked changes are found in its lower portion, where this structure is invaded by a tumor mass from the adjacent ciliary body. On the side opposite the tumor the sclera shows a slight infiltration with lymphocytes and plasma cells, and the thickened subconjunctival tissue contains a small amount of granulation tissue. Elsewhere the sclera shows slight lymphocytic infiltration around the blood-vessels, particularly around those which penetrate it.

Only the upper third of the anterior chamber is open ; even here it exists only as a narrow slit. The entire lower two-thirds of the

*For the confirmation of the histopathological part of the article, I am indebted to Privat dozent Dr. Adelbert Fuchs of the I Augenklinik of the University of Vienna, where the author was working in 1925-1926.

anterior chamber, commencing at the upper margin of the pupil, is completely obliterated by a thick connective tissue membrane which, in the process of shrinking, has pulled the iris toward the cornea. The entire pupil is occluded by this membrane, which is adherent to the cornea, the iris, and the anterior lens capsule, and is infiltrated with numerous lymphocytes and plasma cells. This membrane is continuous through the filtration angle with the mass in the ciliary body. In the upper third of the anterior chamber a thin layer of granulation tissue covers the entire surface of the iris from its root at the filtration angle to the pupillary margin, whence it is continuous with the membrane occupying the pupil. The filtration angle is completely blocked, and the ligamentum pectinatum is densely infiltrated with lymphocytes and plasma cells.

The most important and interesting changes are found in the lower part of the eyeball in the region of the ciliary body (Fig. 1). Here the entire ciliary body and the adjacent root of the iris have been converted into granulation tissue composed of fibroblasts interspersed with an enormous number of plasma cells, lymphocytes and pigment. It occupies completely the space between the lens and the scleral spur, and involves not only the ciliary body and the root of the iris, but also the circumlental space. The ciliary processes as well as the ciliary muscle fibers have been entirely destroyed. In some places the granulation tissue is deeply pigmented, and lymphocytes are present in form of small nodules. Some of these lymphocytic nodules, especially those in the periphery of the granulation tissue, are in close proximity to blood-vessels, while others do not show such a relation. Epithelioid cells are also present, but are not readily recognizable. Eosinophiles are very scanty. In some sections a few giant cells are seen. In the granulation tissue there are many obliterated blood-vessels. On its vitreous side the granulation tissue is covered by a thick membrane which separates the diseased ciliary body from the vitreous. That this membrane had begun to shrink may be inferred from the fact that the lens capsule is thrown into folds at the place where the membrane is adherent to the capsule, and that the lens itself is drawn downward. The circumlental space on the opposite side is much broader and is free from granulation tissue.

The sclera is greatly thinned in the region of the ciliary tumor. A perforation exists at the corneo-scleral junction adjacent to the mass. In its place are masses of lymphocytes, plasma cells, and free pigment. At the outer scleral sulcus, external to the ciliary tumor, there is a large elevation, covered by epithelium, containing granulation tissue and a considerable amount of pigment. The latter is here contained in large cells, which are probably detached pigment cells of the destroyed ciliary body. Near the perforation in the sclera one finds at the corneo-scleral junction slit-like projections of newly formed connective tissue interspersed with lymphocytes and pigment. These projections are situated between the

tumor mass internally and the granulation tissue externally (Fig. 2).

On the side opposite the tumor the ciliary body is covered by a thin layer of connective tissue. From this fine membrane thin shreds of organized exudate extend into the vitreous and to the equator of the lens. The structure of the ciliary body itself is here practically normal, but it is completely detached from the sclera. The lamellae of the suprachoroidea are spread apart, and their spaces are filled with an albuminous fluid in which are found cells of various kinds, such as white blood cells, red blood corpuscles, and swollen mononuclear cells. Accumulations of lymphocytes are found in the external part of the ciliary body and adjacent to the ciliary nerves.

The entire iris has been pulled towards the cornea by the organized exudate formed in the anterior chamber. In the region of the ciliary tumor it is highly inflamed and partly destroyed. The rest of it is infiltrated, especially in its posterior part, with numerous lymphocytes and plasma cells. As stated before, a fine layer of connective tissue covers its anterior surface and contains large newly formed blood-vessels. In addition to lymphocytes, eosinophiles are seen throughout the entire iris, some even within the vessels themselves; a similar accumulation of eosinophiles occurs also in the ciliary body on the side opposite the tumor. In many places the lymphocytic infiltrations have broken through the pigmented epithelium of the iris posteriorly, to form nodular masses of cells between the iris and the lens. Some of these nodules are partially organized, and blood-vessels may be seen running into them from the iris. The iris is to a large extent adherent to the surface of the lens.

The lens is shrunken and the capsule is thrown into many folds, especially at the equator on the tumor side. It has been subluxated forward and downward, due to the traction of the membrane emanating from the ciliary body and partially filling the circumlental space. There is a marked proliferation of the capsular epithelium especially in the region of the inflammatory mass in the ciliary body. On the posterior surface of the lens capsule there is a thin connective tissue membrane which is continuous with the membrane in the circumlental space.

The choroid is infiltrated in several places with lymphocytic nodules, more numerous near the tumor. Plasma cells are also present, but there is no destruction of this ocular structure.

The retina is detached and thrown into numerous folds, due to contraction of the connective tissue membrane which extends from the ciliary body to all parts of the retina. Three types of inflammation are found in the retina. The first is that in which a connective tissue membrane, resulting from an exudate, covers the surface of the retina. Large newly formed blood-vessels pass from the retina into this membrane which is infiltrated with numerous

red blood corpuscles, plasma cells, and phagocytes containing blood pigment. Some free blood cells cover the membrane—probably an artefact. Precipitates consisting of mononuclear cells are seen here and there between the retina and this area of hemorrhage.

The second type of inflammation is a marked perivasculitis, especially in those veins which are surrounded by lymphocytes. Many of the small blood-vessels of the retina are sclerosed and obliterated.

The third type of inflammation is an extensive exudation located in the internuclear layer, especially in the macular region where it is most marked. This exudate consists of albumin, which exists in the form of cones between the fibres of the internuclear layer. In some places there are hemorrhages in the retina. In one place near the ora serrata, the hemorrhage is contained in a fold of the detached retina which apparently was perforated at this spot, causing an escape of blood into the pre-retinal space.

The nerve-fiber layer is much thickened and diffusely infiltrated with lymphocytes. The ganglion cells are few. The inner nuclear layer takes the stain poorly in some places, but normally in others. The outer nuclear layer appears normal, except where it is in folds. The rods and cones are degenerated.

The optic disk is very much swollen. The blood-vessel funnel is still present, but is filled with blood. The papilla is slightly infiltrated, its veins being surrounded by lymphocytes. The tissue of the papilla is edematous but the nuclear rows are recognizable; the bundles of optic nerve fibers are somewhat edematous, but show no atrophy.

Diagnosis: Syphiloma of the ciliary body.

DISCUSSION:

In the light of its clinical picture and morbid anatomy, syphiloma of the ciliary body is no doubt as distinct a pathological entity as is tuberculosis or sarcoma of the same structure. It is, so to speak, analogous to iritis papulosa. Ewetzky points out that in seventy per cent. of his cases this disease occurred within eighteen months after the primary infection. It appears almost always either before or simultaneously with the secondary lesions in the other parts of the body and is, therefore, to be regarded as a form of eruption, namely, a papule in the ciliary body during the stage of generalized syphilitic infection. Involvement of the ciliary body also occurs in the form of a gumma, but more rarely.

Clinically, syphiloma of the ciliary body usually begins with severe inflammation involving the eyeball and the conjunctiva, and is accompanied by pain in the eye, headache, and symptoms of severe ocular irritation. Locally one finds a pronounced injection of the conjunctival vessels, and an iridocyclitis with its usual complications. Vision often diminishes with alarming rapidity, and blindness may ensue within a few weeks. Enucleation of the diseased eye is

sometimes necessary for the relief of pain. When the disease begins acutely, it lasts about two or three months; not infrequently, however, it runs a more chronic course. The symptoms are in the latter instance correspondingly less violent; in fact they may be so mild that the underlying cause is hardly suspected. In such cases the disease may drag on for a period ranging from six to twelve months. The tension of the eye is usually subnormal, but it may be normal or even be increased. It should be borne in mind that when the syphiloma is in its initial stage and when the accompanying inflammatory reaction is slight, no suspicion of its presence may be aroused, since the ciliary body is not accessible to the ordinary methods of examination. Even in advanced cases it may be overlooked on account of its being obscured by some such complication as an occluded pupil or a severe keratitis, which prevents a satisfactory examination of the interior of the eye.

As the syphiloma grows, it has a marked tendency to burrow through the sclera in the neighborhood of the limbus, along any meridian, but most frequently external to the vertical meridian of the cornea (Ewetzky). It may then appear beneath the bulbar conjunctiva without breaking through, or it may extend through the filtration angle and appear in the anterior chamber, or it may do both at the same time. More rarely it extends to the posterior part of the eyeball. Within the ciliary body itself, the disease has also a tendency to spread, so that a large part of or even the whole of the ciliary body may be involved, bearing in such instances an analogy to ring sarcoma of the iris.

The case presented in this paper ran a clinical course which agrees more or less with the above description except for the absence of the secondary symptoms. The most striking and interesting finding in this instance is revealed by the histopathological examination of the enucleated eyeball. There is no doubt but that we are dealing here with a case of spontaneous healing of syphiloma of the ciliary body. The place of perforation in the sclera is still recognizable behind the limbus. There is an accumulation of uveal pigment both in the sclera and the subconjunctival tissue adjoining the diseased part of the ciliary body. This shows that some uveal tissue prolapsed through the perforation and subsequently became separated from the other parts of the uvea within the eye by a membrane which closed the perforation. The large defect in the root of the iris and adjoining part of the sclera, underwent repair, partly by the development of granulation tissue and partly by the formation of connective tissue, the strands of which interlaced irregularly one with another.

It is improbable that the change was a result of injury. If injury were the cause there would be a different kind of wound and scar in the sclera. Again, the appearance of the ciliary body, the character of the granulation tissue, and the fibrous membrane speak against any supposition of traumatic cause. Moreover, the character

of the granulation tissue, the destruction of the iris root and of the ciliary body, the situation of the perforation in the sclera, the presence of a large number of plasma cells and eosinophiles, and finally the positive Wassermann reaction are in favor of the diagnosis of syphiloma in the process of healing. The changes in the retina are without doubt secondary, caused by the toxins emanating from the diseased focus in the ciliary body.

At the time of enucleation the eye still had light perception, but the presence of a contracting membrane on the surface of the retina near the ora serrata, and of an extensive detachment of the retina anteriorly made it certain that total detachment would eventually develop and that vision would eventually be entirely destroyed.

In both treated and untreated cases, the prognosis for the eye is grave in syphiloma of the ciliary body. Ewetzky's series show how frequently eyes are lost as a result of this disease. In twenty per cent. of his cases, the eyes became atrophied ; in thirty per cent. more they were enucleated for various reasons ; and in a further fourteen per cent. their vision was so much reduced as to render them economically useless. Hence in seventy-two per cent. of the cases the eyesight was lost. The measures to be taken against this disease are preventive, not curative, as far as the function of the eye is concerned. Only by treating the disease at its very inception is it possible to save the eye.

It is interesting to note that in occidental countries syphiloma of the ciliary body has practically disappeared within the last few years, due probably to the fact that antisyphilitic treatment has been undertaken much earlier and carried out more vigorously than formerly, when people usually paid no attention whatever to the primary stage, but waited until secondary symptoms appeared. Although we have no statistics to show just what the corresponding situation is in China, there is every reason to believe that the incidence of this disease is proportionately greater in this country where syphilis is either neglected or very inadequately treated.

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AMYLOID DEGENERATION OF THE CONJUNCTIVA.*

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In the year 1925 three patients presented themselves, suffering from precisely the same kind of tumour of one or more eye-lid. In each case the tumours were superadded to a cicatricial trachoma, and the lids had been needled on one or more occasions by an old dame. My theory at the time was that the tumours were formed by cartilage cells from the tarsus becoming implanted into the superficial layers of the lid and continuing to grow. It was only after specimens had been examined for me by Dr. H. Smetana, to whom my thanks are due, that the nature of the disease was established.

There is a good description of amyloid disease of the conjunctiva in Duane's translation of Fuchs' text book 7th.Ed. pp. 493-494. It is stated that the disease is rare, and has been mainly observed in Russia and adjacent countries. "It consists in a peculiar degeneration of the conjunctiva, by reason of which the latter becomes yellowish, translucent like wax, non-vascular and very friable . . . . . it forms swellings which look like new growths . . . . . In a case that has lasted a long time, the following clinical picture is found. The patient cannot open the eye, because the two lids, transformed into large misshapen swellings, cover it up . . . . . These swellings are so friable that they often tear when an attempt is made to open them for examination, although when they tear, they bleed very little . . . . . At length the patient is deprived of the use of his eyes by inability to open his misshapen lids . . . . . The disease attacks people in middle life, and ordinarily both eyes are affected. Very frequently amyloid disease is preceded by trachoma, "which, however, should not be regarded as the cause of the affection, inasmuch as the latter may develop in eyes that previously were healthy . . . . .

Photo by G. A. M. Hall

*Since writing the above, Dr. H. J. Howard and Dr. P. S. Soudakoff of the Peking Union Medical College, have read my paper and examined my specimens. They point out that the essential condition was undoubtedly in the original instance one of plasmoma which has undergone secondary amyloid degeneration.—D. S. B.-B.

"Medical treatment is powerless against this disease. We must confine ourselves to removing the growths to such an extent that the lids can be opened and vision rendered possible . . . . . "

Case 1. Hosp. No. 5138. Farmer of 16 sui 歲 only. Eighty days before admission the patient had a small swelling in the R. upper lid, which was needled by an old woman, and has been growing ever since.

On examination, R. upper lid much thickened and hard. On eversion a flat growth was seen, which was readily friable. Cicatricial trachoma.

L. upper lid thickened to a much lesser extent, and scarred. L. lower lid, small chalazion.

Operation 15/4/25. Excision of new growth. Conjunctiva and cornea anaesthetised with cocaine 4 per cent., and novocaine half per cent. with adrenaline injected subconjunctivally and subcutaneously. Canthotomy was performed, and the growth removed nearly entire with the tarsus. The free edge of the conjuctiva was united to the lid margin by mattress sutures, and tied over glass beads, and the canthotomy wound united.

Stitches were removed on the 18th, and the patient discharged on 19th., refusing operation on the other eye.

The growth showed the characteristics described above.

Case 2. Hosp. No. 5234 was a housewife of 39 sui 歲, of whom a photo is reproduced. The history covered a period of three years, during which the lids were frequently needled, and growth has been continuous. She can scarcely open the eye at all.

On examination both right lids enormously thickened and distorted. They are of cartilaginous consistency, the swellings of the upper and lower lids join at the outer canthus. Cornea just visible. R.V.=6/60. L. eye cicatricial trachoma.

Operation 16/5/25. Anaesthesia as above. Canthus split. Lower part of growth removed in greater part, though very friable. Lower tarsus removed. Upper part of growth removed in similar fashion with tarsus. Conjunctival edges sutured to lid margin as in case 1. It was a little scanty below. Canthotomy wound sutured.

Stitches out on 18th, 26th soundly healed. R.V.=6/24. Eye movements free.

Pathological report by Dr. H. Smetana.

"The squamous cell epithelium of the eyelid is partly missing. In the corium and subcutis there are still a few large sebaceous cysts and hair follicles left. In the superficial layers of the subcutis one sees a few bundles of striped muscle fibers, which are partly atrophic and degenerating. The rest of the section consists chiefly of hyaline material, which is in some parts composed of large and small globules, often surrounded by giant cells. Other parts of the section show a more homogeneous hyaline in which there are only a few nuclei and blood vessels left. This material

gives a metachromatic reaction with methyl violet, and stains electively with congo-red.

Diagnosis : Amyloid tumour of eyelid.

Case 3. Male 32 sui 歲. History not noted.

On examination R. eye cicatricial trachoma with entropion of both lids. The lower lid is occupied by a sausage-shaped swelling of cartilaginous consistency. There is much infiltration of the cornea due to entropion. L. eye cicatricial entropion with staphyloma.

Operation 9/7/25. Anaesthesia as above. Canthotomy. Tumour removed piecemeal, with lower tarsus. Conjunctiva scanty, but united to lid margin in usual way. R. upper tarsectomy. Canthotomy wound united. 12th. stitches out. 14th. Conjunctiva scanty with tendency to symblepharon. Upper lashes well everted.

SPINAL ANAESTHESIA UNDER NOVOCAINE-CAFFEINE COMPOUND*

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Like other radical innovations in Medicine, the use of Spinal Anaesthesia has its rising tide and ebb. But I believe its present unpopularity is largely due to the indiscriminate and unrestricted use in the early days following its introduction and experimentation when knowledge and technique were both imperfect. It is for the same reason that Tuberculin was almost abandoned shortly after its introduction.

For years Spinal Anaesthesia has met with considerable opposition especially on the part of those who had little experience and perhaps less study. But thanks to the work of A. E. Barker[1] Spinal Anaesthesia has been established on a comprehensive and scientific basis. And since the publication of his results, the method has been continuously reported with favour by those who used it largely.

During the writer's last visit abroad in 1922 Spinal Anaesthesia was observed to be quite widely practised in the leading clinics of Paris, Berlin and Vienna, but in Great Britain and America only a few clinics were found employing it.

*Read at the Joint meeting of the British Medical Association and China Medical Association, January 1925.

Unfortunately this paper only came into our hands a few weeks ago. —Editor.

With us it is the method of election in all operations performed below the umbilicus. During the last two years we have performed it 514 times and we have not had a single case of death or permanent injury arising from its use. It is because of its safety as well as other advantages that we propose to describe our experience and technique.

I am indebted to my colleague Dr. P. J. Todd, head of the Department of Obstetrics and Gynaecology, Kung Yee Medical School Hospital for the use of his records.

Of the 514 cases we have kept detailed records of the last 109 for special study. Although the remaining cases also have records they were not such as one might wish for special study. Dr. Todd practises a technique different in some respects from that of the writer. This affords us many instructive and interesting points for comparison.

The Anaesthetic Agent: Novocaine.

Elsewhere almost all the local anaesthetics have been tried at one time or other. Most of the authorities are, however, either using Stovaine or Tropacocaine.

In the beginning we used largely Apothesine and Procaine. Although their Chemical formulae[1,2] were claimed to be identical with Novocaine their effects were not the same under our observation. For almost two years now we have used only Novocaine, although Allen[2] wrote: "It has not proved generally satisfactory and is accordingly less used at the present time."

Novocaine was our anaesthetic of choice because it is efficient and the least toxic, it has only one-sixth of the toxicity of Cocaine. Furthermore it is the least irritating to nerve-tissue. It is readily soluble in water and makes a neutral solution. It stands boiling to 120 degrees C. without decomposition. Its action on the sensory nerves is well marked; while the motor nerves are less affected than by other local anaesthetics; for this reason it is the least likely to cause respiratory paralysis.

Use of Novocaine and Caffeine in Combination.

When Novocaine was used alone we observed in a large proportion of cases a syndrome not unlike that of shock though of a transitory nature. It consists of pallor of the face, clammy skin, frequent and low pressure pulse with perhaps vomiting and a feeling of faintness.

The work of Smith and Porter[3] has thrown important light on these symptoms. They observed that if anaesthesia of the dorsal nerve roots was induced, a very sharp fall in blood pressure resulted. The fall was due to dilatation of blood vessels as the result of splanchnic paralysis. They have also shown that rabbits could be bled

to death within their portal system by section of the splanchnic nerves.

These important observations demanded that some means must be devised to combat this sudden fall of blood pressure due to the anaesthetic. At the present stage of our knowledge it is impossible to obviate or control splanchnic paralysis when the anaesthetic is injected intraspinally. Because of this, we were led to try various cardiac stimulents injected subcutaneously preceding or following the intraspinal injection. We have tried Adrenalin, Camphor Oil, Digitalin, Strychnine, Caffeine, etc.

With the use of some of these, the results were encouraging, as the syndrome above mentioned was effectively mitigated particularly with the use of Caffeine.

Shortly after this, I combined the Novocaine with the Caffeine in the intraspinal injection, and noticed that the group of symptoms was more effectually prevented, while in no case was there any harmful effect observed. I found that headache was less frequent, and when present, was slight in comparison with subcutaneous injection of Caffeine (See AFTER-EFFECTS). In approximately one-half of our cases I used this compound.

It is interesting to note that Jonesco[4] used a combination of Stovaine and Strychnine, later the strychnine was replaced by Caffeine, with this he practised injection as high as the Cervical region. His method however has not met with general acceptance. In 1921, Rene, Bloch & Hertz[5] published serious cases of syncope successfully treated by intraspinal injections of Caffeine. Bloch & Hertz however pointed out that the mixture of Caffeine and Novocaine has imperfect anaesthetic properties.

One further advantage with the addition of Caffeine to the Novocaine solution lies in that it increases the density of the solution.

Barker was the first to point out the necessity of using a solution heavier than Liquor Spinalis. By using such a dense solution, its movements within the Canal could be controlled elevating or depressing the pelvis and that it could be kept away from the higher vital centres. For this reason, he added 5 per cent. glucose to a 5 per cent. solution of Stovaine, and by this simple device, he opened a new era in Spinal Anaesthesia. The results obtained by him and those who have used his compound were reported to be remarkable.

The density of the compound as used by the writer is somewhat heavier than Barker's compound. *The Modus Operandi* is that the heavier the compound the quicker it gravitates to the most dependent part of the canal. It may be so quickly localised as to exert its maximum specific action at any chosen level. With such a solution the diffusion and its consequent dilution is less, so that a small dose would effect the maximum result.

TABLE I.

RELATIVE SPECIFIC GRAVITY.

	Specific Gravity
Normal Cerebro-spinal fluid (Chinese Standard) (From 10 patients mixed fresh)	1.0060
Barker's Compound—Stovaine 5%, glucose 5% (Distilled water 90%)	1.0230
The writer's Compound—	
Novocaine 2 grs. (.13 gm.)	
Caffeine 3 grs. (0.195 gm.)	
Distilled water 2 c.c.	1.0270

But Barker's Compound as well as Bier's, and Chaput's Compound are more or less haemolytic in action on account of the Stovaine contained. Barker was the first himself to observe this action.

Now the Novocaine-Caffeine Compound as I have tested has no more haemolytic action than normal saline. The examination for haemolytic action was made under the microscope on mixing a small quantity of blood with the Compound.

TABLE II.

HAEMOLYTIC ACTION

Red blood Corpuscles seen under microscope	5 minutes	10 minutes	20 minutes	6 hours
Barker's Compound	Swollen & pale	Almost invisible	Totally invisible	Totally invisible
The writer's Compound (1 in 20 and 1 in 100 dilution with blood)	No change	No change	No change	No change
Control with Normal Saline (.91% Sodium Choride)	No change	No change	No change	No change

PHYSIOLOGICAL CONSIDERATIONS.

Haemolysis.—It may be assumed that there is much less likelihood of injury to nerve or other tissue cells in a fluid which has no destructive action on blood cells, than would be the case in a fluid which destroyed blood cells.

The Liquor Spinalis which occupies the subarachnoid space, normally permeates the pia-mater and communicates freely through the apertures with the ventricles in the interior of the brain, and it comes into direct contact with the nerve tissue. It is concerned in the nutrition of nerve-tissue. Normally the Liquor Spinalis is completely renewed six or seven times a day. We can readily understand what an important bearing the above statement concerning haemolysis has in relation to spinal anaesthesia.

Specific gravity of cerebrospinal fluid in Chinese.—In comparing the density of the injected solution with the cerebrospinal fluid above referred to, it is necessary to ascertain first the true specific gravity of the fluid. As far as I am aware there has not hitherto been any Chinese physiological standard established.

In comparison with the published data abroad, I find the Chinese cerebrospinal fluid to be slightly lighter. Beattie[6] puts the specific gravity at 1006 to 1010, Howell[7] puts it at 1007 to 1008, while according to Barker it is 1007, the last basing his reading on the fluids taken from three patients and mixed fresh.

However in mixing the cerebrospinal fluids from ten Chinese patients I found it to be 1006. These patients had either minor accidental wounds or minor surgical complaints but were otherwise normal persons. Five men and five women were chosen and 10 c.c. was taken from each. The fluid was collected in a stoppered bottle and the test made within four hours of the spinal punctures. It is noteworthy that two of these ten cases developed slight headache within 12 hours, and one of the two headache cases had also vomiting.

Quantity of cerebrospinal fluid.—The actual quantity of cerebrospinal fluid is impossible to determine during life.

Beattie[6] puts it 60 to 80 c.c. and Keyes, 50 to 150 c.c. In view of this the effect following sudden and excessive withdrawal is obvious.

Dosage of Novocaine and Caffeine.

For a Chinese patient of average weight, the dose of Novocaine is two grains and Caffeine three grains, injected together in 2 c.c of distilled water. 84 per cent. of my cases received this dosage.

With patients heavier than the average or in prolonged operations, we have used Novocaine up to three grains without harmful effects. Allen however, recommends one grain and Cabot one and a half grain, but Allen's results were not satisfactory.

With Caffeine we never use more than three grains.

Both Novocaine and Caffeine are usually dissolved in 2 c.c. of water. I think a dilution less than 1.5 to 2 c.c. is undesirable because the escape of two or three drops during manipulation would have materially reduced the effect; on the other hand a higher dilution would lessen its density.

Indications.

When not contra-indicated Spinal Anaesthesia is our routine method in all operations below the umbilicus, although most of the present day workers are restricting it to cases that are unsuitable for general narcosis or other regional and local methods. We also employ it in a large proportion of operations on the upper abdomen.

Our experience agrees with the Conclusions of Hugh Cabot[13] that it is the anaesthetic of election for Cystoscopy, as it paralyses the nerve endings of the bladder and consequently abolishes spasms and contractions of that organ, which no general anaesthetic can effect, unless pushed to a dangerous depth.

In gynaecological operations haemorrhage is markedly lessened on account of the vaso-motor relaxation.

The method is so safe that we had not the slightest hesitation in using it for minor operations such as circumcision, uterine dilatation and curettage, etc.

In using it for laparotomy it completely relaxes the muscles of the abdomen creating a " silent " and " negative pressure abdomen."

For operation on cases of acute intestinal obstruction general narcosis is not so good as Spinal Anaesthesia. Under Spinal Anaesthesia the abdominal wall is completely paralysed while intestinal peristalsis is not only maintained but actually stimulated.

Contra-Indications.

In those whose blood pressure is low (say under 100) the method is not advisable. It may be used, however, in selected cases of this nature because under these circumstances even general narcosis is dangerous. In such cases a smaller dosage should be used.

It should not be employed in cases of severe shock, advanced heart disease, and diseases of the spinal cord and meninges.

Limitations.

In spite of the convincing work of Tyrrell Gray[14] we do not practise it in children. The full effect of the anaesthetic usually lasts from 45 to 90 minutes, a second injection or a little ether may be given when it is desired to prolong the anaesthesia ; for this reason Finsterer[8] had given up the use of Spinal Anaesthesia in abdominal surgery. This however should not be a valid objection.

At one time it was held to be dangerous for use in the Trendelenberg position but it was later shown that in heavy solutions the anaesthetic cannot be moved by gravity after a few minutes. This observation tallies with our experience as we have repeatedly adopted the position and no untoward result was noticed.

For satisfactory anaesthesia a faultless technique is absolutely essential.

A preliminary subcutaneous injection of morphia is desirable. This should be given three quarters of an hour before the operation. In the average case no cardiac stimulant need be injected.

Position of Patient during injection.—Two positions are employed and both are equally used by us. Although the sitting position is easier I prefer the right lateral position for the following reasons :—

1. The left hand of the operator is more conveniently used to palpate the landmarks (while the right hand is holding the needle).
2. The patient is more easily protected from exposure as the sitting position involves his leaving the warmth of his bed for a time.
3. There is no added strain to the heart. In nervous patients a fainting fit may occur from fear during the injection, and the risk of this is much reduced when the injection is made with the patient in the recumbent position.

The patient should lie on the side with his spine flexed as completely as possible in order to open out the interspinous spaces. When it is difficult to get him to co-operate, I have found it easy to secure this by simply asking him to place his upper elbow between his knees.

Site of injection.—As we do not employ spinal anaesthesia for operations above the xyphisternum we have confined our injections to the lumbar region and as the spinal cord ends approximately at the level of the disc between the first and second lumbar vertebrae, we have further restricted our punctures to the three spaces between L^2 and L^3, L^3 and L^4, L^4 and L^5. It is well known that variations in the length of the cord occur. Cunningham[9] points out that in the female it is apt to reach a little lower than in the male and it is sometimes seen in either sex to reach the level of the disc between the second and third lumbar. The L^3 and L^4 is therefore the most common site resorted to and is commonly known as Quincke's Point, or the classical point. Opposite to this point is the highest part of the forward curve of the lumbar canal.

The needle may be applied in the middle line or slightly to one side of it. Pauchet[10] and Allen recommend puncture from the side of the midline. We however preferred the midline itself because it is less likely to injure the nerve bundles; moreover opposite the space between L^2 and L^3 the Cauda Equina separates into two bundles with a central space of 2 to 5 m.m. If the injection should be made into one of the bundles the solution is likely to be concentrated around them which would result in unequal or unsatisfactory anaesthesia.

Preparation of Skin.

Painting the skin with Tincture of Iodine 5 per cent. is both quick and effective (I have not noticed any harmful effect by not washing the Iodine off with alcohol).

In order to obviate unnecessary suffering and the consequent stiffening of the back on puncturing, the skin should be anaesthetised. I made use of the Novocaine-Caffeine Compound prepared for the intraspinal injection; injecting a few drops first intradermally with a small needle. After the skin is traversed little pain is felt.

Landmarks.

When the fourth spine is found, the remaining spines are readily identified.

According to Tuffier a line drawn transversely between the highest points of the iliac crests crosses the fourth lumbar spine. Some stretch a towel across for the purpose, but with the patient on his right or left side this is not only inexpedient but misleading, I therefore make use of the following method:—

Rest the tip of the index finger on the highest point of the iliac crest, then abduct the thumb in a perpendicular line. The point

of intersection of this imaginary line and the midline will be the interspace between the third and fourth spines. Half an inch from this point towards the caudal end will be the fourth spine. This method of location is perfectly simple and takes but a second or two.

Instruments.

These consist of two 2 c.c. all-glass syringes, one for aspiration and the other for injection. These syringes should be kept apart for the purpose and they should not be boiled in water containing alkalies or antiseptics. Alkalies destroy the Novocaine and antiseptics are irritating to the cord. But any air-tight all-glass syringe may be used.

For making the puncture a long needle is used and for the intradermal injection, an ordinary hypodermic needle.

The long needle should have a sharp point shortly bevelled and of as small a calibre as possible, consistent with strength but not so small as to be easily choked. Special lumbar needles are not essential.

We keep our syringes and needles in alcohol. They are thoroughly rinsed in plain sterile water before use. For the sake of simplicity we do not use stylets or cannulae with the needle when making the puncture.

Puncture and Injection.

The needle is held in the right index and middle fingers with the thumb over the hub. The skin having been steadied by two fingers of the left hand, the point of the needle is applied to the centre of the interspinous interval and the needle is pushed in gradually in a slightly upward direction. After the thick tissue is traversed (about 1½-in.) the hub is grasped between the thumb and index finger and the needle is pushed onwards until cerebrospinal fluid appears. When this is noticed, slightly advance the needle 2m.m. further so as to ensure that the bevel of the needle is completely within the arachnoidal sac.

In the event of the needle striking bone it should be withdrawn but not completely and its direction slightly changed, working in the vertical plane. Sometimes a drop or two of blood may appear but if it is followed by clear fluid all is well. On the other hand if blood is continually mixed with cerebrospinal fluid, the needle should be at once withdrawn, cleansed and reintroduced either at the same space or the adjacent one. (Blood destroys the anaesthetic agent).

When clear fluid appears at the hub the empty syringe is at once fitted to it and a gradual withdrawal is made to the 2 c.c. mark and the syringe is detached. The escape of fluid is meanwhile prevented by applying the gloved left thumb to the hub. The next syringe containing 2 c.c. of Novocaine-Caffeine Compound is attached and the piston is driven home gradually without force. This syringe is

then detached and if the injection was correctly made, cerebrospinal fluid will again be found dropping from the needle hub, and the needle is then quickly withdrawn. A pad of gauze is fixed over the puncture and the patient is immediately rolled on his back. Anaesthesia usually appears in two to ten minutes.

After-Effects.

1. *Fever.*—Based on our last 109 cases, fever is almost a constant after-effect. The temperature usually rises directly after operation ; the maximum is reached in six to ten hours ; after which it gradually falls to the normal. The average maximum is 101 degrees.

2. *Headache.*—Headache as a rule is slight and transient. We have never had a single case of persistent headache or a case in which lumbar puncture was resorted to for relief. Slight headache occurred in 52 per cent. of the Novocaine cases, and 50 per cent. in the Novocaine-Caffeine cases. While there was no severe headache in the Novocaine-Caffeine series there were 4 per cent. of severe headaches in the simple Novocaine cases. When severe aspirin is invariably successful.

3. *Retention of urine.*—It is difficult to assess how many cases are actually due to the anaesthetic and how many are due to the reflex influence of the operation. It is common experience that retention frequently follows operations on the perineum and the lower abdomen under general anaesthesia. 31.57 per cent. of our cases required catheterization. But 72 per cent. of our operations under spinal anaesthesia were performed on the perineum and lower abdomen. 42.61 per cent. are on the perineum alone.

It has been observed[11] that even under general narcosis it occurs as high as 23 to 25 per cent. following major gynaecological operations. Of those who had retention 86 per cent. required not more than three catheterizations.

4. *Vomiting.*—Vomiting was never serious. It occurred in one third of our cases. Less vomiting was noticed in the cases under the Novocaine-Caffeine Compound ; vomiting may follow simple puncture without any injection.

Other After-Effects.

Rectal incontinence has occasionally occurred during operation but is never persistent. (For this reason when performing hysterectomy the vagina should be first packed to prevent infection.)

Permanent Paralysis in any form has never been encountered nor have we ever met with any case of syncope or paralysis of respiration.

In no case was there permanent injury of any kind found following Novocaine anaesthesia, and we have not had a single case of death in the series of 514 cases. It may be mentioned however that in addition to previous cases recorded, five recent cases[4] of syncope under novocaine have been reported in the journals.

ADVANTAGES.

Briefly, Spinal Anaesthesia has the following advantages:–

1. It does not increase or awaken preexisting pulmonary disease. The prevalence of phthisis in this country is well known. The serious effects of inhalation anaesthesia on these cases are but too frequently experienced.
2. Surgical shock is entirely prevented or mitigated. Our experience with the method in such major operations as Wertheim's hysterectomy, disarticulation at the hip, etc. is entirely satisfactory.
3. Complete relaxation of the abdominal muscles are produced, creating a " silent " and " negative pressure abdomen."
4. It is suitable in subjects who are bad for general anaesthesia such as the aged, feeble, corpulent, diabetic and those with renal affections. In acute septic infection such as appendicitis, osteomyelitis, etc., it is of the greatest value because these patients are liable to the complications of pneumonia and acidosis. The use of general anaesthesia in these patients should be avoided.
5. It may be resorted to in times of stress and limited personnel and also in the absence of a skilled anaesthetist. In small out-lying hospitals and with those in country practice this method is of the greatest possible advantage. The surgeon here is both operator and anaesthetist.
6. Retention of consciousness. Even in a teaching hospital we do not consider this a disadvantage as many claimed. On the other hand it is sometimes a distinct advantage in enabling the surgeon to secure further permission, whenever an operation discloses unsuspected conditions.
7. It conduces to an earlier convalescence, because fluid and normal food are given much sooner than in cases under general narcosis.
8. No post-operative nursing is required. Relatives or friends may be admitted to the room immediately after operation if so desired.
9. The dread of inhalation anaesthesia is eliminated. Many Chinese patients have an abhorrence for inhalation anaesthesia, some amounting to a positive terror. For this reason many would accept an operation under spinal anaesthesia which would have been refused had general narcosis been proposed.

   Moreover those who have had both forms of anaesthesia before invariably have a preference for spinal anaesthesia in subsequent operations.
10. Economy. When used alone the cost is insignificant in comparison with ether.

    When used in association with ether, it greatly reduces the quantity of the latter required.

    The use of ether in the summer and in hot countries is an expensive item. Frequently we have seen large quantities of

ether given without apparent effect, thus wasting valuable time and the drug.

SUMMARY

For operations below the umbilicus Spinal Anaesthesia under novocaine is a safe procedure.

The dosage of novocaine recommended by various authorities is insufficient which may be the reason for the frequent unsatisfactory results.

The addition of caffeine to the novocaine has no harmful results. The compound is rendered heavier than the simple solution, which is desirable for its speedy localization. The compound as compared with other anaesthetic agents is the least toxic and it is not irritating to nerve-tissue, or destructive to blood cells. The syndrome so frequently present in simple novocaine cases is entirely or largely obviated by the addition of caffeine, and the untoward after-effects are lessened.

The specific gravity of cerebrospinal fluid in Chinese (1.006) is lighter than those reported abroad.

The position of the patient during injection should be on the side, preferably the right-lateral position. When the patient is placed in a recumbent position, the usual method of locating the spines is inexpedient. An easy and practicable method is recommended herein.

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A PRELIMINARY NOTE ON A NEW METHOD OF PLATING FRACTURES

(Read before the Surgical Section of the Conference of the China Medical Association at Peking in September, 1926).

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It is somewhat of a reproach to modern surgery that when a bone is broken the average surgeon hesitates to accurately unite the fragments. Yet a nerve, a muscle, a tendon, a ligament or an aponeurosis will be sutured as a matter of routine.

It is true that Lane and others have long adopted the fixation of the fragments in position with metal plates and screws in almost all fracture cases, and that many other methods have been advocated to meet special cases. But the routine treatment of fractures by

open operation has never become popular, and during the Great War open operation played only a small part in the treatment of simple fractures.

The disinclination to fix the fragments of a fractured bone with plate and screws at open operation is due to several considerations :—

(1) The proneness to septic infections in such operations and the appalling results of such septic infection.
(2) A tendency to delay in firm bony union of the part.
(3) Technical difficulties in (*a*) accurately replacing the fragments and (*b*) manipulating the plates, drilling holes and inserting screws and (*c*) controlling haemorrhage.

The proneness to septic infection is due to the fact that the bone is stripped of much of its periosteum, not so much by the initial violence as in the efforts of the surgeon to clear the ends freely and to expose a long area of bare bone for the application of plates and screws.

The shaft of a long bone receives nearly all its blood supply from the periosteum. If the latter is stripped off and then replaced the blood vessels soon join but the deeper layers of the bone probably die. In the absence of infection the dead bone is absorbed and replaced by living bone. A small contamination by bacteria (which would easily be dealt with by the phagocytes in an ordinary surgical wound) in these circumstances becomes very serious for the organisms get into the interstices of dead bones where the phagocytes cannot quickly come to grips.

It is beyond the scope of this paper to pursue the inquiry as to how septic infections of the bones come to be so much more serious than infections of other tissues. Suffice it to say that in operation upon a fracture case a strict aseptic technique must be followed of an infinitely higher order than that employed in ordinary surgical operations. No surgeon should attempt to do open operation in fractures who is not prepared to train himself in such technique. The method and details of such technique will not be considered in this paper.

The tendency to delay in firm bony union of the part sometimes seen when plates and screws have been used is probably due also to the extensive stripping up of the periosteum and the consequent devascularisation of the fragments we wish to unite. It has been pointed out by Hey Groves that the stoutest union of fragments could be obtained by 2 steel plates on opposite sides united by bolts and nuts through the whole thickness of the bone. It is not often possible to secure sufficient access to perform this.

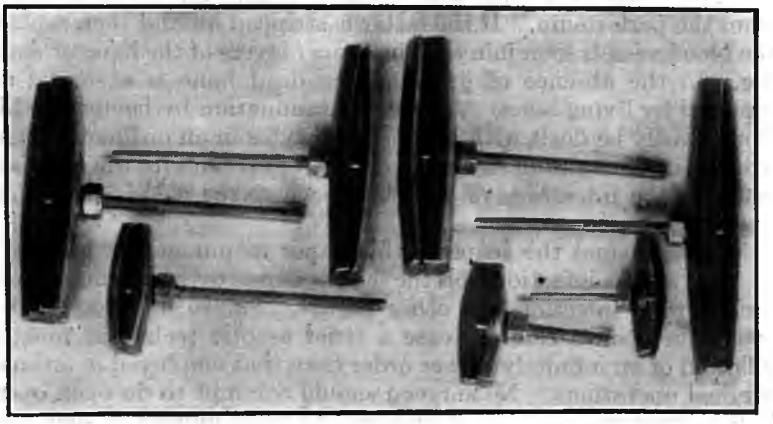
It then occurred to one that a plate outside the compact tissue and a second plate inside the medullary cavity could be held to one another by a single bolt and nut and that such would not require a very long incision nor excessive stripping of periosteum. It was hoped that it might present in some respects a simpler manoeuvre than that of plates and screws and might with advantage replace them in cases.

Plate I is a photograph of the plates we have tried for this operation.

The details of use evolved in experiments on fractured dry bones are as follows :—

Two short plates are employed, one within the medullary cavity, the other outside on the surface of the bone. These two are tightly clamped together by means of a single screw attached to the inner plate and the outer plate and traversing a hole in the compact tissue of the bone near the site of the fracture or close to it, a nut outside the outer plate screws up to press the plates together. The compact tissue of the bone is thus tightly gripped and held in position.

The method of application is as follows :—The site of the fracture is freely exposed by an ample incision. The limb is sharply angled at the site of the fracture till the ends of the fragments protrude



Internal and external plates with screws and plates, x 1

clear of the wound. The actual fracture faces are cleaned of soft parts. With drill mallet and chisel or with gouge forceps a small piece of bone is chipped off at the superficial edge of the fracture so as to leave a free hole for the screw. One half of the inner plate is inserted into the medullary cavity of one fragment (if the fracture is a little oblique the plate goes into that fragment which has its medullary cavity open to the surface). The other end of the inner plate is hitched into the end of the other fragment and as the limb is straightened the ends slide over the inner plate and become approximated. The outer plate is next applied and finally the nut which is screwed down by means of a special instrument. The projecting part of the screw is nipped off by reinforced wire cutters and any irregularity smoothed away by a small file in a special instrument. The wound is then closed.

Special difficulties have to be met in various ways.

Where two parallel bones, tibia and fibula or radius and ulna, have been broken the nuts on the external plates are only screwed home after both internal plates have been inserted.

When the line of fracture is exactly transverse a hole is drilled on one side a little distance from the line of cleavage and chisel and mallet make a slit to the line of fracture. The internal plate is pushed more than half way into this side, the screw slipping into the slit. The fragments are aligned and the screw is then slipped along to the line of the fracture.

When the line of fracture is oblique the plates should be applied at the site of the end of one fragment.

When the fracture is very oblique so as to lie almost in the long axis of the bone the internal and external plates are not suitable.

When there are three fragments three pairs of plates can sometimes be used with advantage. One of the nuts (the first to be applied) in this case lies within the medullary cavity.

The plates are constructed of spring steel. Bone grafts or boiled bone could be used similarly but in some ways would be less satisfactory.

The immediate strength of the union by internal and external plates was tested as follows :

A bone was broken in a particular way the force required being measured. The fragments were then united with external and internal plates and the original type of violence repeated, the force required for rebreaking being measured

The details may be omitted from this preliminary paper but the results may be noted. Three femurs which were fractured by forces of 2540, 2934, and 2799 inch pounds respectively were united by steel plates and again subjected to strain. Either inner or outer plate bent or the screw snapped at the following forces 100, 290 and 184 inch pounds respectively.

By using vanadium steel it is hoped to obtain plates three times as strong as this.

Clinical Cases.

We have attempted to make use of this new method in four cases.

1 case of ununited fracture of radius and ulna

2 cases of ununited fracture of tibia and fibula (one old compound with fracture of patella)

1 case of compound ununited fracture of femur (and patella).

We have not yet had an opportunity of trying the method for a fractured clavicle for which in many ways it would appear especially suitable.

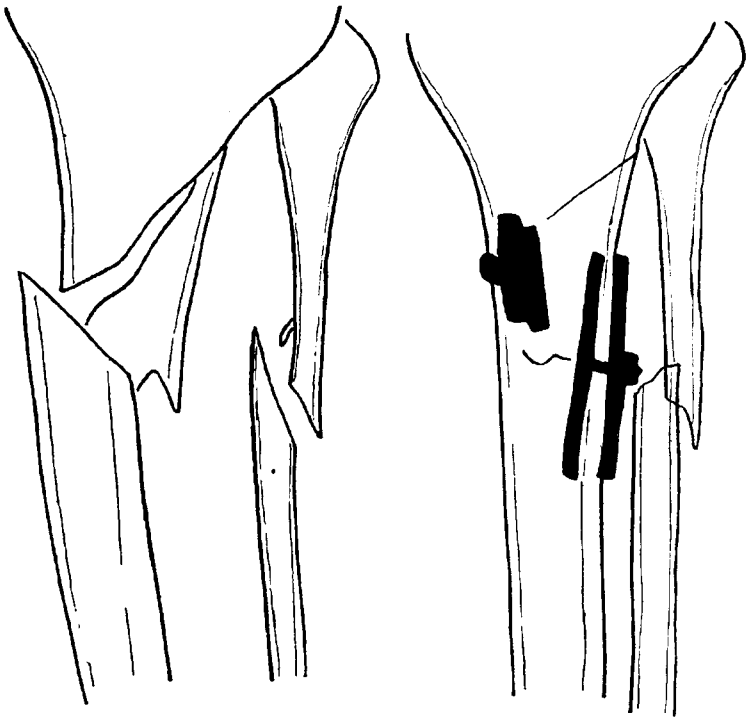
These four cases are not brilliant successes (except perhaps the second) but the cases were all difficult ones, the plates available were not of ideal size and special tools required were not available.

Moreover the cases are too recent to give the end results (or even the hospital results except in case 1 and 2).

CASE 1 Chan Wah (with Dr. Paterson). Male 58, ricksha coolie, ref. No. 165/26.

42 days before admission and 44 days before operation patient had been knocked down by a motor car and sustained a fracture of his tibia and fibula, the former being broken into 3 fragments. Back splint and foot piece and then an accurately fitting plaster of Paris

CASE I



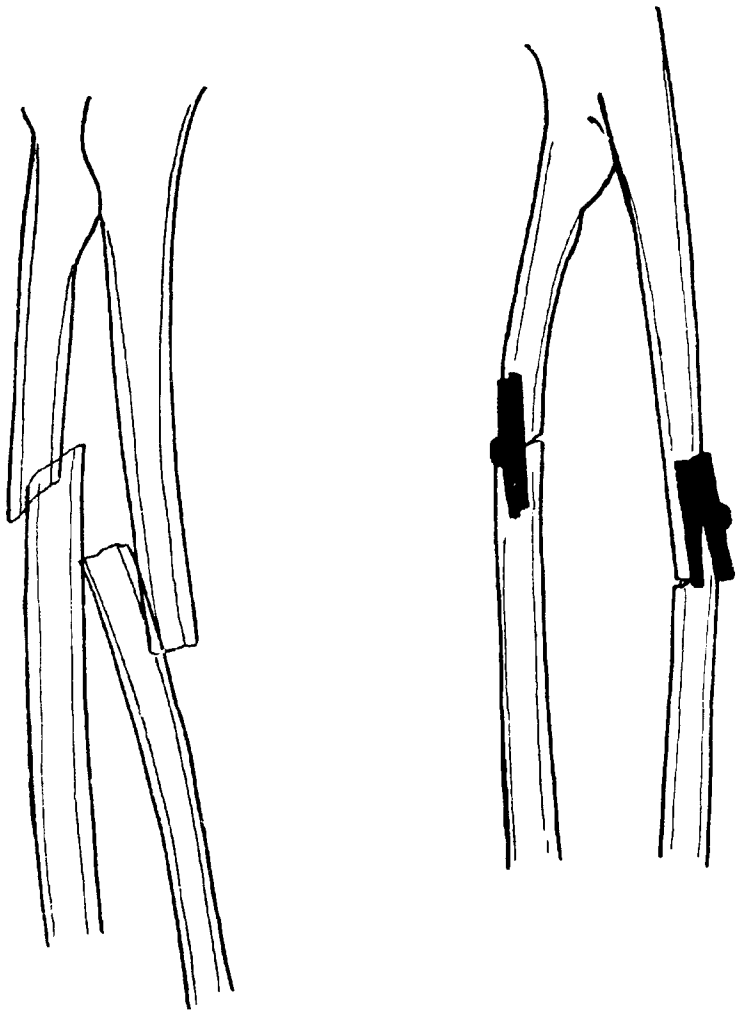
CASE I.—Antero-posterior views before and after operation—tracings of X-ray films.

had been employed but no union had taken place and the fragments were in bad position (X-ray Ia). On the 16th May, 1926 a U-shaped flap was turned up (the tip of this flap subsequently sloughed). The displacement was reduced but tended to recur on the slightest provocation. Large internal and external plates (mild steel) were applied to the antero-lateral surface and small internal and external plates (mild steel) were applied to the ant-medial surface. The latter was tightened first.

Plaster of Paris was applied for 3 weeks and then a back splint with foot piece and movements begun.

23/6/26. Not firm union. Some sense of give. Ant. lobe

CASE II



CASE II.—Antero-posterior views before and after operation—tracings from X-ray films.

hypophysis (B & W) 3 tablets daily and passive congestion 1 hour daily.

The patient developed severe beri-beri (absent knee jerks, mycardial degeneration and an extreme degree of oedema).

At present 17/8/26 position of fragments is good but consolidation is not complete. By the end of September patient was in good health and there was firm union in good position.

CASE 2 NG SHANG, M. 19, a scavenger (with Dr. Paterson). 30 days before operation the patient had fallen off his bicycle and fractured both bones of the forearm. Repeated attempts to restore good alignment failed. No union had occurred and it was feared that cross callus might form and prevent pronation and supination.

On the 19th May, 1926 a vertical incision was made along the back of the forearm, small internal with external plates (mild steel) applied to the radius and others to the ulna. The nuts were only screwed home after both had been applied. A plaster of Paris splint was applied for three weeks. 4 weeks after operation patient had full pronation and supination and was actively helping in ward work.

He was discharged well a few days later.

CASE 3 (With Dr. Valentine and Dr. McKenny). Failure owing to a sufficiently small internal plate not then being available.

On 3rd June Mr. K., a European, whilst riding a motocycle collided with a lorry and was thrown.

Compound fractures of the right tibia, fibula and patella (no separation of fragments) followed.

Repeated attempts at reduction under anaesthesia and once also with X-rays were unsuccessful and in spite of plaster of Paris splinting no union had taken place and the position was unsatisfactory.

On the 11th July, 1926 operation was performed. Both tibia and fibula were exposed by a vertical incision over the anterior tibial compartment. The fractures of tibia and fibula were at the lowest point of trisection and the internal plates of suitable strength then available were just too large. Further in attempting to attain end to end apposition a comminuted fracture was produced. Further projections hindering reduction were intentionally chipped away. End to end apposition was then secured and maintained by an ordinary short Lane plate on the antero-medial surface, most of the loose fragments being interposed.

Plaster of Paris was applied.

Firm bony union occurred.

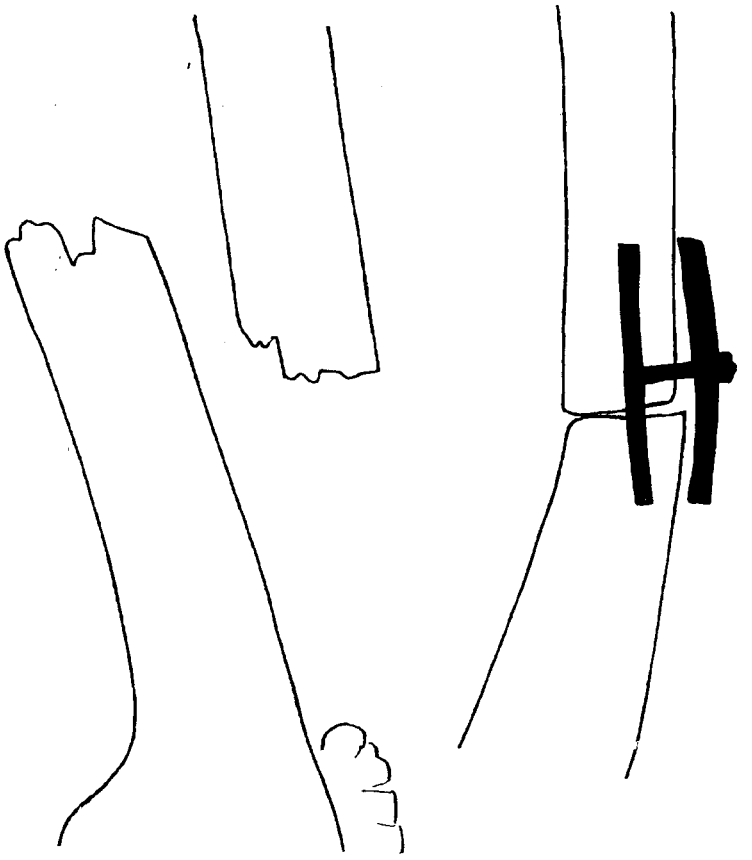
The failure to employ internal and external plates in this case was entirely due to the fact that I had not at that time had thin enough internal plates manufactured.

CASE 4 (With Dr. Valentine and Dr. McKenny).

Mr. S., a European sailor, fell 60 feet from the top of the mast onto the deck of his ship. He sustained open (Compound) fractures of femur and patella. The combination of injuries made the fracture difficult to treat and though the patella was comminuted with little separation of the fragments and healed well, fragments of the femur, as it transpired, had been driven widely apart into the vasti muscles and much soft tissue intervened between the ends.

After 8 weeks no union had taken place and the fragments were as shown in the X-ray. The wound on the thigh had only just healed. A provocative injection of boiled milk into the buttock caused a slight further discharge for a few days but no constitutional flare up. It was decided to take the risk of not waiting longer.

CASE IV



CASE IV.—Antero-posterior views before and after operation—tracings from X-ray films.

On the 22nd of July, 1926 the fragments were exposed and cleared with difficulty. It was only after a prolonged struggle with much angulation that the overlapping was overcome and the fragments brought end to end. The apposition even then was not quite accurate. The patient showed severe shock. Internal and external plates were applied. It would have been exceedingly difficult to apply a long femur plate as there was a slight ridge at the fracture

line owing to the imperfect alignment. The general condition contraindicated futher attempts at correction. A plaster cast was applied, (a window opposite the wound being cut later).

The temperature showed continuous slight irregularity from the day of operation. Three weeks after the wound burst discharging large quantities of grumous pus.

The wound was dressed with B.I.P.P. and the limb fixed in successive plaster casts. Well marked callus soon formed. By the middle of October the plate had slipped loose and was projecting from the wound and was easily pulled out. Consolidation is taking place but a sinus is still present.

The following advantages are claimed for this method :

(1) Ease and speed of application. Numerous holes do not have to be drilled and numerous screws inserted and tightened whilst the fragments are held in accurate alignment.

(2) The replacement of the fragments in correct position is sometimes facilitated by the inner plate acting as guide. Some oblique fractures recur at once when reduced. The internal plate may check this tendency.

(3) Stripping up of the periosteum is reduced. Risk of infection is diminished, its possible consequences lessened and there is not so much chance of delayed union.

(4) Fractures of parallel bones are more easily dealt with.

(5) The internal and external plates can be employed successfully near the extremities of bones where the compact tissue is too thin to afford a secure hold to screws.

A disadvantage would appear to be the removal of the inner plate in the few cases where this might become necessary. This presented no difficulties in case 4, a compound fracture operated on too soon, which went septic. (Since the paper was read further cases have been treated with internal and external plates. These will be recorded later. But it may here be remarked that we are now trying the plates in obviously septic compound fractures. By the time that sequestra and plates eventually separate a satisfactory involucrum has formed).

ENDOMETRIOSIS*

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Endometriosis is a term coined by John A. Sampson, of Albany, New York, and means the presence of ectopic endometrial tissue in various locations. A well known illustration is adenomyoma of the uterus. This condition was described simultaneously by von Recklinghausen and Cullen ; the latter being the first to demonstrate the fact that uterine adenomyomata are due to a direct invasion of the myometrium by the endometrial glands.

This did not, however explain the etiology of tumors having similar histological structures, and occuring in other ectopic situations. "Adenomyomata of the round, broad, and utero-sacral ligaments, of the recto-vaginal septum, umbilicus, and abdominal wall were described, and considerable discussion as to their cause has taken place. The controversary centered mainly around the wolffian or mullerian duct origin. In his book on Adenomyoma, published in 1908, Cullen, after giving the evidence pro and con, says : "It would be unwise to say absolutely that these growths cannot be derived from remains of the wolffian duct, but the evidence is overwhelmingly in favour of the muller's duct origin.

Except for the finding of endometrial like tumors in still other parts of the pelvis, no important contributions were made on the subject until 1921. In June of that year Sampson read his epoch making paper before the American Gynecological Society on Perforating Hemorrhagic (Chocolate) Cysts of the Ovary. At this time he advanced, and to the satisfaction of many really proved, the theory that some of these ectopic adenomyomata are implantation tumors arising from perforating hemorrhagic cysts of the ovary. He showed that these are of endometrial origin, and caused by the escape of menstrual blood, with small particles of endometrium through the fimbriated extremity of the fallopian tube, lodging in the ovary. The ovary seemed to act as an intermediary host or incubator, and when perforation of these hemorrhagic or chocolate cysts occurs, there are implantations of "Adenomyomata" in various parts of the pelvis.

This theory would not of course explain the presence of endometrium-like tumors that had been found in other ectopic situations, c.f. the round and utero-sacral ligaments, groin, subperitoneal growths, etc., that had been described in the appendiceal and intestinal wall. In 1922 Sampson suggested that some of these were probably true metastases through the blood or lymphatic streams.

*Read at the China Medical Conference in Peking, September, 1926.

It would seem from his recent publication in the autumn of 1925 that this is really proven.

As one might expect, Sampson's contribution has aroused considerable discussion, and in some quarters strong adverse criticism. Some at least, of these can be explained by a misunderstanding of the claims Sampson has made, and lead one to feel that these critics have not read with care his original articles. Let us see what Sampson has said, as summarized from his own writings :

From a diagnostic standpoint misplaced endometrial like tissue may be divided into three groups. The histologic structure and associated conditions of that found in the first group are such as to enable one to make a definite diagnosis of endometrial tissue. In the second group it can be ascertained that the tissue is not endometrial. Its structure is atypical, and the gland-like spaces have obviously been derived from inclusions of the peritoneal mesothelium ; or their relations to known remnants of the Wolffian body may be such as to indicate their origin from these. In the third group the diagnosis is uncertain, due to the small amount of tissue for microscopic study, its atypical structure and indefinite associations.

Misplaced endometrial tissue may be divided into four, possibly five groups, according to the manner in which this tissue has reached its ectopic situation.

The first group consists of ectopic endometrial tissue in the wall of the uterus, which has arisen from the direct invasion of the myometrium by the mucosa lining the uterus. This was first shown by T. S. Cullen. A similar condition occurs in the fallopian tubes from a like invasion of their walls by the mucosa lining their lumina.

In the second group implantation-like lesions, similar in their distribution to those of cancer, are found scattered throughout the pelvis. These lesions occur most frequently in the posterior cul-de-sac, on the posterior surface of the uterus, and broad ligaments, in the anterior cul-de-sac, and in other natural peritoneal folds and pockets.

Transplantation endometriosis constitutes the third group. Several instances have been reported of endometrial tissue developing in the scar of the abdominal incision after cesarean section, and also after other pelvic operations.

The fourth, and most interesting group includes extra-peritoneally misplaced endometrial tissue in the groin, vulva, and possibly some of those in the vagina, umbilicus, and in the pelvis. Should such lesions arise from the mucosa lining the uterine cavity or from peritoneal implantations, WE MUST CONCLUDE THAT THEY ARE TRULY METASTATIC AND REACHED THEIR PRESENT SITUATION THROUGH THE LYMPH VESSELS OR VEINS.

I do not know whether or not developmentally misplaced mullerian tissue occurs. If so, it would constitute a fifth group."

It is with this last statement that T. S. Cullen disagrees, for he has from the beginning ably championed the mullerian duct theory. In discussing the subject at the 1925 meeting of the American Gynecological Society, he says :

" Some ovarian, some recto-vaginal septum growths, some intestinal and appendiceal adenomyomata may owe their origin to transplanted uterine epithelium. Adenomyomata developing in the scars after abdominal operations are undoubtedly due to transplantations, they allow of no other interpretation. To summarize : The glands of adenomyomata of the uterus develop from the uterine mucosa. Adenomyomata of the round ligament and umbilicus appear to be due to embryonic inclusions. Adenomyomata developing on the peritoneal surface in or near the pelvis are still in " No Man's Land," with much evidence that they owe their origin to transplants."

Others criticize the implantation theory because they have never seen menstrual blood coming from the fimbriated extremity of the tube, do not believe it ever occurs during menstruation, and cannot conceive that viable endometrial epithelial cells are thus transported

to the ovary or pelvis. The answer is that Sampson has seen this more than once while operating upon menstruating women, and positive evidence has always been considered of greater value than negative. Quoting from his closing remarks :

I have observed at times that blood is present in the peritoneal cavity of these (menstruating) women and that it is coming through the fimbriated opening of the fallopian tube. I have demonstrated epithelium and "stroma" in the lumen of the tube. This tissue is probably of uterine rather than tubal origin and it looks healthy. The patient was menstruating at the time of the operation and blood was escaping through the fimbriated end of the tube. If, when walking through the woods, we observe little oak trees, and on looking up see a large oak tree above us we might believe that the smaller trees came from that. It is possible that the acorns may have been brought from another portion of the woods by a squirrel. It is difficult to prove their exact origin because we did not plant the acorns. I think that a somewhat analogous condition exists in some of these implantation-like lesions observed in situations easily soiled by menstrual drippings from the fallopian tube.

In support of his metastatic theory to explain certain of the extra-peritoneal growths, he shows sections with endometrial tissue lying free in the lumen of vein or lymph vessel of the uterine wall.

M. R. Robinson attacks Sampsons work with this rather vitrolic statement : "With all deference to Sampson's attainments these teachings excel any of the previous histogenetic theories in pathological causistry and phantasy." Robinson laboriously develops another histogenetic theory in which he claims that : "The genetic source of all adenomyomas irrespective of location is the coelomic epithelium." Thus attempting, without great success, to explain all varieties by one inclusive theory. Ewing, whose pathological ability must command our attention, wisely says :

Anyone who is familiar with the structure of the pelvic tissues, will realize that this region is a regular potpourri of tissue abnormalities of various types. Here we see metaplasias of the intestinal and of the peritoneal lining cells. Nearer the uterus and tubes we frequently see tissue rests which I feel it is impossible to interpret and which have never been successfully interpreted or classified by anyone. Theories we have, but the attempt to identify all the epithelial inclusions in this region I think is impossible. . . . They are extremely numerous and I think no one theory can explain them all. Besides the intestinal and peritoneal epithelium, many other adult and embryonal structures may give origin to epithelial rests in the pelvis. The postanal gut, neurenteric canal, mullerian duct, parovarium, urachus, and bladder are all to be regarded as possible sourses of epithelial rests. The wolffian origin of such rests has become less popular in recent years. It would be a mistake and unfair to Doctor Sampson if his followers should attempt to apply this doctrine, which he has established, in my opinion beyond doubt, indiscriminately to the whole field."

Sampson does not claim that the adenomyomata found in the center of utero-sacral ligaments, round ligaments, umbilicus and under the intestinal and appendiceal peritoneum, are implantations, and yet that is just what some of his critics seem to think he does say.

This whole question has attracted considerable attention in the literature, particularly in Germany and America, also in Great Britan, where for years Lockyer, Blair Bell and Donald have been interested in it. There was a symposium on the subject at the 1925 meeting of the American Gynecological Society, the papers with a

most stimulating discussion being published in the American Journal of Obstetrics and Gynecology for November, 1925. The reader is referred to the bibliography herewith appended for the original articles from which much of the material was obtained in the preparation of this paper.

I am greatly indebted to Doctor H.B. Rollins of our Pathological department, for his enthusiastic co-operation and help in the pathological examinations of our specimens. To our artist, Mr. Yeh for the illustrations, and particularly to Professor J. Preston Maxwell, of the Peking Union Medical College for his kindness in having microphotographs and lantern slides made.

Time and space do not allow us to go into great detail concerning the gross and microscopic description of endometriosis, so we shall confine ourselves to the histo-pathological aspect of this condition.

The microscopic picture of endometriosis, whether it be in the uterus, ovary, broad ligament or cul-de-sac, is essentially the same. The most interesting and striking picture is that encountered in the ovary ; there we find small fissures and crypts or pockets lined with tissue of endometrial type. The lining cells vary from a medium tall columnar to a cuboidal type, depending upon the degree of cystic change present in the tissue. In some cases of Chocolate cyst we find the lining composed of several way layers of leuten cells, capped here and there with columnar cells ; the nuclei may be centrally placed, the more often they are basally. If one follows this tissue by serial sections, a narrow tract may be found leading to the surface, to the point of rupture. In other cases the cells are arranged in glandular form ; these may either rest directly on the ovarian substance, or be surrounded by a richly vascular stroma, creating a picture similar to that of normal uterine endometrium. A smaller group of cases are those in which the cyst wall is composed of ovarian tissue without the vascular stroma ; these are lined with a single layer of cuboidal cells, which may be absent at the point of perforation. These cases are difficult to recognize unless other lesions confirm our suspicion.

The outstanding features of the secondary implantations are in every way similar to the above description, consisting of gland-like structures lined with columnar or cuboidal cells. These may occur as single discrete glands, or as islands or pockets ; they may stand out on the surface as small nodules, or puckering the surface, may dip down and invade the tissues. The picture does not markedly change; it shows the glands either surrounded by cellular stroma, or resting directly on the invaded tissue. The contents of these endometrial structures consist at times of a substance resembling old menstrual blood, at others of a fine amorphous granular material, depending upon the phase of the menstrual cycle. The cells follow in general the law of Specificity of Tissue : once endometrium, always endometrium.

The illustrations herewith appended render further description unnecessary. Our own cases furnish examples of endometriosis of the uterus, (adenomyoma), of the ovary, and implantation endometriosis on the peritoneal surface of the uterus and pelvic floor. So far we have had no cases of transplantation or extra-peritoneal endometriosis.

From a clinical point of view adenomyoma of the uterus is well known ; Cullen established its clinical entity years ago, and to many gynecologists its diagnosis is quite clear. It is surprising therefore to see in Graves latest edition the statement : "Adenomyomata are not, as a rule, of great clinical importance. They do not often grow to a size large enough to produce serious symptoms unless the tumor is a polypoid growth into the uterine canal." As a matter of fact this manifestation is really rare, though serious symptoms do not depend upon its occurrence.

The presenting symptoms are : Menorrhagia and menstrual pain, often of a severe, grinding type. Most patients notice a gradual lengthening of their periods, with increased flow. Intermenstrual bleeding is not common, unless there is submucous involvement, or a co-existing myo-fibroma. Cullen claims that sterility is not frequently a symptom, though Sampson reports that 9 out of 15 of his cases were sterile, and of the six who had borne children, only three had more than one child. It must be remembered however that Sampsons cases had adhesions from implantation endometriosis, while Cullen is speaking of uncomplicated adenomyoma of the uterus. Of the six cases herewith reported, 2 were unmarried and nulliparous; 1 uncomplicated adenomyoma of the uterus had three children ; 2 with implantation endometriosis and myofibroma were nulliparous ; 1 had one child 9 years before admission.

Most of the cases are from 30-50 years of age ; it is rare after the menopause, and is not associated with carcinoma.

In a young woman in the childbearing period, free from inflammatory disease in the pelvis, giving a history of gradually increasing menorrhagia, accompanied by pain in the uterus at the time, having a moderately enlarged and freely moveable uterus, Adenomyoma is the most probable diagnosis. Glandular hyperplasia of the endometrium may be differentiated if necessary by curettage. If the symptoms are sufficiently severe, hysterectomy, with preservation of the ovaries, is the treatment.

In implantation endometriosis the symptoms are due principally to the adhesions formed, and to the tension in the endometrial implants during menstruation. The pain due to the former is apt to be more or less constant, to the latter, only during the period. It must be remembered that the endometrium in the implants, wherever it be, goes through the same cycle as do the cells in the normal uterine lining. The chocolate cysts are merely accumulations of menstrual blood confined in these closed off "minature uterine cavities."

The adhesions formed in the pelvis when one of these chocolate cysts ruptures, or when menstrual blood from the fallopian tube soils the peritoneum, are exceedingly dense. One is impressed by this at operation, they cannot be separated as can inflammatory adhesions in a line of cleavage. There is no line of cleavage, instead there is a dense, invasive glueing together of the surfaces, and sharp dissection is necessary for their separation. The severity of the symptoms depends upon the extent and location of the adhesions. In one of our cases previously reported the adhesions, plus the implantations on the small bowel at the ileo-cecal junction caused intestinal obstruction.

When the implantation is at the recto-vaginal septum, pain on defecation is complained of, and on rectal examination a hard nodule involving the bowel wall is found. This may strongly suggest malignancy, and only at operation can this be ruled out ; even after opening the abdomen, unless the operator is familiar with implantation endometriosis, this mistake will be made. The induration, the invasion, and the fixation of the organs involved in the adhesions, all arouse ones suspicions of malignancy. The history, age of the patient, and the finding of even small chocolate cysts, which are so characteristic, usually enable us to make a correct diagnosis. Of course the pathologist gives us the last word.

Complete removal of the affected parts when practicable, and invariable removal of the ovaries usually assures a cure. Implantations deeply involving the bowel, etc., should be left in situ, it having been found that these give no further trouble if the ovaries are removed. The reason for this being that the implanted endometrium will remain quiescent, or atrophy if there is no activating ovarian hormone.

In the China Medical Journal for February, 1926 I reported two cases treated in the Hunan Hospital during the preceding year. Up to that time Myoma of the uterus was one of the most infrequent of our gynecological conditions, and no cases of Adenomyoma or other endometriosis had been diagnosed. Since then, within the first six months of 1926, we had six more cases of endometriosis ; two of the uterus, adenomyoma, and four of implantation endometriosis. All of them except one was associated with Myo-fibroma of the uterus. These cases are reported herewith in some detail, and lantern slides of the micro-photographs illustrate the findings.

Case Reports.

Miss H. American, single, Age 42, Ad. No. 25-1886, Disch. No. 7680, Admitted Dec. 11, '25. Disch January 1, 26.

Chief complaint : Excessive and painful menstruation.

Past History : Negative, except for an operation 20 years ago for abdominal pain. (right tube and ovary removed).

Menstrual : Onset at 13, interval 25-28 days, duration 3-5 days. No pain. Two years ago had one excessive period.

Present Illness : Since January 1925, or about one year, periods have frequently been overdue and painful. January period six weeks late, with cramps and very free flow. April period six weeks late, with menorrhagia and pain for two days. June and July regular. Amenorrhea during August, and up to September 26, (ten weeks). This period lasted 12 days, with hemorrhage for 5 days. Was free from flow for 10 days, followed by sudden and severe hemorrhage lasting ten days, with four more days of moderate flow. A free interval of 10 days, then five days of bleeding, very severe during the first three. No bleeding now since November 22, *i.e.* 19 days before admission.

Physical examination reveals nothing of importance. Hemaglobin 95%. Pelvic examination reveals a freely moveable uterus enlarged to twice its size, globular and symmetrical. Pre-operative diagnosis : Myoma uteri.

Operation December 12, 1925. Ether. The omentum is found adherent to the parietal peritoneum under the medial line incision, and to the fundus of the uterus. There is a left sided hydrosalpinx adherent to a cystic left ovary. The uterus is enlarged to twice its size, and is the seat of multiple myomata. The bladder is densely adherent to the anterior uterine wall. The right tube and ovary are missing. Appendix strictured from old inflammatory reaction, it is removed. Classical hysteromyomectomy done, with removal of the left tube and cystic ovary. Pathological report No. 676. Diagnosis : Multiple myo-fibromata. Adenomyoma uteri.

Convalescence uninterrupted, discharged well on January 1, 1926.

C.Y.S., Chinese, Married, aged 47 ; Ad. No. 98 ; Disch. No. 7851. Admitted to hospital January 20, 1926, complaining of a mass in the lower abdomen. Past history negative except for menstrual and the present illness. Married 30 years ago at the age of 17. No pregnancies.

Menstrual : Onset at age of 13, regular every 30 days, lasting 5 days, and quite normal up to 20 years ago. Since then the flow has become more and more profuse, and there has been some pain during menstruation. She has had some yellowish, offensive discharge for about 5 days after each period.

Present illness : One year ago patient noticed a round, hard mass in the superpubic region, associated with some discomfort in the right lower abdominal quadrant for the past 4 months.

Examination reveals a smooth round tumor arising from the pelvis reaching to the level of the umbilicus. It moves readily from side to side, but cannot be lifted out of the pelvis. Cervix is short and flattened out, smooth and nulliparous. Mass in the pelvis is continuous with the mass felt above. There is no tenderness.

Diagnosis : Myoma uteri.

Operation January 21, 1926. Ether.

Multiple pedunculated sub-serous myomata are found on the fundus of the uterus, which is enlarged to the size of a grape fruit, and jammed down in the pelvis. The right tube and ovary are adherent to the posterior surface of the uterus, and to the pelvic floor. On releasing these dense adhesions, dark, chocolate colored blood escapes. Left tube and ovary likewise adherent. Hystero-myomectomy and bilateral salpingo-oophorectomy done with considerable difficulty, owing to the density of the adhesions binding the tumor mass to the pelvic floor. There are remnants of the chocolate ovarian cysts left attached to the rectum and floor of the pelvis.

Operative diagnosis: Myomata uteri, Chocolate cyst right ovary, Endometriosis (implantation) uterine wall and pelvic floor.

Convalescence normal, and patient discharged well on February 6, 1926.

Pathological report No. 707: Myomata uteri, Implantation endometriosis ovary and posterior uterine wall.

S.L.S., Chinese, Married, Aged 44. Ad. No. 333. Disch. No.

Admitted to hospital March 10, 1926.

Chief Complaint: Excessive menstruation; Intermenstrual bleeding; Pain in the lower abdomen.

Past History: Negative. Married 20 years ago at the age of 24. No pregnancies.

Menstrual: Onset at the age of 15, regular every month, duration 5-6 days. Moderate flow and no pain or irregularity up to the present illness.

Urinary: Arises 3 or 4 times at night to void, no polyuria or dysuria.

Cardio-respiratory: Some dyspnoea and palpitation on exertion. No swelling of the extremities.

Present Illness: Three years ago patient had a severe attack of bleeding during one of her periods: this lasted over an hour, and was increased on sitting up. No pain at this time. Ever since them she has had irregular bleeding lasting 3 or 4 days at intervals of 15 to 30 days. During the past year she has had severe pain in the lower abdomen, sometimes associated with bleeding, sometimes not. This morning, March 10, she had severe bleeding lasting an hour. She has acquired the opium habit on account of pain, and now smokes 8 feng a day.

Examination: There is a definite mitral murmur transmitted to the axilla.

The abdomen is prominent below the umbilicus, as the patient resists, it is difficult to make a satisfactory examination, but there seems to be a pelvic mass reaching nearly to the umbilicus. In the left inguinal region there is a soft smooth tumor the size of a walnut, probably a lipoma. (This turned out to be a bit of omentum adherent in the inguinal canal).

Vaginal outlet nulliparous ; cervix smooth, flattened out and shortened. It shades off to a hard globular uterine mass, fixed in the pelvis, though on account of patients resistance, this cannot be well outlined. One is impressed with the fixation of the pelvic mass, attempts to move it being painful and futile.

Diagnosis : Chronic Pelvic Inflammatory Disease, with adherent tubes and ovaries.

Myoma uteri, possibly associated with implantation endometriosis.

Urine : R.B.C. Trace of albumen. (Voided specimen)

Stools : Ascaris

Blood : Hb. 40% R.B.C. 2,436,000 ; W.B.C. 3,700 ; P.M.N. 66%.

Sputum : Negative for Tubercle bacilli.

Operation, March 13. Ether.—Thickened omentum found adherent in the left inguinal canal. Left hydrosalpinx adherent to the ovary and pelvic floor ; the right tube and ovary are likewise adherent. There is a globular myomatous uterus, enlarged to the size of a small grapefruit filling the pelvic cavity, into which it is tightly wedged and densely adherent. There is a walnut sized subserous, pedunculated myoma on the anterior uterine wall. The bladder is drawn high up on the anterior parietal peritoneum. With great difficulty, and by sharp dissection the pelvic mass, consisting of myomatous uterus, adherent tubes and ovaries, is freed, and the cardinal vessels ligated and cut. The left ureter had been drawn up on the left side, and was accidently tied and cut along with the ovarian vessels. The patient was not in good condition, so we decided to let bad enough alone, and did not try anastomosis. Uterus, tubes and ovaries, or what was left of them, removed en bloc.

Specimen : A globular myomatous uterus, amputated at the internal os ; there is a walnut sized subserous pedunculated myoma on the anterior surface. There is a hydrosalpinx, left, size of a small egg, and adherent to the ovary. The right tube is adherent to the right ovary, which contains a pea sized chocolate cyst. The fundus of the uterus, where it had been adherent to the pelvic floor, presents a puckered appearance, and two or three shot sized chocolate colored areas, characteristic of endometrial implantations. This area is well away from the inflammatory adhesions involving the tubes, and the adhesions are quite different, being much more dense.

Pathological report No. 751 : Hydrosalpinx, with chronic inflammation ; Myomata and Adenomyoma uteri ; Endometriosis of ovary and tube.

Convalescence complicated with pyonephrosis requiring nephrectomy. (left). Discharged well on June 7, 26.

Miss M... American, age 37. Discharge No. 8263, admitted to the hospital March 28, 1926. Complaint : Menorrhagia and dysmenorrhea for 3 years. Menstruation began at age of 12, and was

normal and regular up to present illness. The interval was 28 days, lasting 3 to 4 days, no pain and moderate flow. P.I. During the past three years her periods have become more painful, interval q 20 to 23 days, and the flow much more profuse; the duration has increased to 7 days. Her last period began March 6, lasted until the 13th, very free. Flow started again on the 19th and kept up for a week. Otherwise history unimportant.

P. E. Hymen intact; Uterus lies deep in the pelvis, enlarged to nearly double its normal size, retroverted and tender. The fundus is in the cul-de-sac and cannot be outlined. Diagnosis: Adenomyoma.

Operation March 29, ether, median line incision. The omentum is found adherent to the posterior uterine wall and to the right cornu. Uterus is retroverted and densely adherent in the cul-de-sac; there is a hard nodule where the cervical portion is adherent to the rectum. The right round ligament is densely adherent to the cornu and turned back on itself figure S shape. Both ovaries are adherent to the posterior uterine wall, and contain small shot sized chocolate cysts. Sharp dissection is necessary to free the uterus, the density of the adhesions and their hardness reminding one of malignancy. The ureters are identified, cardinal vessels ligated, and the uterus, posterior lip of the cervix, both tubes and ovaries removed.

Pathological report showed: Myomata uteri, (2) Implantation endometriosis on the posterior surface of the uterus. Discharged well on April 18, 1926.

Mrs. L. . . Chinese, aged 29. Discharge No. 7976, admitted to the hospital February 19, 1926. Complaint: Menorrhagia and dysmenorrhea for 3 years. Menstruation began at 15, regular q 26 days, duration 3-5 days moderate flow and no pain up to the P.I. Married in 1918: eldest child born 1920, living and well. Second 1922, living and well. Incomplete abortion 1923, followed by dilatation and curettage. Youngest child born 1924, living and well.

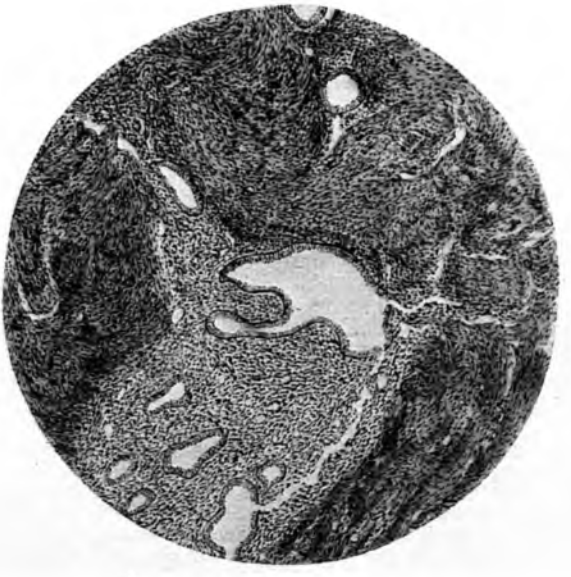
Present illness: During the past three years her periods have become much more painful, and the flow very profuse. The interval and duration, 3-5 days have remained the same. Recently the dysmenorrhea and menorrhagia have been disabling. History otherwise unimportant.

Physical Examination. The uterus lies in the cul-de-sac, markedly retroflexed, and slightly larger than normal. No tenderness, adnexae normal. Diagnosis: Retroflexion with passive congestion of the uterus.

Operation February 20, ether. Median incision, the uterus is sharply retroflexed, and the fundus lies in the cul-de-sac, readily brought forward. On the anterior surface at the cornu, the peritoneum is red and roughened, as is the bed on the pelvic floor from which it was raised. There is a round hard tumor, size of a silver

The above drawing is made from a section taken from the wall of the uterus well away from the inner surface. The section is composed of well defined glands similar to those in the endometrium which are surrounded by a wide zone of stroma cells like those seen in the inner layer of the uterus. There is no evidence of malignancy. The basal membrane is intact and no mitotic figures are made out.

Diagnosis Adeno-myoma of Uterus. Endometriosis.

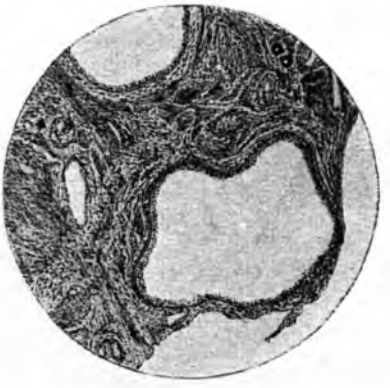


The above drawing was taken from a section from the ovary. The ovary contained a chocolate cyst and on the outer surface were numerous adhesions. Scattered thru the ovary were numerous fields which contained glandular tissue surrounded by stroma cells like that seen in the endometrium. The glands were of the same type as those seen in the uterus. No cilia were made out. One was able to follow the glands from the inside of the ovary to the periphery and for a short distance on the periphery. This area corresponded to the area where the adhesions were seen grossly.

Diagnosis Chocolate Cyst. Endometriosis.

The above drawing is made from a section taken thru the broad ligament near the uterus. The section is composed of typical bundles of muscle fibers and several large blood vessels. Scattered thru the section are numerous glands lined by a single layer of tall columnar cells whose nuclei are situated basally. A few of the cells have cilia. This section was cut so that there is no possibility of one having included any of the endometrium.

Diagnosis Endometriosis of the Broad Ligament.



The above drawing is made from a section taken thru a small cystic nodule on the posterior surface of the uterus. The section shows several gland like structures which are lined by a single layer of medium tall columnar cells. The nuclei of the cells are for the greater part located at the base of the cells. A few of the cells had cilia. The glands are surrounded by typical bands of muscle. In one field there was a single gland which stood out clear except at the point of attachment from the uterus. These glands were not surrounded by any endometrial stroma.

Diagnosis Implantation on Uterus Endometriosis.

The above drawing is made from a section taken from an irregular nodule in the wall of the uterus. The nodule was composed of numerous gland like structures which were surrounded by a stroma similar to that seen in the endometrium. The glands themselves are lined by a single layer of medium tall columnar cells. The nuclei of the cells are located at the base. The lining cells are quite regular and in no place was the basal membrane broken. No mitotic figures were seen.

Diagnosis Adeno-myoma of Uterus.

dollar in the uterine wall at the cornu, projecting about one cm. above the surface. Thinking this is a discrete myoma, an attempt is made to shell it out from the surrounding uterine tissue. It is found to be a diffuse adenomyomatous area, with no line of demarcation. The cut surface plainly showing the typical whorls and endometrial glands in section. The cardinal vessels are ligated, and the uterus amputated at the level of the internal os. Hysteromyomectomy.

Pathological report: Adenomyoma. (Uterine endometriosis).

Discharged well on March 6, 1926.

Y.W.S., Chinese, Married, aged 38, Ad. No. 912, Admitted May 24, 1926

Chief Complaint: Pain in the lower abdomen.

Past History: Married 10 years ago at the age of 28. One pregnancy terminated in still-birth 10 years ago.

Menstrual: Onset at the age of 14, regular every month, 4 days duration, free flow. Since child-birth periods have been irregular, coming only once or twice a year, scanty, and very painful.

Present Illness: During the past 9 years patient has had severe, paroxysmal attacks of pain in the lower abdomen preceding menstruation; this is relieved after a gush of dark menstrual blood. During the past year the pain has lasted longer, 7 days preceding the flow; has had pain now for a week, and the flow started this morning. Preceding period five and a half months ago, lasting ten or more days.

Examination: General physical examination negative.

Abdomen: There is a round, smooth mass above the symphysis, reaching nearly to the umbilicus. On vaginal examination the cervix is found flattened out and the pelvis filled with a hard ball-like uterine tumor This is continuous with the mass felt above, and extends into the cul-de-sac, where it is densely adherent. Rectal examination reveals dense adhesions at the recto-vaginal septum.

Diagnosis: Adenomyoma of the uterus, with recto-vaginal implantations.

The unusual menstrual history is difficult to explain.

Operation May 26. Ether.—Two sausage shaped hydro-salpinges are found riding on top of a myomatous uterus; the left one lightly adherent to the posterior uterine wall. The right one, with its ovary, densely adherent to the posterior of the uterus and the pelvic floor. The uterus is enlarged and chokes the pelvis, "frozen" in the cul-de-sac, and can only be released by sharp dissection. (The contrast between these adhesions and the light, easily released inflammatory ones encountered above, is marked). In freeing the uterus and right tube and ovary, about 3 cc. of dark chocolate colored blood escapes from a ruptured hemorrhagic cyst of the ovary. The parietal peritoneum is densely adherent to a spot on the fundus. One is impressed with the extreme density of these adhesions, and

the fact that sharp dissection is necessary for their release. The ureters are identified and avoided, and classical hystero-myomectomy, with removal of the adnexae done.

Pathological report No. 830: Endometriosis of the Uterus, (implantation), Tube, and Ovary.

Myoma uteri.

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ENDOMETRIOMA INVOLVING THE RECTUM

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Abstract.

(The complete paper will be published in the American Journal of Obstetrics).

Tumours containing typical endometrial tissue frequently invade the wall of the rectum or sigmoid colon. It would be expected that with extensive growths, menstruation or bleeding per rectum would be fairly common but the author has only found three cases in the literature. Brief abstracts of these cases are given. Miles adds the history of another case, a Chinese woman aet 42, with a mass in the lower abdomen, and periods of haemorrhage into the rectum occurring at the menstrual period but only once in two or three months.

The ovary at operation was filled with a number of cysts containing dark brown material. Both tubes were patent, and in the middle of the right tube was a spindle like thickening. The uterus was enlarged. The sigmoid was extensively involved, and to have removed the whole growth, would have meant resecting the sigmoid. Both tubes, ovaries and uterus were removed and all contained adenomyomatous growth. The patient made a good recovery, and after 14 months was perfectly well, without any pain or bleeding.

Miles discusses the pathological findings in this case and then goes on to describe a second case, an American woman, act 34, who came into hospital for dysmenorrhoea, pain on defecation, and constipation.

At operation a soft haemorrhagic mass filled the cul de sac. This was removed with the uterus, but the tubes and ovaries were left. Microscopical sections showed an endometrioma involving the posterior surface of the uterus, and the sigmoid. The patient returned after a month with pain and induration in the vaginal wall and rectum, and an indurated tender mass on the right side. She was treated with radium, a dose of 2205 mg. hours being given. Seven months after she had lost her symptoms, and was well.

Miles concludes that in dealing with adenomyomata that have penetrated beyond the uterine tissue, and in ectopic endometriomata with numerous adhesions to adjacent organs, in which it is impossible or inadvisable to remove the entire new growth, the removal of all ovarian tissue, is the sine-qua-non of successful treatment.

A *bibliography and Illustrations* are added.

"PHARMACEUTICAL STERILIZATION"

JOHN CAMERON, PH.C., F.C.S., Member of the Pharmaceutical Society of Great Britain.

During the past few months the writer has been repeatedly requested to supply information on the subject of the sterilization of solutions intended for hypodermic, (intravenous or intramuscular) injections. There appears to be some difficulty in the minds of medical men in China as to how best to sterilize apparatus and solutions, especially alkaloidal salt solutions, for example solution Cocaine hydrochloride. In these notes we will endeavour briefly to state the more salient facts regarding pharmaceutical sterilization in the hope that these may prove of some service to the various hospitals scattered throughout China.

The term sterilization, as used in medical or pharmaceutical practise, means a process whereby the destruction or removal of all microscopic living organisms and their spores is accomplished. Some bacteria, under certain conditions, undergo a transformation into a resting stage, when they are called spores. In the spore state they are able to resist influences which would kill the bacteria. Most disease-producing bacteria do not form spores and are therefore comparatively easily killed—the anthrax and tetanus bacilli are however exceptions.

Dry Heat Sterilization.

Apparatus.—In the sterilizing of apparatus (test tubes, flasks, etc.) dry heat should be used. Heating these in a hot air oven at 160° C. (320° F.) for one hour will destroy all known bacteria and their spores. Before exposing any glassware to this heat it should be thoroughly dried. It is better perhaps that the object to be sterilized should be wrapped in paper so that it may easily be removed and stored in a sterile condition. Slight charring of the paper is not objectionable, in fact, this is an indication that the proper temperature has been reached. This method may be used for the sterilization of petrolatum, fixed oils, lard, and some powders, such as talcum powder, boric acid, zinc oxide, etc. These powders should however be spread out in a thin layer so that the heat may penetrate. A quick way of sterilizing petrolatum and fixed oils is to heat the container which has the oil on a sand bath directly until the temperature of the oil is about 200° C.—then withdraw the source of heat and protect the sterilized oil from contamination.

Glycerine should not be heated above 150° C.—above this temperature acrolein may be produced—but by maintaining a steady temperature of 150° C. for thirty minutes the glycerine will be sterile. In using the hot air oven or any modification of it the oven should be allowed to cool to about 60° C. before removing the sterile glassware. It is advisable to observe this rule otherwise damage to the contained glassware is inevitable. The hot air oven cannot and should not be used for the sterilization of surgical dressings or other bulky masses of fabric. The power of penetration of dry heat at 160° is not sufficient to cause the mass to be sterile throughout.

Moist Heat Sterilization at 100° C.—This process entails the use of live steam and any suitable apparatus may be used to generate steam. For preference an Arnold steam sterilizer is the best piece of apparatus we know. Line drawings of this apparatus with prices may be seen in the Catalogue of the Arthur H. Thomas Company. By this process sterilization is sometimes continued for from thirty minutes to one hour. Fractional sterilization is however to be preferred, because many substances are altered chemically or physically by being subjected to steam heat for a full hour. In fractional sterilization the substance is heated in live steam, after the temperature has been raised to 100° C. for fifteen minutes each day on three successive days, the substance being kept during the resting period between the heatings at a temperature of approximately 20° C.

This ensures the destruction of all spores. Care should be exercised in packing the substances or pieces of apparatus into the sterilizer ; they should not be packed too closely together.

Autoclaving.—Most of our hospitals in China depend upon this method of sterilizing all kinds of surgical dressings, instruments, etc. Pharmaceutically the autoclave can only be used for the sterilization of solutions of stable salts—normal saline, etc. We append

herewith a table of pressures and temperatures for " Saturated Steam " which may be useful where autoclaves are in use. The rapidity with which complete sterilization is attained is determined by the pressure of steam employed. A pressure of ten pounds (Temp. 115° C.) is fatal to both bacteria and spores in fifteen minutes —whilst thirty pounds pressure (Temp. 135° C.) is effective in ten minutes.

TABLE I.

Pounds pressure	Degrees F	Degrees C	Pounds Pressure	Degrees F	Degrees C
0	212	100	12	244	117
2	218	103	14	248	120
4	224	107	16	252	122
6	230	110	18	255	124
8	235	112	20	259	126
10	239	115	22	262	128

Low Temperature Pasteurization.—This process is practically the same as Fractional sterilization already described, except that the maximum temperature maintained is from 60° to 70° instead of 100° C. Substances to be sterilized by this method are heated on six, not three, successive days for from thirty minutes to one hour each day at say 65° C. and during the resting stage between the heatings they should be kept at approximately 20° C. (68°F.) Professor J. W. H. Eyre recommends this method of sterilization where convenient. The object of alternating cool periods is to induce the spores to germinate and so assume the vegetative form, thus rendering them susceptible to the temperature used. He suggests a maximum temperature of 56° C.

This method of sterilization is the one which should be employed, when circumstances permit, in the sterilization of all alkaloidal salt solutions and in fact solutions of organic salts of any kind which are known to be decomposed by heat. It causes some inconvenience and owing to the six day's delay before sterilization is complete is not a very common method of sterilization in hospitals to-day. However this is the ideal method of sterilizing solutions of cocaine, morphia, adrenalin, etc. and the one which should be adopted by our hospitals if proper sterilization is required, without any anxiety about the breaking down of the alkaloid or organic salt in the solution.

Sterilization by Filtration.—This is a method of sterilization which cuts out the use of heat, there is no risk of alteration in the character of the filtered product, and, what in some cases is very important, the micro-organisms are actually removed from the filtrate. Various kinds of apparatus are on the market for this method of sterilization but the principle is the same in them all. Filtration takes place through a " Candle " which may be either of unglazed porcelain (Chamberland and Doulton Types) or of keiselguhr (Berkefeld type). In all cases the candle, receiving vessels, glass and rubber connections must be sterilized before use. The

rate of filtration may be hastened by using some method of reducing the pressure in the receiving vessel. For fuller particulars we would refer readers to the monographs in the U. S. P. National Formulary or Bentley (3).

We append herewith Table II, which gives a list of some special alkaloids, etc. with temperatures at which they may be sterilized according to Lesude.

TABLE II.

METHODS OF STERILISING HYPODERMIC INJECTIONS ACCORDING TO LESUDE (1)

The following tables show the methods of sterilising the hypodermic injections most frequently employed :—

(*a*) Sterilisable in the Autoclave at 115° for fifteen to twenty minutes :—

Adrenalin	Gelatin (twice or thrice)	Morphine
Benzoate (sodium)	Guaiacol	Novocaine (hydrochloride of)
Caffeine	Heroin	Pilocarpine (salts of)
Cocaine (hydrochloride)	Holocaine	Quinine (salts of)
Codeine (salts of)	Magnesium (sulphate of)	Sera (artificial, nonphosphatic)
Creosote	Mercury (salts with mineral acids)	Strychnine (sulphate of)
		Stovaine.

(*b*) Sterilizable at 100° C :—

Aconitine (salts of)	Emetine (Hydrochloride of)	Methylene Blue
Adrenalin		Physostigmine (salts of)
Apomorphine (Hydrochloride)		Scopolamine (hydrochloride of)

(*c*) Sterilizable by Tyndallisation (four to five times at 60° to 70°) :—

Aristol	Ergotinine
Chloral	

(*d*) Sterilizable by filtration through a Chamberland filter :—

Glycerophosphate (of Calcium)	Salt solution (isotonic)	Vaccine
	Sera, Therapeutic	Waters, Mineral.
Organic Extracts	Tuberculin.	Yeast

(*e*) To be prepared with aseptic precautions :—

Aconitine (crystalline)	Ichthyol	Mercury (most salts with organic acids)
Collargol		Oils (medicated)
Cholesterin		Protargol
Colloids (all)		Salvarsan.
		Neosalvarsan.

As a comparison we give herewith Table III which shows Remington's (2) idea as to the temperature he thinks best in *sterilizing* various pharmaceutical solutions.

TABLE III.

Substance in solution or suspension to be sterilized	Process	Temperature
Argyrol	Steam heat	100° C.
Atropine Sulphate	Low heat or filtration	60-70°° C.
Caffeine and Sodium Benzoate ...	Low heat or filtration	60°-70° C.
Calomel in oil (5 per cent.)	Steam heat	100° C.
Camphorated Oil (10 per cent. in ampoules	Autoclave or steam heat	115° C. or 100° C.
Cocaine Hydrochloride	Low heat or filtration	60°-70° C.
Emetine Hydrochloride	Steam heat	100° C.
Ergot (aqueous solution)	Low heat or filtration	60°-70° C.

TABLE III.

Substance in solution or suspension to be sterilized	Process	Temperature
Eucaine Hydrochloride	Low heat or filtration	60°-70° C.
Mercury Benzoate	Steam heat	100° C.
Mercury cacodylate	Steam heat	100° C.
Mercury Salicylate	Steam heat	100° C.
Morphine Hydrochloride	Steam heat	100° C.
Morphine Sulphate	Steam heat	100° C.
Morphine and Atropine	Low heat or filtration	60°-70° C.
Pilocarpine Nitrate	Low heat or filtration	60°-70° C.
Quinine Dihydrochloride	Steam heat	100° C.
Quinine and Urea Hydrochloride ...	Steam heat	100° C.
Salvarsan	Approximate sterilization	No heat
Stovaine...	Steam heat	100° C.
Strychnine Nitrate	Steam heat	100° C.
Strychnine Sulphate	Steam heat	100° C.

Sterilizing Ampoules.—Empty glass ampoules can be purchased from Messrs. Allen & Hanbury, Shanghai, these are carried in stock in various sizes. We would recommend their use to the hospitals in China where small quantities of sterile solutions are required.

In the Peking Union Medical College we use two sizes of Ampoules. 1 c.c. amber glass and 2 c.c. amber glass.

These Cost : 1 c.c. ampoules. $34.00 per thousand.
2 c.c. ampoules. $51.00 per thousand.

These ampoules are made of hard, alkali free, Jena Glass and we have never experienced any chemical reaction taking place in our filled ampoules due to traces of free alkalinity. Ampoules are usually sealed when purchased—the narrow end should be carefully broken.

Herewith the method we use in the P.U.M.C. for filling ampoules.

We break off the ends and fill the ampoules by means of a sterile syringe with sterile distilled water. As the ampoules are filled they are dropped into an evaporating dish containing distilled water this water is gently boiled for ten minutes. The ampoules are then taken out by means of sterile forceps—one at a time, emptied of the water they contain and the hypodermic solution is then cautiously introduced into each empty ampoule by means of a sterile syringe which contains about 25 c.c of the alkaloidal solution. It is important to check all calculations in weighing out the alkaloidal salt so that the correct amount of salt is present in each c.c. of the finished solution. The ampoules are next sealed in the bunsen flame and then the sealed ampoules are finally sterilized by placing them in a beaker containing a solution of Sodium Chloride (about 5%) and boiling for thirty minutes. We add a trace of methylene blue to this saline solution and after boiling examine each ampoule to see if there is any trace of blue colour within the ampoule. Any trace of colour within would indicate imperfect sealing at the bunsen flame.

The great advantage of using ampoules in hospital pharmacies lies in the fact that the sterile solution need only be made once a month or once every three or four months instead of making up solutions daily or weekly as the practise usually is. Ampoules should be distinctly labelled stating the amount of alkaloidal salt per c.c. of solution.

Sterilized Distilled Water.—Distilled Water is sterilized by transferring the requisite amount to an already sterile flask, plugging the neck of this flask to a depth of one inch with cotton wool and boiling the water for ten minutes.

Sterilization Chemically.—The use of chemical substances is sometimes resorted to to render solutions free from bacteria or fungoid growths. Many widely different chemical substances have the property of inhibiting bacterial growth but in our opinion their use should, where possible, be avoided. An example will serve to illustrate the use of a chemical substance as an antiseptic.

Salicylic Acid 0.05 per cent. strength is a fairly powerful antiseptic. This chemical may be used as an addition to alkaloidal solutions—for example cocaine hydrochloride solution—in 0.01 per cent. strength to prevent the growth of micro-organisms.

Table IV (3) gives the results of some experimental studies carried out at University College, Nottingham on the comparative efficiency of chemical germicides in the case of a spore-producing organism " Bacillus Mesentericus."

TABLE IV.

Germicide + 1 % Organic Matter	Strength of Germicide	Time of exposure of non-sporing culture. Growth = +, No growth = —.	Time of exposure of spores Growth = +, No growth = —.
1. Salicylic Acid	Cold saturated aq. solution	6½ min.—, 22 min.—, 2 hrs.—	22 min. +, 2 hrs. +, 2 days +.
2. Chloramine-T	2 %	5 min. +, 15 min. +, 2 hrs.—	2 hrs. +, 12 hrs. +, 2 days +.
3. Phenol	5 %	3 min.—, 6 min.—, 12 min.—	12 min. +, 12 hrs. +, 2 days +.
4. Formaldehyde	5 %	3 min.—, 6 min.—, 12 min.—	12 min. +, 12 hrs. +, 2 days +.
5 Mercuric chloride	0.5 %	1½ min.—, 3 min.—, 6 min.—	3 min. +, 6 min. +, 9 min.—.

Throughout pharmaceutical literature there are hundreds of references to various methods of sterilization and results obtained by the different authors. We have confined our remarks in this note to our own experiences in sterilization in pharmaceutical laboratories in China and abroad. We have used as references the U. S. P., N. F., Remington's Pharmacy 6th and 7th Editions and Bentley's Text Book of Pharmacy 1926. We would recommend these reference works to any medical men who wish more detailed instructions on sterilization.

1. Lesude (La Sterilization des liquides injectables,) through Schweizer Apoth. Ztg.
2. Remington's Pharmacy 6th Edition. P. 1847.
3. Bentley A. O.—Text Book of Pharmacy 1926. P. 468. U. S. P. X. P. 459-461.

"ADULTERATIONS"

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In the December issue of this Journal a short note was published under the Hospital Technology(1) section dealing with the dangers of purchasing chemicals and drugs anywhere. It occurred to the writer that a brief note on some of the results of our analysis during the latter half of 1926 might be of interest to other hospitals in China —and it is hoped that the publication of these notes will be taken as a warning by some chemical houses who send various items to the far eastern market which we have found to be adulterated. For various reasons we will not mention the firms who have supplied the items listed—suffice it to say that most of these chemicals were purchased in bona-fide chemicals houses in either the United States or Europe.

1. *Opium* :—A sample of opium we analysed contained only 5% morphine. This opium however was not sold as complying with the requirements of any pharmacopoeia.
2. *Cocaine Hydrochloride* :—The melting point of one sample was 8° above the maximum limit of 186°—but otherwise the sample responded to all the usual tests for this alkaloidal salt.
3. *Iodoform* :—This sample was labelled Iodoform cryst. puriss B. P. On analysis we found 4% sand. When gauze was treated with a paste of this iodoform and sterilized the gauze assumed a greenish colour.
4. *Formaldehyde Solution* 40% :—On analysis we found this sample to be a 4% solution of Formaldehyde HCHO. We suspected this sample on opening the bottles owing to the very weak smell of formaldehyde.
5. *Formaldehyde Solution* :—This sample had polymerized and on analysis was found to be of 30% strength only.

   In this connection we have found that during the very cold winter months of North China, December, January and February it is advisable to store solution formaldehyde in a storeroom which is slightly heated; if stored outside in a courtyard during these very cold months there is a fifty per cent. loss in formaldehyde.
6. *Acid : Salicyl : B.P.* :—This sample we found contained about 6% of Sodium Salicyl as an impurity. The whole sample had a reddish tint.
7. *Methyl Alcohol* :—This sample although labelled chemically pure we found to contain 14% of acetone.
8. *Sodium Hydroxide* :—This sample contained about 5% iron and was of a reddish colour. The colour in our opinion was due to the fact that the sodium Hydroxide was shipped and

stored in five pound tin containers which were badly rusted when delivered to us.

9 *Bleaching Powder :*—This sample on analysis showed a 60% available chlorine content—it was very expensive but on the basis of chlorine content was economical.

10 *Bleaching Powder :*—This sample on analysis showed a 25% available chlorine content. It was expensive.

In this connection might we point out the desirability of assaying each consignment of bleaching powder for the available chlorine content before using the bleaching powder for the preparations of Carrel Dakin Solution. It will be evident that if equal amounts of sample 9 and sample 10 were used in preparing two lots of C-D Solution the resulting solutions could not comply with all the essential tests for alkalinity, etc.

11. *Saccharose :*—This sample was listed " extra pure " but was found to contain some dextrose. It was useless for the purpose for which it was required.

12. *Tragacanth Gum. Powdered. B. P. :*—Two samples were analysed. One was found to be about eight times stronger than the other in suspending properties. We were not able to account for this great difference in properties.

13. *Methylene Blue Tablets : (Sugar Coated) :*—A sample of these tablets was found to have burst the sugar coating. These tablets had been stored in our pharmacy here for three years.

14. *Quinine Tablets :*—One batch of quinine tablets was found to contain small splinters of wood. The wood when examined microscopically was not cinchona bark.

15. *Green Soap :*—One sample of a shipment of green soap was found to contain a small percentage of a highly smelling fish oil.

16. *Lysol :*—One sample of this disinfectant was found not to be properly emulsified. It had to be heated before being used.

We have not listed all the adulterations detected but have given examples from our analysis list which will prove our previous assertion that chemicals and drugs are sometimes adulterated or supplied below the purity specified and it is essential that strict care should be exercised in purchasing chemicals and drugs in the Far East. Unfortunately many adulterations are not easily detected and it often requires a fair amount of chemical knowledge and expensive apparatus to detect the impurity—but a fair rule for most of the hospitals in China to follow would be to take the U. 6. P. or the B. P. as their standard, in the absence of any official Chinese Pharmaceutical publication, and apply the tests given in the monograph under the item concerned. Most of these tests are easily carried out and this would certainly be a great help towards the ensuring of all our chemicals and drugs being of pharmacopoeal purity at least. There is another side to the picture—the purity or freedom from adulteration of the chemicals and drugs we purchase. In this laboratory we have analysed hundreds of samples of drugs

and chemicals purchased in American and European markets and it has been gratifying to find that in many cases the samples were purer than actually required by the Pharmacopoeia of the country from which the drugs came. We have systematically checked the arsenic and lead limits of all the chemicals in daily use in our pharmacy such as Borax, Boric Acid, Potassium chlorate, Magnesium sulphate, Sodium chloride, etc. and in no case have we found these to be outside the pharmacopoeal requirements of purity. We have devoted a great deal of time to oils, essential and fixed—but these have all complied with the very definite requirements of the pharmacopoeias as to S. G., refractive index, optical activity, etc.

Alkaloids and Alkaloidal Salts.—With the few exceptions noted all our Alkaloids and Alkaloidal salts were very pure. This is very important because most of these alkaloidal solutions are used hypodermically and any impurity might have disastrous results.

Barium Sulphate.—We have analysed quite a number of different samples of this very important X-ray chemical and have always found it very pure, we have never once found a trace of any soluble Barium Salt present.

Ether and Chloroform.—We analyse each fresh batch of these important anaesthetics and have always found them very pure.

It is gratifying to note that only about one per cent. of all the chemicals and drugs we submit to analysis show any deficiency in purity when judged by the pharmacopoeal monographs.

In the analysis of the chemicals and drugs mentioned in this short note I have had the assistance of Mr. Moody Meng, Ph.C.

1. C. M. J. V. XL. 12. P.1240-1241.

THE TYPES OF BREEDING PLACE USED BY *ANOPHELES HYRCANUS* IN NORTH AND CENTRAL CHINA*

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During the summer and autumn of 1926, observations on the breeding places of anopheline mosquitoes were made in the neighborhood of Peking and in the lower Yangtze Valley, namely at Nanking, Wusih, and Soochow in Kiangsu Province, and at Huchow and Shaohsing in Chekiang Province. Brief observations and enquiries were made also at Tsinanfu, Shantung, and at Hsüchowfu, Kiangsu. In the Peking area *Anopheles hyrcanus*, var. *sinensis*, *A. pattoni* and *A. lindesayi* were found, and these three species have also been reported from Shantung Province (1). At Hsüchowfu and in the

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Yangtze Valley only *Anopheles hyrcanus* was encountered, nor has any other anopheline mosquito been reported from Central China. It is probable that *A. hyrcanus* is the chief carrier of malaria in North and Central China. The present paper deals with the types of breeding place of this species only.

In general the following features characterize the bodies of water in which larvae of this mosquito were found. The water is still and clear, and contains water plants which cover the surface to a greater or less extent. The plants most constantly present were Spirogyra and Ceratophyllum. Spirogyra is a fine, filamentous, light-green alga growing on the surface in a thick scum-like formation. Ceratophyllum grows from the bottom of the water, has slim flexible stems, and its upper twigs lie horizontally just beneath the surface. The leaves are fine green finger-like projections extending out from all aspects of the stem. These two plants provide mechanical protection from fish for anopheline larvae as they lie horizontally at the surface, and the Spirogyra has been shown to be important as a source of food for these larvae. On the other hand, no matter how thickly these plants cover the surface of the water they will not prevent the larvae from reaching the surface for breathing, and indeed form minute pools in which they can lie and feed.

Specifically, the most common bodies of water in which the larvae were found were ponds ranging from one to a hundred meters in diameter. In the town of Fengtai near Peking the ponds were always in pits from which clay had been dug for making brick, existing long enough for the development of a good growth of tall reeds and the appropriate water plants. At Hai Tien, in and near the campus of Yenching University, and at the foot of the Western Hills, artificial lakes and ponds were the most suitable breeding places. In the city of Nanking are hundreds of ponds of this kind, the principal source of water supply for most of the city. At Soochow, Wusih and Huchow similar ponds with larvae were found. At Shaohsing a large inundated field close to a canal offered the requirements. Near Huchow a rice field which had long been under water had developed proper conditions.

Canals in general were not found to contain larvae, except where, through lack of use, they had become choked with grass or had collections of the appropriate water plants in patches along the shore or in small lateral projections.

Running streams, if the current was very slow and if water plants were present, were occasionally found to contain larvae, but in one of these, near Peking, they were found to be less numerous when the water was definitely flowing after a few days of rain.

Larvae were occasionally found in water in which no water plants were growing ; namely, first, in a few rice fields near Peking ; second, at Wo Fu Ssu, near Peking, in a large tank about 25 meters square, having sides and bottom of flag-stones ; and third, in a puddle of clear water with muddy bottom, part way up the side of

Purple Mountain near Nanking. It is noteworthy that in none of these places were any fish present.

The presence of small fish is undoubtedly an important factor in connection with the breeding places of *Anopheles hyrcanus*. At Nanking, where many of the ponds are used for fish-raising, larvae were never found in ponds so used, and such ponds never contained any surface water plants. Whether the water plants were devoured by the fish or removed by the owners of the ponds was not determined. On the campus of Yenching University, however, one pond containing large fish which fed on various kinds of grass thrown in daily by the attendant, also contained Ceratophyllum, which effectively protected anopheline and culicine larvae. At Ginling College, Nanking, in a pond which Professor Reeves had stocked with small larvae-eating fish, no larvae could be found although Ceratophyllum grew there plentifully. Many factors enter into the efficacy of fish as destroyers of mosquito larvae, but it is clear that, under proper conditions, certain species of small fish prevent mosquito breeding; and also that in their absence breeding can take place without the presence of the usual water plants. A study should be begun at once to determine what fish, native to China, are efficient larvae eaters.

Only once were anopheline larvae found in a domestic water receptacle. This was in a kong about three feet in diameter, in which the water had remained for several weeks or months so that Spirogyra had succeeded in growing. In view of the fact that it is generally believed in China that anopheline mosquitoes breed in water receptacles, it should be emphasized that this never takes place, except under such unusual conditions as those just mentioned.

Certain water plants, such as *Lemna* (duck-weed), which have flat leaves floating on the surface, and which tend to cover the entire surface of a body of water, are distinctly inhibitory to the development of mosquito larvae. The leaves prevent larvae from reaching the surface to breathe. In such ponds, larvae were found only where small areas had been cleared of the *Lemna*.

Rice fields are generally considered to be important in the breeding of anopheline mosquitoes in China, although no direct observations have ever been reported. In October and November, when the above observations were made in Central China, most of the rice had already been harvested. Where rice was still standing larvae were found only in fields where abundant water-plants were also growing. The fact that a few larvae were found in rice fields near Peking in which no water plants were growing, points to the probability that some breeding takes place in the rice fields in Central China during the summer months. The decision as to whether this is an important factor in the malaria problem in Central China must await further investigations.

As a result of the above observations, certain general principles may be laid down for the control of the breeding of *Anopheles hyrcanus* in North and Central China.

First.—Attention should be focussed on ponds as the principal breeding places.

Second.—Wherever possible such ponds should be filled in or drained.

Third.—Where drainage or filling is impossible, a larvicide should be used on the surface of the ponds. Recent work by Hackett (2) and others has shown that Paris green (copper aceto-arsenite) is the most efficient larvicide yet discovered for the destruction of anopheline larvae. When it is thoroughly mixed with finely screened road dust in the proportion of one part of Paris green to one hundred parts of dust, and sprayed or scattered on the surface of the water (100 c.c. of the mixture to nine square meters of water surface), anopheles breeding is completely inhibited. The frequency of its application depends upon the rate of development of larvae in any locality. In North and Central China once in every ten days will probably be found to be a safe interval. The great advantage of this over other larvicides is that there is no necessity of removing the surface vegetation from the water, as the distribution of the drug becomes remarkably uniform and the larvae are killed by ingesting it. There is no danger to cattle or to people using the water, even when used in two and a half times the concentration advocated. The chief precaution necessary is to be sure that a good quality of Paris green is used. It should contain at least fifty per cent. of arsenious oxide. The only disadvantage is that it is effective only against anopheline larvae which feed at the surface. Culicine larvae which feed below the surface are not destroyed by it.

Fourth.—If Paris green is found to be ineffective or if some special condition prohibits its use repeated removal of surface water-grass and floatage, and stocking ponds with fish known to be efficient larva eaters should be employed.

It is realized that these measures cannot be applied on a large scale until public health agencies take them up, but a start can be made at once in small areas where a hospital or school is interested in reducing the incidence of malaria among its constituents.

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THE MEDICAL HISTORY OF NAPOLEON*

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There is, of course, a great difference between Napoleonic History and Napoleonic Legend . . . Roseberry is expressing the legend when he writes—"Napoleon is so multifarious, luminous, and brilliant that he gives lights from a thousand facets," and the legend appears again when Wellington declares that "Bonaparte's whole life—civil, political and military was a fraud; there was not a transaction, great or small into which lying and fraud were not introduced." But Wellington also paid this tribute to his memory—"I can hardly imagine anything finer than Napoleon at the head of a French Army . . . he suited a French Army so exactly; depend upon it, at the head of a French Army there never was anything like him!"—and surely these words belong to history.

Measured by his own standard he said "I hold the immortality of the soul to be the remembrance which we leave behind in the minds of men." Napoleon is indeed an Immortal and from our point of view an Immortal with an interesting medical history.

Much of the enormous literature is tainted by passion or prejudice, and must be accepted with great reserve . . . specially anything that was said or written by Napoleon himself. Such words as these "Now, thanks to my misfortune one can see me naked as I am" might lead or rather mislead one into expecting the truth, but they have a totally different significance when placed alongside two of the favourite maxims of the speaker . . . "I am an entirely political person" and "Policy justifies everything." The declared and persistent policy of the French at St. Helena was to obstruct and misrepresent the actions of the British and specially of poor old Hudson Lowe, the Governor, and also to convince their sympathisers that the climate (deadly) was killing the Emperor, and therefore any lie was justifiable. Similarly, the British attitude was influenced by political motives and the official view was that General Bonaparte was a malingerer and the climate excellent.

The Doctors were compelled to take sides and are no more trustworthy than the other memorialists, who include practically all the French suite except Bertrand, most of the British, the Doctors, the European Commissioners and the servants of Longwood household: and even the modern dispassionate historians such as Holland Rose in England, Sloan in America and Frederick Masson in France are not always free from national prejudice. My paper, which makes no claim to originality, accuracy or research is therefore an eclectic conception that I have extracted from the vast womb of the literature through polluted channels.

*Communicated by D. R. Howard Mole.

Napoleon was a native of Corsica—a rocky and rugged island traversed by mountain ranges. The inhabitants were mainly of Italian blood, and with the exception of a few tradesmen and sailors, chiefly engaged in the pursuit of agriculture. They were not only isolated as islanders but still further cut off from the general development and progress of the rest of Europe by the inaccessibility of their mountain homes. Hence, they were very tenacious of old habits and customs, and amongst others, of the Vendetta or blood feud : a slight or merely fancied insult would call forth the words—"Guard thyself, I am on my guard," and forthwith began a bloody feud that might last for generations. The carrying of arms was generally practised, quarrels were common and lawlessness and violence general. Elegance or culture was scorned, and the people as a whole were primitive and boorish. But physically they were exceptional, especially the men, who were of striking appearance and character, of medium height but powerful build, with fine teeth and piercing eyes and the strong limbs of the mountaineer. With such physical qualities the Corsican was also sober, brave and trustworthy and hence made an excellent soldier.

The island had produced a series of national heroes who had, at various times, attempted to secure the national independence, but in vain, as Corsica had always remained under the Suzerainty of a foreign power. In 1764—five years before the birth of Napoleon—a provisional agreement had been drawn up between France and Genoa whereby Genoa ceded her rights over Corsica to France for a period of four years, and in 1768 a definitive treaty made this cession permanent. Paoli, who appealed to the great powers, including England, in vain, led the patriotic resistance, but although he achieved one notable success at the battle of Borgo in 1768, it was impossible for the undisciplined, ill-fed and poorly equipped Highlanders to hold out long against the French regular troops who had been reinforced by 20,000 men, and after some months of guerilla warfare Paoli was finally defeated at Ponte Nuovo in the spring of 1769, a few months before the advent of Napoleon, who later said he was born when his country was dying.

The Bonaparte family had long been resident in Corsica. They were not of princely or royal blood, although a once popular legend ascribed their origin to the twin brother of Louis XIV, the Iron Mask. The most illustrious Bonaparte declared that his ancestry began at Toulon—his first military success, or on the 18th Brumaire, when he seized the Consulate. The family was almost certainly Italian and probably patrician in origin and were persons of some consideration. They were adherents of the Genoese Protectorate and had received from that Republic, at the end of the 16th century, the right to the distinguishing prefix 'Di,' which was granted to one Jerome Bonaparte, the then head of the family, and in 1757 the Grand Duke of Tuscany issued a formal patent attesting the nobility of the Bonapartes. These facts have historical importance because they explain

the grounds on which the French authorities recognised the family as a noble one in 1771, and how, in consequence, Napoleon became a ward of the French king and received his education at the royal expense.

Napoleon's father, Charles Bonaparte, was a tall man with a large head ; he was lean and lanky and had a slightly pimpled complexion. He is described as ambitious, a place hunter, suave, elegant and bumptious. He was evidently a cheery soul on occasion for it is alleged that after taking the degree of Doctor of Laws at the University of Pisa, he spent two years income in celebrating with his friends. Although indolent, he managed, with his wife's help and his uncle's influence . . . his uncle Lucien being the Archdeacon of the Cathedral at Ajaccio . . . to attain a position of some importance and finally became a deputy of the Council of Corsican nobles. He displayed a temporary enthusiasm for Paoli and liberty, but eventually surrendered to Vaux, the French Commander, and became a French subject. But there is no doubt that Charles and his wife suffered severe hardships during the Spring of 1769, and that part of Napoleon's prenatal existence was spent as a fugitive in the mountains. On one occasion Madame Bonaparte, who was some months pregnant at this time, had to cross a swollen river on horseback, carrying Joseph, the eldest son, in her arms. The horse lost its footing and was carried down stream, and but for the courage and address of the rider, who managed to control the animal and bring him to the bank, all would have been drowned including the foetus who, however, maintained his placental attachment for some months longer and eventually appeared as Napoleon. How much these turbulent scenes affected the developing child is an interesting speculation.

Charles had married Maria Letizia Ramolino in 1764 a beautiful child of fifteen. She came of a good stock for, although her mother was a peasant, her father was a Genoese official of some importance and belonged to a good Florentine family long resident in Corsica. But although well born, Napoleon's mother had no real education and was of peasant nature to the end of her days. Sloan says of her that she was ' hardy, prolific, unsentimental, frugal, avaricious, mean and sometimes unscrupulous, and that it was to his Mother that Napoleon owed his unparelleled physical endurance. Speaking of her to Gourgaud at St. Helena, her illustrious son said—" My Mother had thirteen children of whom I was the fourth . . . my Father died in 1785 . . . . if he had lived my Mother was capable of having twenty children she was a superwoman. Although prolific, the Bonapartes were a short lived race and five generations had passed away in the century : there were Rheumatism, Gout and Cancer in the family history and apparently Tubercle as well. There is no doubt that Charles Bonaparte died of Cancer of the stomach, and tradition says that his Father died of the same disease at the age of forty, . . . whilst four of his children—Lucien, Pauline and Caroline, and the famous exile are reputed to have succumbed to

malignant disease, although the evidence is not conclusive in each case. With regard to Charles, the diagnosis was fully confirmed by postmortem which was carried out in Montpelier, (where the invalid had gone to consult the faculty) by an army surgeon named Bousquet, assisted by a medical student. An attested copy of the report of the examination is extant, signed by Dubois the Accoucheur of Marie Louise, who made the copy at the request of Louis Bonaparte who wished to know the cause of his Father's death.

It is worthy of remark that at this date, February 25, 1785, autopsies were exceedingly difficult to obtain and only about 100 were made in Paris in the course of a year ; consequently body-snatching was a common, indeed the accepted method of supplying the schools of anatomy.

Concerning the birth of Napoleon, many stories gained credence during the Consulate and Empire, as, for example, that the future Conqueror was born onto a carpet patterned with characters from the Iliad or onto tapestry ornamented with military trophies and figures of Alexander and Caesar. These sychophantic absurdities were effectually dealt with by Madame Mere who explained that the child could hardly be born onto a carpet as she had no carpets. The plain facts are that Madame had gone to Mass on August 15, the Feast of the Assumption, and that labour pains began in Church and she had barely enough time to get home. The child was a B.B.A. who, instead of putting his conquering foot on the neck of a Caesar or Alexander, bumped his puny vertex on the tiles of the drawing room floor. The new arrival was a full term child, but small and feeble—this condition being attributed by the parents to the disturbances of the Mother during pregnancy. On account of this frailty, a wet nurse, one Camille Bari by name, was engaged ; she was a young woman with no pretence to beauty who possessed other valuable qualities including a flawless complexion, perfect health and an abundant and excellent milk. The illustrious suckling developed into a thin, puny child with a large head, a long pointed face and thin lips. He was quick, fiery and impatient and nicknamed ' the Little Owl ' ; he had a dry yellowish skin, which persisted throughout his lifetime.

In 1779, at ten years of age, he went to school in France and after a few weeks at Autun was entered at the Royal Military School at Brienne on the nomination of King Louis. An Inspecting Officer in 1783 described him as . . . ' Height 4 feet 10 inches, of good constitution and excellent health,' but his Mother who visited him at this time thought differently and was specially upset by his thinness : Napoleon explained to his Mother that this was due to the fact that he used to work in the hours of recreation and often spent the night in study, because the idea of being anything less than top of his class was unthinkable. He was no good at games and took no interest in them, if we except those of a military flavour which always strongly appealed to him.

He was transferred from Brienne to the Military School in Paris in 1784, at the age of 15, at which period he was a small and very dark complexioned youth, gloomy and stern, but a great talker and specially fond of argument. At the same time, he practised self-control if the following anecdote be true. It was the practice of the authorities at this school to send boys who had suffered bereavement to the sick room to give vent to their feelings in private, but when Napoleon was told of the death of his Father he refused to go, saying, "I will not go . . . it is for women to weep but a man should know how to suffer."

In 1786 he obtained a commission in the Artillery, at which time he was small, excessively thin, beardless and nothing to look at. His shoulders were narrow and stooping and his uniform creased by his jerky movements, his cheeks were hollow, the lips pursed together, but the eyes were brilliant and piercing.

From now onwards the medical aspect of Napoleon's career can be divided into four parts :—

1. From 1786 to 1793, associated with Fever and prolonged leave from his regiment ;
2. From 1793 to 1807 or 8, a period of good health and successful campaigns ;
3. From 1809 to 1815, characterised by declining health and military defeats ;
4. From 1815 to 1821, the exile in St. Helena.

With regard to the first three of these epochs, *i.e.*, excluding the period of captivity, I would suggest to you that the health of our subject was largely influenced by two factors, first, by policy. During his astounding leaves, he undoubtedly wished to be in Corsica for personal and political reasons, and therefore pleaded ill-health to the French authorities but never, please note, complained of ill-health in Corsica. From a similar motive I suggest he remained quite well during his campaigns in Italy and Egypt . . . until he was on his way home when, in both cases, he had very obvious political motives for the fatigue and illness of which he made official complaint.

Secondly, it had occurred to me, a short time before I found that the same thing had occurred to others, and had been published, that there is some reasonable possibility that the physique and health of Napoleon were influenced by some disturbance in the endocrine balance.

You will note that he was thin, quick, decisive, nervous and jerky in his early years of success and fatter, slower and lethargic later on. Note also that he had small feet and hands, an exceptionally fine and hairless skin, and an effeminate appearance, features that remind one of the internal secretions, and Hypo-Pituitarism or Hypo-Thyroidism . . . further, he had a slow pulse—50 to 60 and was very uncomfortable in cold weather.

During the leave period he took four absences from his regiment in seven years . . . usually on account of fever which was, at any rate, a plausible excuse : but in any case leave was exceedingly easy to obtain in the Artillery and it was the custom for Full Colonels to take five months out of the twelve ; Lt.-Cols. and Majors, six months, whilst Captains and Lieutenants frequently wangled eight or nine months.

Arrived in Corsica, Napoleon was invariably better until the time came for his return . . . he then applied for extensions and accompanied his applications with medical certificates and a request for full pay as ' he was poor and the cure costly ' . . . it was also at this period of his life that he first displayed a taste for Spa treatment and Hydrotherapy which never deserted him ; . . . and it is rather astonishing to find that he became a Lt.-Colonel of Volunteers in Corsica.

Period two begins with the Siege of Toulon, where, for a time a Doctor of Medicine, Doppet by name, was in command of the investing army. Fortunately for Napoleon, Dommartin, the Chief Artillery Officer, was wounded and invalided, and Napoleon, in spite of his want of experience, was given the command of the Artillery ; he also was wounded during the repulse of a sortie, receiving a small laceration of the left thigh from an English bayonet. He also contracted the Itch which like venereal disease, was rampant throughout the army, and a frequent occurrence in the best circles of society ; . . . even the Empress Marie Louise was troubled with it during a visit to Aix in 1814.

But inoculation with this infection was actually recommended for the treatment of Phthisis and Epilepsy, and Napoleon himself was advised to wear the clothes of a man with Scabies as part of the treatment of a gastric attack in Egypt.

Although Napoleon had no serious illness during this time he still made capital out of his apparent ill-health, and cultivated a singular appearance . . . He was untidy with unkempt hair, and wore badly made, dirty boots ; he had a stoop and looked fragile and unhealthy. How much of this was a pose on the part of the erstwhile Corsican aristocrat and protege of royalty, who was now trying to live up to the part of a Republican general ?

Before leaving for the Egyptian campaign, Napoleon met Corvisart, already a man of reputation and the head of the largest hospital in Paris. He wrote a book on aneurysm, was one of the founders of clinical medicine in France and became the first Professor of clinical medicine in the University of Paris. Corvisart, the physician, Larrey and Ivan, his military surgeons, were the only medical men in whom Napoleon ever placed any real confidence.

With these exceptions Napoleon had very little faith in Doctors and none in pure physicians, and mistrusted the disinterestedness of the profession as a whole . . . In Egypt he said to Larrey, who was arguing with Desgenettes as to the contagiousness of plague—

"You are all the same, you Doctors, with your infernal principles and opinions ;—rather than sacrifice one of them you would let the whole army perish."

He thought surgery was more exact than medicine but expressed a complete contempt for drugs and usually refused to take them himself. On the other hand, he believed in Dietetics and preventive methods generally, and when in Elba did a great deal to improve the sanitary condition of the island, and instituted the police supervision of patients with venereal disease. He always had great faith in Hydrotherapy and counterirritation, and a life-long passion for hot baths. Bourrienne frequently read the morning despatches and journals to a partially submarine royalty, who, on many occasions would demand a hot bath in the middle of the night. During these functions, Napoleon positively cooked himself by raising the temperature of the water as high as possible and also by remaining in the bath for two hours.

To the medical objectors he replied that he had always found it of the greatest service for Dysuria, to attacks of which he was frequently liable from the first Italian campaign onwards, and also for his inveterate constipation. It is probable that his urinary symptoms were due to Vesical calculus, for several small stones were found in Napoleon's bladder at the Postmortem examination.

Counterirritation was considered as a rational method of treatment by Napoleon and blisters were a favourite remedy for his gastric attacks . . . He also recognised the therapeutic virtues of leeches by attaching them to the Royal piles which became troublesome in 1807, . . . and expressed his fundamental confidence in this line of treatment by recommending it to his brother Jerome.

In Egypt the General liked the climate, and remained perfectly well. He then appeared as a small man with a rather effeminate face, small ears, a rather short neck and sloping shoulders : he had a big chest, noticeably free from hair, small feet and shapely legs. His hands were small and well cared for, although he used to bite his nails when preoccupied.

His height was 5 feet 2 inches.

After the battle of the Pyramids, the populace of Cairo turned out to welcome the Conqueror, but had eyes for Kleber alone who was riding by the side of his chief, and when they learnt their mistake were very loath to pay homage to the puny swarthy Napoleon. From this time forward through the Consulate and during the first part of the Empire Bonaparte enjoyed good health: he was wounded at least twice,—at Ratisbon and at Wagram, but both were superficial injuries and soon healed. His exceptional powers of endurance have been described in the following words . . . 'Fatigue and forced marches appeared to be essential to him and his mind and body were proof against exhaustion. He could remain in the saddle for 12 or 14 hours at a stretch without inconvenience. He once fought a series of actions for five whole days without taking his boots off

or once going to sleep. Nor was this endurance merely physical, for he could return from field service, summon a council to begin on his arrival and then proceed to tire out all his ministers, use up relays of secretaries and yet remain fresh himself.

From 1806 onwards his health declined . . . It was noticed that his face was becoming puffy and the eyes less brilliant : he began to put on flesh, his movements were slower, his speech a little hesitating and his outbursts of temper less frequent.

These changes were no doubt partly due to premature senility in a man who was constantly taxing the whole of his physical and mental resources . . . and who came from a short-lived race, . . . and perhaps in part to want of exercise (for exercise was considered incompatible with the royal dignity), and endocrine disturbances.

How far these changes were responsible for his military decline is a problem, for while the exponents of the legend explain the downfall of their hero on a basis of ill-health, the hostile critics deny that the physical condition of Napoleon had anything to do with his defeats.

Many moderate people think that the decline of Napoleon was accompanied by and partially due to a definite physical deterioration.

Lord Wolsey's opinion is expressed as follows,—when writing of the disastrous Russian campaign of 1812,—" Napoleon had bad luck and lost thousands of men from Dysentery and such a large number of cavalry and artillery horses that he was compelled to leave 100 cannon and 500 waggons at Wilna, . . . but why this hesitation, . . . this loss of time by a man of habitually quick decision, . . . how can one explain the long halt at Wilna and Vitebsk, and especially the fatal delay at Moscow except as an example of weakness of will-power, the result of overwork, worry or mental exhaustion."

Larrey, the chief Military surgeon and a most honourable man said—" He who in Egypt supported with gaiety long marches across the desert in fearful heat,—who in Spain astonished even the natives by his endurance of fatigue—now (in Russia) complains of the temperature, seeks his carriage and passes long hours half-dressed on a couch."

After the battle of Dresden in 1813, the victor displayed such indecision as to convert apparent success into defeat : but here as in Moscow (where the Emperor had an attack of Pleurisy) he was unwell, suffering from a severe bout of Diarrhoea and Vomiting.

Again at the Battle of Leipsig his staff noticed an extraordinary state of irresolution and agitation which was accompanied by nervous vomiting. But during the battles that preceded his abdication in 1814 Napoleon displayed all his old initiative decision and recourse and during his residence at Elba his health was excellent.

Sir Neil Campbell emphasises his physical fitness at this time, when he says that " Napoleon, after walking under a burning sun from five in the morning to three in the afternoon inspecting ships, . . . rode on horseback for three hours in order to fatigue himself."

But this improvement was only temporary, for during the Hundred days that followed the Return from Elba the Emperor's deterioration was obvious to all, . . . he had bouts of drowsiness and sometimes slept for fifteen hours on end. . . . His energy and optimism were waning and he appeared to recognise that his splendid star was fading.

At Ligny which preceded Waterloo, he was so apathetic that General Vandamme said "The Napoleon that we have known exists no longer." On the night before Waterloo the Emperor worked hard and only allowed himself four hours rest, but was apparently asleep at the commencement of that momentous action.

This may have been the result of fatigue, . . . for, as he was suffering from an attack of Haemorrhoids he was unable to sit a horse and thus was compelled to walk round the French positions. The ground was chiefly clay, the night wet and squally and Napoleon was soon wet to the skin and covered with thick sticky mud, and the combination of wind, rain, mud and piles are calculated to inspire a feeling of lethargy in the most robust. This may have put the Emperor off his game, but it cannot be said to account for his defeat . . . and certainly there is no evidence at all of the presence of Epilepsy or Postepileptic automatism.

The remainder of Napoleon's life was spent in St. Helena, first at the "Briars," a villa belonging to a general merchant in the island, called Balcombe, and later at "Longwood," and may be shortly summarised in three periods . . .

First, during the O'Meara regime from October 1815 to July, 1818. During this time the Emperor, or rather General Bonaparte, which was the only title conceded by the British authorities, enjoyed fairly good health, but in September, 1817 Napoleon began to complain of a dull pain, heaviness and a sensation of heat in the right Hypochondrium . . . O'Meara diagnosed Hepatitis and prescribed friction, Calomel and seawater baths. From this time onwards Napoleon was never free from such symptoms which were accompanied also by recurrent attacks of fever.

Barry O'Meara was born in Ireland in 1786 and claimed to have been educated at Trinity College, Dublin, although Chaplin states that no record of his name can be found here. He joined the army and served in Italy with the 62nd regiment but was obliged to resign his commission after acting as second in a duel. He then joined the Navy and served in the Goliath and Bellerophon under Captains who gave him an excellent character.

In the Bellerophon O'Meara was called in to treat Napoleon for seasickness and probably influenced by his Irish nationality and knowledge of Italian, the latter asked him to become his personal medical attendant. O'Meara made three mistakes :

(1) He diagnosed Hepatitis which implied an unhealthy climate, and this was forbidden by the British authorities ;

(2) He became a tool of Napoleon and not only accepted bribes from the French but attempted to seduce others ;
(3) He engaged in clandestine correspondence with people at home and, being found out, was put under arrest, expelled from St. Helena in July and dismissed the Service in November, 1818.

His after history has some interest. In 1823 he married the ancient widow of a Captain Donnellan who had been executed for murder forty two years previously (and whom John Hunter had in vain attempted to resuscitate) and took up the cause of Queen Caroline, . . . and later identified himself with the movement for the repeal of the Union. He died on June 3, 1836, from the effects of a chill contracted at one of O'Connell's meetings. He was a very unreliable person, but certainly did his best for his patient.

After the departure of O'Meara, and before Antommarchi arrived, Napoleon had no special medical attention. Sir Hudson Lowe appointed Dr. Verling, a surgeon attached to the Artillery, as physician to Longwood, but Napoleon refused to accept any nomination of the Governor's and although Verling was in charge officially from July, 1818, to September, 1819, and lived at Longwood, he never examined or spoke to the Emperor, and only managed to see him by some trick. Montholon says the Emperor was far from well during this time and that he was indolent and spent a lot of time in hot baths. On January 17, 1819, Napoleon had an attack of Vertigo, and Dr. John Stokoe was called in. He was surgeon to the Conqueror, he confirmed the diagnosis of Hepatitis and ordered a small bleeding and a purgative. On account of this diagnosis, but ostensibly because he broke certain regulations Stokoe, like O'Meara, was sent home and dismissed the service. During the interim, before the arrival of Antommarchi, Hudson Lowe was content to receive reassuring reports from his Deputy Inspector of Hospitals, Baxter, who transmitted to the Governor the verbal messages of Verling who rarely saw the patient and never examined him.

Verling was also an Irishman born near Queenstown. He studied medicine at Dublin and Edinburgh, qualified at twenty-three and wrote a thesis on Jaundice. He joined the army and was appointed to the Artillery with which arm of the service he served throughout the Peninsular War, returning to England in 1814. He sailed to St. Helena in the " Northumberland " with Napoleon and probably met him on board. Apparently the French rather, liked Verling for he could speak both French and Italian, and moreover had always been friendly with O'Meara. . . Their refusal to allow him to attend the Emperor was, of course, merely political.

Antommarchi arrived on September 20, 1819. He was a Corsican who had been assistant to Mascagni, the Professor of Anatomy at Florence, and was himself a skilled anatomist and pathologist but a man of unprincipled character. He was chosen by Madame Mere and Cardinal Fesch (the uncle of Napoleon) because of his Corsican blood, his pushfulness and perhaps also from motives of economy, for whereas O'Meara had received 12,000 francs, Foureau,

the other candidate demanded 15,000, whilst Antommarchi consented to go to St. Helena for 9,000 francs per annum.

Before setting out on his journey he had consultations with the faculty in Rome and London and long talks with O'Meara about the Emperor. He had had little clinical experience and did not get on well with his distinguished patient, and more than once tried to leave the island. However, some improvement followed Antommarchi's arrival and treatment, but in 1820 the symptoms increased in severity and there were frequent and ever increasing attacks of abdominal pain, sweatings, vomiting, dry cough and constipation. Antommarchi, like O'Meara and Stokoe diagnosed Hepatitis

As 1821 came in, the general condition became progressively worse and in March Napoleon went out for the last time in his carriage. On March 25, Dr. Arnott was called in: he was the senior M.O. and a consistent upholder of the official views. He assured the Governor there was nothing much the matter and eight days before the patient became moribund announced that there was no danger, and that the patient was suffering from Hypochondriasis, whilst five days before this he had told Sir Thomas Reade that if a 74 gun frigate put into the Bay to set Napoleon free the latter would be up and on his legs directly.

Arnott was either blatantly ignorant or damnably prejudiced for after Napoleon had been unconscious for three days he still said he thought there was a fair chance of recovery. On April 13 and 14 the dying man made his will and on the 16th became partially comotose.

On April 27 coffee ground vomit appeared, and tarry stools. On May 2 incontinence set in and risus sardonicus appeared and Napoleon Bonaparte died at eleven minutes to six in the evening of May 5, 1821, aged fifty-one years and nine months.

The Autopsy, which was carried out next morning, must have been approached with very different feelings by the medical men present, the French and Antommarchi hoping to find pus in the liver, the British doctors determined to find something else, and poor old Arnott facing the music and his diagnosis of Hyperchondriasis. Three separate reports of the P.M. were published. All agreed that the cause of death was cancer of the lesser curvature of the stomach, which was an enormous surprise to all present, except perhaps, the corpse, who had previously suspected its existence and suggested the diagnosis, but there was considerable disagreement as to the condition of other organs. Antommarchi and Short, one of the English surgeons, stated the liver was enlarged and fixed by adhesions, the result of Hepatitis. The enlargement was denied by the other doctors, who admitted the fact of adhesions but stated they were clearly due to a Perihepatitis which had followed an old perforation of the cancerous ulcer. Antommarchi alone, mentions malignant glands in the small omentum and also describes " small spots and patches of a reddish colour disseminated on the peritoneal surface of the small gut."

In spite of the condition of the stomach there was a great deal

of fat in the subcutaneous tissues, the omentum and heart, and the penis and testicles were small.

Controversy now centres around the secondary cause of death, if any.

Arnold Chaplin states there was no tropical lesion and that Napoleon died from carcinoma supervening on an old gastric ulcer ;

Arthur Keith holds the view that Napoleon suffered from Malta Fever and that these symptoms masked the Cancer, which killed the patient ;

Some French authorities still maintain that the liver was the seat of a non-suppurative amoebic hepatitis.

Although none of the doctors present could be trusted . . . they were all either ignorant or dishonest . . . I personally follow Sir Arthur Keith in accepting Antommarchi's account as the most accurate, and there can be no question at all of the fact that he was the only medical man present who had any claim (and a good one too) to scientific training and laboratory experience. Antommarchi had no particular grievance against the British and certainly no love for the Emperor or the French . . . and admitting that he was influenced by selfish motives, he was chiefly concerned with finding a disease that was obviously impossible to cure, in order that he should satisfy the patient's family that he, personally, had done his best for the patient. When he found cancer he must have felt secure and therefore had no particular reason for scientific perjury. And although I am prepared to concede that as Antommarchi had diagnosed Hepatitis, he would be unlikely to underestimate the size of the liver, yet he was honest enough to admit and write that the liver looked normal on section, and I can see no reason whatsoever for doubting his description of the bowel, which contained those curious plaques that must have greatly intrigued a man of his type. Nor have I the slightest difficulty in believing that Dr. Arnott and his political brethren thought the gut looked healthy. What more natural, therefore, than the removal of a piece of gut for future investigation ? Much nonsense has been written on this point, and Dr. Arnold Chaplin actually perpetrates . . . " The postmortem was performed under the vigilant supervision of Sir Thomas Reade who represented Sir Hudson Lowe, and it is inconceivable that any of the medical men present could have removed a portion of intestine without his knowledge." This sounds very well until one is informed that Reade was a combatant officer and the deputy adjutant general of the island.

In a book published in 1922, " The recollections of St. Denis, the Emperor's valet," the diarist states that, before sewing up the body, Antommarchi, taking advantage of a moment when the eyes of the English were not fixed on the body, took two little pieces from a rib. He also took a death mask when the orderly officer was supposed to be keeping a vigilant watch, although of course this is denied.

Supposing that Antommarchi secured this specimen of gut, it is certain that he would show it to O'Meara, whom he already knew

and whom he again met in London in August 1821, on his return from St. Helena. I think, too, they would refer the specimen to the leading pathologist for his opinion. I suggest that this is what actually happened and that it was owing to the official edict against pathological pilfering that nothing further was heard of the specimen until the Royal College of Surgeons received the pathological collection of Sir Astley Cooper. In this collection were two small pieces of gut labelled " Incipient fungus in the glands of the intestine—Barry O'Meara to Sir Astley Cooper."

The latter was the leading surgeon and pathologist of his day : was surgeon to William IV and George IV attended Lord Liverpool, the Tory Prime Minister, and was well acquainted with Lord Bathurst, who was Minister for War and had charge of Napoleon at St. Helena. It is absolutely certain that Cooper was not only interested in the great Exile, but also had an inside knowledge of his illness and would greatly value (and perhaps handsomely pay for) any specimen that could throw light on the cause of death. Keith says that Cooper was accustomed to say to his assistant, Mr. Clift, " I must have an inspection of that tumour." which, being produced was inspected, labelled and dropped into a tank for future investigation. But although Astley Cooper lived to the age of 73 he never found time to carry this out, perhaps he was too busy as he is reputed to have made £30,000 a year, and the whole of his specimens were uncatalogued and undescribed except in the briefest fashion.

Two royal specimens . . . whose identity is unchallenged . . . were simply labelled with the name and date. I submit to you that there is no real difficulty in accepting the Napoleonic relics in the College of Surgeons as genuine. Here is a photomicrograph of one of the plaques.

Sir James Paget in 1883 describes them as Cancer.

Frederick Eve in 1910 cut a section and found no evidence of malignancy.

Keith and Shattock in 1913 made another section and described glandular hyperplasia and infection, that might fit in with some forms of tropical disease. Leishmann informed Keith that Napoleon's symptoms . . . recurrent febrile attacks, bleeding at the gums and glandular hyperplasia . . would agree with Malta or Undulant Fever, so that it is possible that O'Meara, Stokoe, and Antommarchi were right after all.

Hudson Lowe was undoubtedly a worthy person . . . a military mediocrity with no sense of humour. He has been much maligned but there is no doubt that he was a poor choice and that a more tactful man of the world ought to have been sent to replace him. He only saw his imperial prisoner on five occasions during which very stormy interviews Napoleon behaved like a madman and Lowe certainly maintained his dignity.

Lowe was the son of a military surgeon who was educated at St. Andrews University and served throughout the Seven Years War.

Clinical Notes

SKIN-GRAFTING BY REVERDIN'S METHOD

REPORT OF A CASE.

N.D. FRASER, M.B. CH. B., SWATOW.

"Reverdin's method consists in planting out pieces of skin not bigger than a pin-head over a granulating surface. It is seldom employed."*

The following case suggests that Reverdin's method may be successfully used in cases in which other methods would be doomed to failure.

The patient, a man of 38, a weaver by trade, gave a history of having burnt his left thigh and calf when 7 years old; the burn healed slowly, leaving a mass of scar tissue and some flexion deformity. About three years ago an ulcer appeared in the scar tissue and gradually spread until it involved nearly the whole area affected by the burn.

In August, 1926, the patient first came to hospital, and showed a typical epitheliomatous ulcer, with heaped-up, rolled, everted edges, and a foul, profuse discharge. The ulcer extended roughly from the centre of the thigh to the centre of the calf, on the dorsal aspect of the limb.

*Thomson and Miles. Manual of Surgery.

For some time conservative treatment was tried—internally Potassium Chlorate,* externally Eusol dressings,—but the discharge remained as profuse and foul as ever.

Towards the middle of November the whole ulcer was excised, the muscles of the thigh and calf being bared, and a mass of epitheliomatous tissue removed with some difficulty from between the hamstring muscles.

For some days the dressing of the wound was an extremely painful operation, and various ways were tried to make it easier. One layer of gauze was left on for two days at a time, the rest being changed daily, but the discharge was still so profuse that this method could not be continued. For some days Carbolic oil was used, but this interfered with the drainage of the wound and had to be discontinued. Finally, daily Eusol dressings were employed, and as the granulations covered the muscles the pain became gradually less.

Early in December, in spite of the discharge it was decided to attempt to graft the bare area. The patient was anaesthetised, and the part prepared by washing with warm saline, the opposite thigh was cleaned with spirit, and from it some one hundred small pieces of skin were taken and immediately planted on the bare area. The point of a needle held in artery forceps was used to raise pyramids of skin, the bases of which were then cut through with a sharp knife. The pits in the right thigh were then dressed with Boracic ointment, and the grafted area was covered with 'silver paper', oiled silk, a pad of cotton-wool, and bandaged.

For two days the dressing was not touched, but there was still so much discharge that on the third day the dressings were removed, and the wound was washed with Boracic Lotion which was thereafter used as a dressing.

Towards the end of December the grafts had taken well, but a nodule had appeared at the edge of the wound, and there was some recurrence between the hamstring muscles. These areas were then cauterised.

The grafts slowly spread and finally coalesced, covering all but the cauterised areas and two small patches which are still slowly healing. The present condition shows a pit where each graft was planted, surrounded by an area of pigmented skin. The rest is firm, smooth pink skin. There is still a little discharge coming from the cauterised patches.

No claim is made to have cured the condition, although such a tumour is probably only locally malignant and by sufficiently drastic excision recurrence might be prevented, but the relief already obtained has justified the treatment adopted. The result encourages one to try Reverdin's method in other types of cases, which are unsuitable, on account of sepsis, for Thiersch grafting.

I am greatly indebted to Dr. A. Wight, who performed the operations, for permission to report this case.

*T. M. Allison. B. M. J. 6/2/26.

A CASE OF INTESTINAL OBSTRUCTION OCCURRING IN TYPHOID FEVER

HENRY W. S. WRIGHT, M.S. (London) F.R.C.S. (Eng.), Tsinanfu, Shantung, China.

The following case is of interest because the pathological changes, seen at operation and subsequent autopsy, were most unusual. Moreover the course of events after operation, together with the pathological findings, showed that the treatment adopted was perhaps not the best thing to have done under the circumstances.

The patient, Ma Yu Shu, was a soldier, aged 21. His family and personal history contained nothing of importance, save that for the last ten years he had suffered from occasional attacks of abdominal pain. These attacks were not very severe. They lasted about six hours, occurred once a month and were not accompanied by vomiting or diarrhea.

When he was admitted to hospital on Friday, July 10th, 1925 he was in no state to give an intelligent account of his symptoms or their onset. But, after talking to the patient and his friends, we gathered that he had been ill for about ten or eleven days. A week before admission he was feeling too bad to do his work properly, and was beaten for some slight misdemeanour. This beating could not have been very severe as the usual signs of bruising and sloughing of the skin were absent. The same evening he complained of severe abdominal pain which stopped him sleeping, and this pain lasted throughout the week following, during which time he consulted several Chinese doctors, without, however, obtaining any relief.

On admission his mental state was torpid, he answered questions slowly but apparently correctly. His mouth was very dry, and his tongue was coated with white fur. The House physician noticed " rose spots " on his chest and arms, which the patient said had been present for one week. These were not seen by the visiting physician the next day. His temperature was 104 and his pulse 115. Routine examination revealed two groups of physical signs. There were a few moist rales at the base of the right lung, and in the right iliac fossa was a small, mobile lump about the size and shape of a little finger. This was only slightly tender. The liver and spleen were not palpable. The patient constantly complained of nausea and abdominal pain, which latter did not seem to be very bad.

His blood count was as follows :—Red cells 4,232,000. Haemoglobin 80%. The total white count was 10,000, made up of polymorphonuclears 71%, small lymphocytes 16%, large lymphocytes 10% and large mononuclear cells 3%. The next day the total white count was 7,000.

He had three loose stools within the first twenty-four hours, which contained no ascaris and no amoebae. In his sputum were seen staphylococci and streptococci, but no tubercle bacilli.

On the night of admission he did not sleep, but was semi-delirious, and all the next day he continued his complaint of nausea and pain.

I was asked to see this patient on the evening of the second day. He looked very ill, was rather drowsy, but reiterated his complaint of pain in the right lower part of the abdomen. His temperature was 104.8, his pulse was 110, its volume only fair. The abdomen was perfectly soft and a little tumid. Its movements followed respiration without the slightest hindrance. On palpation it was easy to explore the whole abdomen, and the finger-like mass referred to above was easily felt. This was slightly tender and quite mobile. Once only did the patient wince during deep palpation. There was no cutaneous hyperaesthesia.

The leucocyte count had risen to 12,000, but the results of other laboratory tests had not yet come to hand. Considering the patient's general condition and his local signs, a diagnosis of typhoid appendicitis was made, and the ordinary routine treatment continued.

The following morning the patient was a little better ; his mind was clearer ; the nausea and abdominal pain had improved, and nothing could be discovered on gentle palpation. This improvement continued till the early morning of the fourth day after admission, when the patient had pain around the umbilicus which made him cry out and roused the whole ward. When seen again at nine a.m., on account of this pain, his condition as indicated by the pulse was undoubtedly serious, and we found in the right iliac fossa a curved soft tumour, about the size and shape of a sausage, the concavity of which faced inwards. This tumour was movable within small limits and not very tender. There were no physical signs of peritonitis, abdominal movement was good and equal, and there was no rigidity. By this time the result of the Widal test was known to be positive, and for want of any other we persisted in our original diagnosis.

At twelve o'clock the physician in charge asked for another consultation, and gave the following history. During the morning the acute abdominal pain recurred about every half hour. It was colicky in type and shortly after it had ceased the patient vomited a little blood-stained fluid which had a slightly faecal odour. During the attacks of pain the tumour could be felt to harden. The tumour was distinctly larger and harder than at the previous examination and on its internal aspect could be felt a small round knob. During the morning two enemas had been administered because there had been no stool during the previous forty-eight hours, but with no result. The patient's pulse was very fast and weak. A provisional diagnosis of intussusception, starting in a patch of oedematous mucous membrane, was made, and, at the request of the patient's friends, it was decided to do a laparotomy.

The abdomen was opened by an incision through the outer border of the right rectus sheath, the line of incision having been previously infiltrated with ½% novocaine.

The peritoneum was very red and injected but there was no free fluid, no pus and no adhesions. The lower ileum when drawn out and examined was similarly injected, the Peyers patches were thickened, and projected well into the lumen of the bowel. Inflamed omentum was lightly adherent to one of these patches. About six inches from the ileocaecal valve, a soft, tumourlike mass was felt, which projected into, but did not block the lumen of the bowel.

The caecum and last few inches of ileum were then easily delivered, and it seemed at first as though an intussusception was present, but a moment's examination dispelled this thought. The last two inches of ileum were filled up with a soft fleshy polypoid substance, which extended into the caecum. It seemed to obliterate the lumen completely. A finger could not be inverted through the centre of this mass. The appendix was also swollen to about three times its normal size ; it was situated on the inner aspect of the tumour. There were no signs of necrosis in its walls.

The mesentery of the ileum was full of soft, red, inflamed glands. The whole mass was intensely inflamed, red and infected, but not adherent. The appendix was rapidly removed for microscopic examination and a catheter tied in the lower ileum after the manner of a Witzel's gastrostomy. The patient died about an hour after the operation was completed. The wound was then opened up and the lower ileum and caecum removed.

On slitting up the caecum towards the ilio-caecal valve, it was seen that around the latter was a swollen oedematous mass, about the size of a walnut, projecting into its lumen. This oedematous tissue was soft but not very friable. It was deep plum-coloured, except for some irregular bile-stained patches where the tissue was more ulcerated than the rest.

Studded about the mucous membrane of the caecum were numerous small pin-point superficial ulcers. Around their edges the mucous membrane was congested, and their bases were darker red in colour.

The last inch of the ileum presented a most unusual appearance. It was filled up with soft friable exuberant tissue, which was dark red in colour with occasional bile-stained patches. This arose from the edges and base of an extensive ulcer, which involved the whole of the mucous membrane of that area. A few inches above this was another similar ulcer, but the granulations were not so exuberant.

It was possible with a little force to insert a thin pencil through the ileocaecal valve into the ileum, but, in doing so some of the tissue was torn off. The edges of the tissue mass, projecting like the head of an intussusception into the caecum, were ordinarily in apposition and the lumen was obliterated.

Sections were made from the mesenteric glands, the appendix, the tissue round the ileocaecal valve, and from the edges of both the large and small ulcers. In all these the microscopical appearances

were essentially the same. There were masses of small lymphocytes which filled up all the interstices between the connective tissue. Practically no polymorphonuclear cells were seen. Among these small lymphocytes were scattered numerous large vesicular cells which did not stain very well. Some of them were seen to contain in their substance three or four lymphocytes in various stages of ingestion. These large wandering microphages are typical of typhoid fever, and their origin is not quite clear. Mallory thinks they are endothelial in origin, but others think they come from the connective tissue.

In sections stained to show bacilli, there were present some rods, or objects having that appearance, but they were infrequent. It ill becomes a mere surgeon to decide whether these were in fact typhoid bacilli or artefacts. The positive Widal reaction and the pathological appearances serve to make the diagnosis fairly certain, though a culture taken from the urine at the time of operation was negative.

Nothing was found in the history to account for the extraordinarily exuberant inflammatory tissue reaction. It is possible that he took large quantities of some Chinese medicine, which altered the usual appearances.

It is rather difficult to say whether laparotomy should have been done or not. The patient was certainly obstructed, but a small amount of fluid could have got through, and probably within twenty-four hours some of the granulations would have sloughed sufficiently to allow enough of the ileal contents to pass.

With the inadequate library facilities at my disposal, I have been unable to find a record of any other similar case, and therefore it is impossible to make an adequate bibliography.

I have to thank Dr. Braafladt for referring this case to the Surgical Department.

REPORT OF CASE OF ECLAMPSIA TREATED WITH MAGNESIUM SULPHATE

Patient.—Mrs. P., Missionary, age 47, four living children, two abortions, last child six years old. Goiter for 15 years. At the birth of last child she had a slight convulsion just before the baby was born and one a few hours later.

Present history.—She says that she is 6 mos. pregnant. January 1st doctor was called and was told that she had had a severe headache for several days and that she had been bothered with swelling of the legs also. (Before this, monthly examinations were made of her urine and reported negative). Blood pressure Systolic 150. and urine ex. showed albumen.

The next morning the doctor was called at 6 a.m. as the patient had a little show of blood. Morphine $\frac{1}{4}$ hypo was given. At this

time blood pressure registered 170 systolic. She was ordered to the hospital. The next morning 9 a.m. she had a convulsion. Chloral 15. and Soda Bromide 15. were given in enema. At this time blood pressure was 180-90 diastolic. In one hour she had another convulsion when she was bled 500. cc and 15 cc. 25% Mag. Sulphate was given intramuscularly. This was very painful for about one hour, but there was no recurrence of convulsions. Blood pressure dropped 20 points. Urine nearly solid with albumen but no casts.

The patient was put on absolute milk diet with Tr. Digitalis and in one week the swelling of legs and face was nearly gone, but pressure again 180-90. Another intramuscular injection of 25% Mag. Sulph. 15 cc given and the pressure dropped 10 points. At this time the amount of albumen had decreased about one half and the patient felt very well.

The patient was doing so well it was decided to carry her to term and save the baby if possible.

To keep her improving it was necessary to give the Mag. Sulph. once a week. The purified powder was procured and intravenous 10% 20 cc was substituted for the intramuscular. The patient complained of a feeling of heat during injection but there was no untoward effect and the intramuscular was not used. Thyroid extract was also given every other week.

February 1. Albumen was down to point 4 on Esbach's tube and B. P. at 170-90, a few casts in the urine and spg. 1008.

February 2. Doctor was called at 7 a.m. The patient again had a little hemorrhage and complained of uterine pains about every ten minutes.

Magnesium Sulphate 10% 20 cc was immediately given intravenously and as the pains continued she was prepared for delivery.

She went on to a normal delivery (no instruments used) at 4 p.m. The baby was husky but weighed only 3-lbs. 9 oz. She eagerly drank water when given.

The labor was perfectly normal in every way, but the placenta contained a number of white infarcts. The blood pressure dropped in two days to 130-35 and one gm. of albumen in urine. The baby took to her mother's breast and the first week gained 6 oz.

It is now the third week and the mother is up and about, feels well and the baby gained 9 oz. this last week.

When the doctor was first called the patient weighed 190 lbs., height 5-ft. 4-in. She now weighs 154 lbs. and feels better than for a long time. She said that she had miscalculated and that the baby was due February 12 instead of March 12, so the baby was only 2 weeks premature.

JOHN D. BIGGER, A.M. M.D. F.A.C.S., PYENGYANG CHOSEN,

March 1, 1927.

Hospital Technology Section

ELECTROLYSIS OF WILD EYELASHES

DR. HARVEY J. HOWARD, Peking, China.

Deformities of the margin of the eyelids are exceedingly common in China. These deformities are referred to as *entropion* and *trichiasis*. Entropion is an introversion of the margin of the eyelid, either upper or lower. There are two types of entropion, spastic and cicatricial. The spastic variety is caused by a spasm of the shorter fibers of the lid sphincter, and is seen chiefly in infants, and sometimes in persons with long-continued irritative inflammations of the conjunctiva and cornea, associated with marked photophobia. Spastic entropion is rarely more than temporary in character, and can usually be relieved by means of one or two small strips of adhesive plaster. The cicatricial type is caused by chronic trachoma, pemphigus and other severe conjunctival diseases in which the conjunctiva is more or less transformed into connective tissue. Cicatricial entropion requires a plastic operation. Every surgeon who does eye work in China has his favorite entropion operation, and the results of these operations are generally very good. But this paper is not concerned with entropion, either spastic or cicatricial.

Fig. 1. Sponge-covered metal electrode (attached to the positive pole).

The other deformity of the lid margin known as *trichiasis*, literally translated, means "three rows" (of eyelashes), i.e., one set or row of lashes that grows out at the proper angle, another that grows upward from the margin, and a third row that grows at an angle towards the eyeball so that the hairs either turn completely in or at least brush against the eyeball. There is another term called *distichiasis*, which means "two rows" of lashes, one normal row and one turned inward. As a matter of fact this term is becoming obsolete and the term *trichiasis* is now used to cover all conditions of the lid margin in which there is a growth of wild hairs, whether two rows of lashes or three rows, whether one hair only or dozens of hairs.

Trichiasis is caused by any inflammation involving the lid margin which affects the hair follicle, either by undue stimulation of

the hair root, or by a cicatricial deformity which alters the projection of the hair. Long standing blepharitis, recurrent hordeola (styes), and those types of trachoma in which the tarsus is deeply inflamed, are the inflammatory diseases chiefly responsible for trichiasis. Trichiasis may involve the whole of the lid from the inner to the outer canthus, or it may involve only part of the lid. By partial we might mean only one wild hair or the term might be used to include a segment of the lid margin containing quite a number of wild hairs. Complete or nearly complete trichiasis requires the same kind of surgical treatment as does entropion. Partial trichiasis could be relieved in the same way, but such an extensive operation is unnecessary. People in China who suffer from trichiasis generally perform epilation (pulling out) of the wild hairs themselves, or get some friend or relative to do it for them. But the removed cilia always grow again, and generally stiffer and larger than before, so epilation only gives temporary relief. A physician can also make a patient temporarily comfortable by pulling the cilia with a pair of epilation forceps, but this procedure should only be followed when the patient refuses to have an operation or to have the hair follicles permanently destroyed.

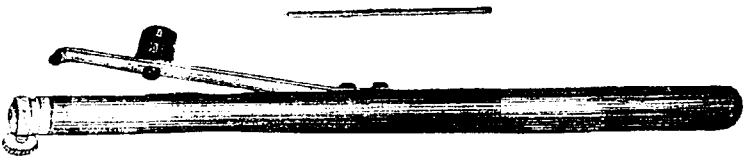

Fig. 2. Electrolysis needle and handle (attached to negative pole).

For partial trichiasis the removal of the wild hairs by electrolysis is the only satisfactory method which a surgeon should employ. By this method the hair follicle is destroyed by means of a fine bulbous needle (designed for the purpose) connected with the negative pole of a battery delivering direct current of small amperage. This form of treatment is painful, so the conjunctiva must first be anesthetized with a solution of cocain. The lid margin should also be somewhat deadened either by a subcutaneous injection of novocain-adrenalin, or by clamping somewhat firmly around the area involved with a special forceps or a chalazion clamp.

The apparatus is simple and inexpensive. It consists of a nine to twelve volt battery, a sponge electrode, a needle holder, and one or more electrolysis needles having bulbous ends.

The sponge electrode (Fig. 1) can be obtained at little cost from any medical supply house. It could be made locally if shop facilities are available. The needle holder (Fig. 2) and needles should be obtained from a medical supply house. The battery is easily improvised from the ordinary dry cells that are used for telephones, electric bells, etc. Such cells cost approximately $1.00 apiece in

Shanghai, and from six to eight are required. The central carbon post is the positive pole, and the outer post soldered to the zinc case, is the negative pole. The cells should be wired in series, that is with a wire leading from the negative pole of one to the positive pole of the next, etc. When so wired, the cells constitute a battery, and the free positive pole of the cell at one end of the line, together with the free negative pole of the cell at the other end of the line, constitute respectively the positive and negative poles of the battery (See Fig. 3).

The wire from the sponge electrode is connected to the positive pole of the battery, and that from the electrolysis needle holder to the negative pole. The needle is not connected to the positive pole because minute metallic particles would thereby be deposited in the tissue. When the needle is inserted into a hair follicle (2 or 3 mm. deep), the switch on the needle holder closed, and the sponge electrode moistened with a solution of sodium bicarbonate (preferable to sodium chloride), is pressed firmly against the skin of the patient's palm or forehead, the circuit is completed and a current of electricity

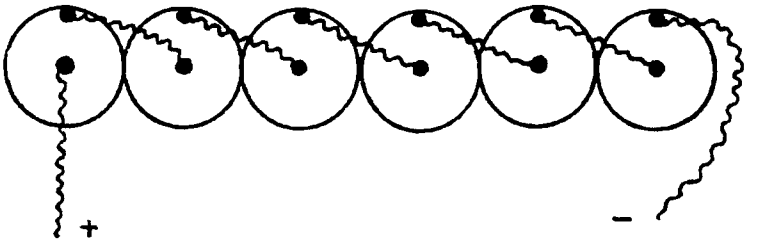

Fig. 3. A battery of six dry cells connected in series.

flows through the patient's body. The current is so weak that the patient experiences no sensation except the contact between the hair follicle and the negative electrode which is the needle.

Text-books state that a current of from 2 to 5 M.A. (thousandths of an ampere) should be used, and commercial apparatus is usually provided with a milliamperemeter, and either a series' rheostat or some similar device for regulating the amount of current used. Such accessories are unnecessary. The best guides to current strength are : (1) the amount of distress experienced by the patient ; (2) the amount of frothing occurring in the follicle ; and (3) the time required for the loosening of the hair. There should be some discomfort, a little foam and redness at the follicle, and the hair should become loose within thirty seconds. If by these criteria the current is found too weak, the patient is instructed to press the sponge more firmly against his skin. If the current is too strong, the pressure of the sponge electrode may be decreased or fewer cells may be used.

If the operator is working without an assistant, he can have the patient hold the sponge electrode tightly against the palm of one

hand, instead of having it pressed against his forehead or cheek. This increase of distance between the positive and negative electrodes merely increases the resistance to the current, and will probably require the addition of one or two cells to make the electrolysis effective.

The apparatus can easily be assembled by the doctor himself. The various parts ought not to cost more than twenty dollars. The parts required are as follows :—

6 to 8 dry cells
12 feet of insulated wire
1 sponge covered metal electrode
1 electrolysis handle with connecting plug
½ dozen electrolysis needles (bulbous ends)
1 epilation forceps

If the cost of the apparatus is no object, complete sets can be purchased from any medical supply company for about sixty or seventy dollars. A silver chloride battery of ten or twelve cells is recommended.

INQUIRY SERVICE

To the I.H.T.—Our pharmacy has recently been criticised unsparingly for the absence of a Poison Cupboard. But is it necessary ? Legal requirements apart must we really complicate our drug shelves with lock-up Poison Cupboards ? If so, what exactly does it mean ? Narcotics, of course ; but what of the Caustics,—the strong Acids and Alkalies ; the salts of the heavy metals ; the Phenols,—all the " External-Application-only " series ? Are we really to regroup our dispensaries in order to put these under lock and key ? And must we open our cupboard for every separate prescription and lock it up again ?

F. C.

Answer—All Mission hospitals in China should certainly have poison cupboards with good working locks on them. All poisons should be stored there,—Narcotics, Acids, Alkalis, Phenols, " 606," " 914," almost all Hypodermic tablets, salts of heavy metals and substances like Luminol, etc. Any new Kala Azar remedy should likewise be locked up.

I would suggest using one side of the dispensing room for poisons only, and three sides for the other items. Keep your stock poisons with the smaller dispensing poisons in the same cupboards. There is no use having the small dispensing bottles carefully locked up, while the larger bottles are left out in the store room somewhere.

As a Pharmacist I can give no other advice. From my own experience in France and Britain, many patients in hospitals owe their lives to the fact that we had to unlock doors before we could dispense

any poison, and we always had to have our poisons checked before we dispensed them.

J. C.

To the I.H.T.—Can you advise me how to sterilize rubber gloves without destroying them ? Does pressure steam damage them more than simple boiling ? If so, is simple boiling permissible ? What should be the minimum sterilization in either case ?

D. L. H.

Answer—Standard practice at home may be represented by The Peter Bent Brigham Hospital technique ("Modern Hospital, August 1922) as follows," Boil new gloves in normal saline for five minutes, dry on both sides, powder, put in glove cases and sterilize under 15 lbs. pressure for ten minutes,—including a puff of cotton with extra powder.

After use, wash the gloves with cold water, soak in Lysol for twenty minutes, test for leaks, mend if necessary, powder thoroughly on both sides, and put in the glove cases for future sterilizing."

Here in China the tendency is to avoid pressure temperatures, and to boil as little as possible-say five to ten minutes (on the analogy of instruments) immediately before use, followed by soaking in Bichloride of Mercury after the gloves are on the surgeons hands ; in any case it is important to avoid weight pressure on the gloves during sterilizing. Also they should be protected from direct contact with hot metal in the Autoclave.

E. G. B.

(This enquiry is of such interest that we are trying to get further information from the manufacturers. Sect. Ed.)

To the I.H.T.—Recently a Japanese-trained medical friend showed me ampules of Gelatine put up for intra-venous use in haemoptysis. He tells me they are being widely used.

I have lost sight of Gelatine as a haemostatic since its vogue twenty years ago, when it was discredited by a series of Tetanus infections. Can you tell me how its status stands to-day ?

B. T.

Answer—Gelatine as a haemostatic is definitely dangerous and it is not known to exert any effect whatever

F. R. D.

Editorial

THE JOURNAL

We greatly regret that the March and April Journals have been so late in reaching the Members. This is particularly disappointing in view of important announcements in them of the policy of the Association with regard to the hospitals.

Unfortunately the Presbyterian Mission Press has had to face serious strikes on the part of their workmen. Unluckily this occurred as the last page of the March Journal, already delayed by an earlier strike, was being printed. A further difficulty has been that the Press being situated outside the limits of the Settlement the handling of the small minority of troublesome workmen, backed up as they have been by the Communist Labour Union, has been a considerable problem.

It has been our very earnest desire that no issue of the Journal should be omitted and we are making arrangements for printing elsewhere if necessary until the Presbyterian Mission Press shall be running smoothly again. We still hope, however, that the need for this will not arise.

In the meantime we must ask the patience of our readers under the circumstances in which we are placed, and assure them that no effort will be spared to ensure the standard of the Journal being maintained.

HOSPITALS

We are glad to know that the confidential report to the Members of the action of the Executive Committee in this crisis has been generally received, and, in not a few cases, has proved of value in explaining to the staff the difficulties of the situation and the impossibility of hospitals being treated on the lines of ordinary commercial undertakings.

This issue contains the minutes of another Executive Committee meeting called to consider further developments of the question. At this meeting the Committee had the benefit of the presence of the Presidents of the National Medical Association and the Nurses Association of China and the Executive is maintaining very close touch with these Associations in the common effort to solve the problem of the relations of labour to management in the hospitals.

Fuller particulars of the actions of the Committee will be found in the Section for Association news.

It will be noticed that a decision has been made to collect all the information possible in regard to the effects of the present crisis on the work of the hospitals and to publish it. This also is being

handled in close association with the leaders of medicine among the Chinese. The Secretary would be glad to receive brief notes of any hospitals that have been seized or forcibly closed by the Authorities or by local Labour Unions. Such notes to be of value must be sent to him promptly.

HOOKWORM INFESTATION

The subject of Ankylostomiasis in China has received much attention from scientific workers of recent years, but the results do not seem to us to be entirely commensurate with the work done, at least in the direction of epidemiology.

This is the reaction that comes to us on reading a review of 15 papers on the subject published in the Public Health Reports of the United States Public Health Service, January 21, 1927.

This review makes the following statements : " Rice cultivation as carried on in China does not spread hookworm infestation." " Experimental evidence indicated that under most conditions the use of human feces as fertilizer for vegetable crops can be only a slight source of hookworm infestation."

Now we do not wish for a moment to belittle the value of the enormous amount of most painstaking work that has been done by the investigators, but we do insist that investigation results must fit in with clinical experience. If they fail to do this it is not the clinician who is at fault.

With regard to the statements quoted above, the first is open to serious doubt and the second is definitely contrary to clinical experience. We speak of this with some confidence as our experience ran to more than ten thousand stool examinations, a number which practically excludes serious error.

With regard to the rice farmers our figures showed an infestation rate of over 40 per cent. We willingly acknowledge that here it is possible for an error to have crept in as a fair proportion of these men may during the year have farmed dry crops as well, but we suggest that this needs to be clearly demonstrated before rice farming is declared guiltless.

In respect of vegetable gardeners the case is entirely different and here we boldly challenge the statement made. In our experience the infestation rate in these men was nearly cent. per cent., and the true infection rate was also very high. So much was this the case that a glance at a patient in the O.P.D. often led us to suggest the nature of his employment—vegetable gardening—and frequently this proved correct.

Doubtless it may be possible that special methods employed in fertilization in one area make the infestation rate much higher in this than in other areas but in some places, and we believe in not a few, vegetable gardening is certainly a source of high hookworm infestation.

THE MEDICAL HISTORY OF NAPOLEON

Every now and then we are able through the kindness of contributors to turn from the strict path of medicine in China to other kindred subjects which vary our outlook and widen our view. For this reason we bid a hearty welcome to the contribution forwarded to us by Dr. Howard Mole, which we publish in this issue.

It was originally planned that this should be read as a paper at the Peking Meeting, but the delights of the Imperial Palaces proved too strong an attraction and the meeting at which this contribution should have been read had to be abandoned.

Our thanks are due to Dr. Mole for making it possible for us to reproduce it now in the Journal.

China Medical Association Section

MINUTES OF EXECUTIVE COMMITTEE

A meeting of the Executive Committee of the China Medical Association was held in the Association's offices on Monday, April 11, at 9 a.m.

Present.—Drs. Fowler (in chair), Iva Miller, W. S. New, R. C. Robertson, H. H. Morris, Gordon Thompson and J. L. Maxwell.

Hospitals and Labour Troubles.—The Secretary reported the receipt of letters from Dr. F. C. Yen the first acknowledging the receipt of the Association's letter asking him to act as its representative, the second transmitting an invitation from the Ministry of Foreign Affairs to appoint a representative to attend a conference on the subject in Hankow.

After considerable discussion the following minutes were adopted :—

> That as regards the invitation from the Ministry of Foreign Affairs, we only approve of sending a delegate if, after a Conference with representatives of the National Medical Association and the Nurses Association of China, this is felt to be desirable.
>
> That, should such a delegate be appointed, his instructions be that the Association cannot draw back from the principles laid down in its former letter as regards the independence of the hospitals from labour control, strikes and picketing.
>
> That the President, Secretary and Dr. Gordon Thompson be empowered to act for the Executive Committee at an early meeting with delegates from the National Medical Association and the Nurses Association of China.

That the confidential report distributed to Members be revised as required and brought as far as possible up to date by the Secretary, in association with the President and Dr. Gordon Thompson, with a view to as wide publicity as possible.

That when sufficient information as to the present situation of hospitals is obtained the President and Secretary call a further meeting of Executive Committee to decide the final arrangements for publication.

Institute of Hospital Technology.—In view of the fact that the work of the I.H.T. at Anking had been closed down on account of the evacuation of the foreign staff from the hospital, the present and immediate future arrangements for it were discussed. Two suggestions were made, (1) that Dr. Hadden transfer his work to Taiku, Korea, to which place he had been invited, and (2) that an attempt be made to carry on the work in Shanghai. The following minutes were finally adopted :—

That Dr. Hadden explore the situation and report to the available members of his Committee and that the I.H.T. Committee be empowered to take action with regard to the location of the Institute accordingly.

That in view of the experience of the past two years the I.H.T. Committee be asked to prepare suggestions for the future of the work and report to the Executive Committee with a view, when circumstances are favourable, to an appeal being issued on behalf of the Institute.

China Medical Journal.—The Editor reported that owing to strikes in the Presbyterian Mission Press the March issue of the Journal had been held up at the last page and the April Journal was not yet in hand.

Further that he had invited a member of the Presbyterian Press to attend this meeting and discuss with the Committee arrangements for future publication. Through some misunderstanding on the part of the Press no representative had been sent.

The Editor was empowered to make all arrangements found desirable for the continued publication of the Journal.

World Federation of Education Association.—The Secretary read a letter from the Secretary of the Health Section Committee of the above requesting the Association to appoint a delegate to its Conference at Toronto, August 7 to 12, 1927, where school-health problems would especially be dealt with.

The Committee appointed Dr. Iva Miller and instructed the Secretary to reply accordingly.

Note of Meeting with Representatives of N. M. A. and N. A. C.—The meeting took place at 6 p.m. the same evening. The National Medical Association reported that after discussion and in view of the wording of the invitation from the Ministry of Foreign Affairs, they felt that it was desirable to nominate delegates to the suggested Conference. It was reported that Dr. F. C. Yen would be nominated by

the National Medical Association and that Miss Lilian Wu R. N. would be nominated by the Nurses Association of China. After discussion it was agreed that Dr. James L. Maxwell should be nominated to represent the China Medical Association. It was agreed that identical instructions with regard to their course of action should be given to the different delegates.

Current Medical Literature

HUMAN INFECTIONS WITH ORGANISM OF CONTAGIOUS ABORTION OF CATTLE AND HOGS

ALICE C. EVANS, M.S., Associate Bacteriologist, Hygienic Laboratory, United States Public Health Service, Washington, D.C.

It is now an established fact that *Brucella melitensis* variety *abortus* may infect man.

The disease of man contracted from cattle or hogs is indistinguishable clinically from that prevalent in Mediterranean countries and known as undulant, or Malta fever. In Mediterranean countries it is contracted from goats by consuming infected milk or cheese, or by handling infected goats or infected goat meat, or from contaminated soil or dust. In this country, although the animal host is not the same as in Mediterranean countries, the same channels for the transmission of the disease from animal to man are to be suspected.

The bovine and caprine varieties of the organism causing undulant fever are so closely related that they cannot be distinguished by ordinary laboratory tests. By the agglutinin absorption test, however, a slight but distinct difference between the two varieties may be detected. They are more closely related than the serologic types of meningococcus.

There appears to be some factor that prevents undulant fever from becoming such a common disease in temperate climates as it is in subtropical countries. The records of the last few years show, however, that it is widespread in the United States. Judgment as to how common it is here must be deferred for at least a few years.

Bassett-Smith, an English investigator, has made the statement that, on account of its variety of forms, undulant fever is seldom recognized in its early stages in countries where it is known to exist. Nearly every case is first treated for some other disease. If that is true in countries where the disease is known to be endemic, the chances are almost negligible for it to be recognized by physicians who are not aware that it exists in this country.

According to the textbooks, the diseases with which undulant fever is most apt to be confused are malaria, acute rheumatism, typhoid and tuberculosis. Tularemia may now be added to the list of diseases difficult to distinguish from undulant fever.—*Jour: of Am. Med. Ass., February 26, 1927.*

LEAD TREATMENT OF CANCER

ACCOUNT OF A DEMONSTRATION BY THE LIVERPOOL MEDICAL RESEARCH ORGANIZATION.

BY R. G. CANTI, M.D. CANTAB., Bacteriologist to St. Bartholomew's Hospital and Lecturer in Bacteriology in the Medical College.

On November 30, 1926, a demonstration was given at Liverpool to representatives of the British Empire Cancer Campaign and others interested in the lead treatment of cancer. After introductory remarks by Professor Blair Bell on the history of the organization and the rationale of the treatment, short addresses were given by Professors Dilling, Glynn, and Lewis, and Drs. Brooks, Cunningham, Jowett, and Millett, on their various subjects.

THE TREATMENT.

The rationale of lead treatment is now well known, and is based on Professor Blair Bell's work on the action of lead on the syncytial cells of chorionic villi. These cells have certain characters in common with malignant cells in that they are rapidly growing, and infiltrate the decidua and, in some cases, other tissues. The administration of certain of the heavy metals has long been known to produce abortion. Their action on pregnant does has been investigated at Liverpool, and it is claimed that lead has a specific action on the syncytium, causing necrosis and thus giving rise to abortion. Other metals, including copper, act in a different way—namely, by producing haemorrhage.

The analogy between new growth and chorion has given rise to the suggestion that lead might have a specific action on new growth. Subsequent investigations tend to confirm this, both from clinical experience and from the various chemical and pharmacological investigations, which show, *inter alia*, that after this treatment the new growth has a high lead content.

Technique.

The lead is introduced intravenously in the form of a coarse colloid suspension containing 0.5 per cent. of lead. In this form it has no immediate poisonous effect, and considerable quantities can therefore be introduced with safety. The lead becomes fixed in the various tissues; it is suggested that it acts by its gradual

ionization, and that the most poisonous effects occur in those tissues where it has been fixed in largest quantities. This, while accounting for the necrosis in the new growth, is probably also the cause of the damage which may be produced in the liver, kidneys, blood, and certain other organs ; and therefore before commencing treatment it is necessary to ascertain that these organs are not already the seat of any gross lesion.

Contraindications.

The more important contraindications are hepatic insufficiency, renal disease, advanced morbus cordis, marked anaemia, and wasting. Extensive preliminary investigations, chiefly of a pathological nature, are therefore carried out with a view to passing the patient as fit for treatment.

The Course of Treatment.

The treatment is spread over four or five months ; ten or twelve doses are usually given, and the total quantity of suspension injected is 120 c.cm.—that is to say, 0.6 gram of lead.

In the course of treatment the patient suffers to a greater or less degree from lead poisoning, and in some cases this effect is so severe that it may be necessary that it should be controlled by the intravenous administration of calcium chloride. Much useful experimental work has been directed to a better knowledge of lead poisoning, which in itself is a matter of great importance, quite apart from the question of malignant disease. It is remarkable that, a few months after the treatment is finished, the patients lose all signs of the effects of lead, and look particularly robust and healthy.

RESULTS.

It is as yet too early to judge the results of treatment by statistical methods, but when the cases are critically examined it becomes evident that they must be divided into two groups :

1. Those in which the growth has been treated by lead and by no other means.
2. Those which have been treated by lead, and in addition by surgery or irradiation, or both.

It is obvious that only those cases which have been treated by lead alone are of real importance. The second class of case—namely, that in which other treatments have been employed, whilst clinically of great significance, are not of such value from a scientific point of view. For example, it is within the experience of most surgeons that from time to time when an avowedly incomplete operation is performed, the patient yet remains apparently well for a considerable time before there is any recurrence of signs.

CONCLUSIONS.

Remarkable and impressive as are certain of the cases in which lead alone has been used, it cannot be too emphatically stated that

the importance of the research being carried out at Liverpool lies, not in the wonderful individual results obtained (which form only a small percentage of the cases treated), but in the fact that it is the first time in history that a generalized treatment has been found that brings about a local disappearance of a cancerous growth.

From a scientific point of view malignant disease differs from any other disease in that control cases are not required, the chances of the spontaneous disappearance of a malignant tumour being negligible. If, therefore, with any given treatment really malignant tumours do disappear then it may be regarded as certain that it is due to the treatment given. The necessity for further investigation into the exact action of the lead cannot therefore be too strongly advocated. In the case of radical surgical operation, or the use of the actual cautery, the principle involved is simple—namely, that of removing all the malignant cells so that none remain behind to grow ; but in the case of lead and of radiotherapy the exact sequence of events leading to the disappearance of the growth is but little understood. The scientific worker is buoyed up with hope that the solution of this problem will lead to discovery of the fundamental principles which, when embodied in some form of treatment (whether akin or otherwise), will with reasonable certainty cause the disappearance of every malignant cell, and thus go far beyond the limitations of surgery.

At no other period in the history of medicine has so much attention been paid to the investigation of malignant disease as at the present time. The public except a specific cure to be found, and the press is on the tiptoe of expectation. They do not understand that scientific discoveries are evolved little by little, and unfortunately, moreover, their anxiety that this goal should be reached makes them exaggerate the importance of any new work. The workers themselves are appalled at times to find that some purely scientific statement has been taken up and so turned and twisted as to suggest that a panacea has been evolved. By none is this more keenly felt than by Professor Blair Bell and his co-workers, who have never claimed that lead treatment is an infallible cure for malignant disease, but they have approached the matter from a scientific standpoint, a fact which is evident to all who visit Liverpool.—*British Medical Journal, December 11, 1926.*

STERILIZATION OF CATGUT BY MEANS OF ANILINE COLOURS

HARALD SEIDELIN, M.D., Principal Medical Officer, S.A. des Huileries du Conge Belge.

Catgut, which is usually considered the best material for ligatures and deep sutures, is no doubt even better in tropical practice. But in remote countries one meets with certain difficulties, unknown

or little noticed in home conditions, where material can be bought at any time, and in quantities as desired. Transport difficulties have to be considered, and requirements cannot be exactly estimated; consequently, large stocks have to be kept, but they may remain unused for years. High-class prepared catgut is costly, and even the most expensive is apt to deteriorate with keeping, especially in a hot climate. If the preservative is strong alcohol, the gut becomes stiff and the ligatures difficult to handle. Iodine catgut becomes brittle.

Raw catgut, on the other hand, keeps well for years, and it is desirable to have an easy and reliable method for sterilizing it, anywhere, at any time, and in large or small quantities as desired. If it could be prepared in such a way as to keep in good condition for a considerable length of time, this would materially add to the value of a method.

Aniline dyes are of great value as disinfectants. After prolonged experience with the solution of crystal violet and brilliant green recommended by M'Leod and Bevan-Brown I described its excellent properties for use in the operation room. This solution is now generally used in all our hospitals and known as "blue," the prepared mixture being of a deep blue colour, and not unlike a solution of methylene blue.

It seemed natural to try the effect of this disinfectant in the preparation of catgut. The problem was, how to make the solution penetrate into the interior of the gut. I therefore combined its use with a previous sterilization by means of oil of cloves, well known in histological practice for its penetrating power, and in dental surgery for its antiseptic properties. It has also been used in other methods of catgut preparations, but I have been unable to find any original publication on the subject. The oil is highly irritating, and it is essential that it should be completely removed from any thread which is to be left in the tissues. This can be done by means of absolute alcohol which mixes readily with the oil, and as readily with the dilute alcoholic solution of the dyes. The following technique was, therefore, developed, which combines the consecutive action of three different and powerful antiseptics: oil of cloves, absolute alcohol, and the combined crystal violet-brilliant green, the former two being general germicides, and each of the two dyes having a selective action on certain groups of bacteria. The "blue" has been found not to irritate skin, mucous membranes, or deeper tissues.

1. Raw catgut, thoroughly dry, is wound on glass spools, or on glass tubes, preferably in a single layer, so as to ensure a thorough penetration of the liquids. It is completely submerged in oil of cloves, in test-tubes or other containers, and left until it has become completely transparent, or for at least twenty-four hours. It may remain in the oil for a week or more, without inconvenience.

2. The oil is poured off, and absolute alcohol added. After twenty-four hours, a change is made into fresh alcohol; and another again after twelve hours, if the slightest smell of cloves remains. The gut should not remain for more than forty-eight hours in alcohol. The first alcohol should be absolute, but for the second and third changes alcohol of 96 per cent. may be used, for the sake of economy.
3. The gut is next transferred to the "blue":—

Crystal violet	.. 1 g.
Brilliant green	.. 1 g.
50 per cent. alcohol.	300 c.cm.

where it remains and is ready for use after forty-eight hours. After more than two years I have found it in perfect condition.

Ligatures may be taken directly from the "blue," or rinsed in sterile water, or left in water some time before use. Used directly, without rinsing, it may feel slightly slippery if the surgeon wears smooth rubber gloves, but not with the "never-slip" variety. I regard it as an advantage of no small importance that ligatures may be cut off and used without soaking, as the operation proceeds. The spool remains in the solution for another occasion, and waste is avoided. This counts for a good deal in out-patient departments. The thread is at once perfectly supple, easy to tie, and gives a tight knot—in this respect far superior to many otherwise excellent brands, which are so stiff that it is impossible to make a safe knot unless the thread has been thoroughly soaked first. The reason is that our catgut is preserved in an alcoholic solution of only 50 per cent. strength.

Without having made exact tests of tensile strength, I have, in practice, found the ligatures very strong indeed, and this has been confirmed by others who have used the gut.

Clinical observation, as well as laboratory tests, has shown our catgut to be sterile.—*Trans: of Roy: Soc. of Trop. Med. and Hyg. November, 1926.*

Book Reviews

A Surgical Pilgrim's Progress. 1845-1925.—Reminiscences of Lewis Stephen Pilcher. Published by J. B. Lippincott Co., Philadelphia.

This is a large volume of autobiographical reminiscences by one who beginning with no special advantages reached the pinnacle of success by his own natural talent and conscientious attention to duty in every detail. Such stories have always a fascination of their own and the book under review is no exception to this. Yet on further thought we doubt whether either of the statements made in our opening sentence is really correct. As the child is the father of the man so it is no small advantage to enter on the work of life from a New England parsonage with forebears of rugged strength of character and sublime devotion to duty.

Such a story as this is a fine tonic in days like these when the tendency to pessimism is so pronounced, and every little back eddy makes men doubt the reality of the advancing tide of progress. For the short spell of one professional life of sixty years takes us through the days of civil war and the liberation of the slaves to the liberty of the XXth century; from pre-antiseptic days to the full development of modern surgery; from days of sailing frigates to battle cruisers, submarines and airships; and from stories of yellow fever epidemics to the conquest of mosquito borne disease.

Through an eventful life the writer of the memoirs has taken his part in all of these. A hospital steward and surgeon in the civil war; naval surgeon of a sailing gunboat with auxiliary steam; in sole charge of a yellow fever epidemic on a sailing frigate and himself finally a victim to the disease; a teacher of anatomy and later a prominent surgeon; for forty years the Editor of the Annals of Surgery; such and many more were the roles of the author of this book and it is impossible that such a story can fail to be of the deepest interest to all who love to study the history of human progress.

At the beginning of this review we questioned the correctness of our first statement that the highest pinnacles of success had been gained. We close the book with this as our strongest impression. What is success? Starting with no material advantages the author reaches the summit of material advancement. Starting with all the advantages of a fervently Christian home he closes his book with a chapter "De Profundis" which seems to leave him in the gloomy maze of hopeless speculation as to the future. Is this not failure rather than success? What compensation is there even in a life well spent, if, when at eventide there should be light, a soul finds itself groping in the dusk? Rather one turns to the old metrical psalms that must have been so familiar to the author's ancestors:

"So they from strength unwearied go
Still forward into strength
Until in Sion they appear
Before the Lord at length."

J. L. M.

Diseases of Women.—H. S. Crossen, St. Louis, U. S. A. The C. V. Mosby Company, 1926. Price G.$11.00.

This is a very fine book and beautifully illustrated. The illustrations which accompany the directions for abdominal and vaginoabdominal examination are specially clear and good. The sections on the diagnosis and treatment of gonorrhoea and other forms of vaginitis are well worked out, and the rarer forms of vaginitis are treated in sufficient detail as to make the book a valuable one for reference in these cases, which are sometimes puzzling and annoying.

The anatomy of the pelvic floor is carefully explained and the illustrations bear out the text. The treatment of relaxation of the pelvic floor, and of lacerations which are the result of labour, is well given, and the conclusions and methods are set out so clearly that the steps of the various operations can be easily followed. This is specially true of the operation for the repair of a complete rupture of the perineum involving the anal sphincter. The treatment of prolapse of the uterus is well described, though the writer devotes a large space to pessaries, hardly reflecting modern views on this form of the treatment of prolapse.

In all sections, the macroscopical and microscopic pathology of the various tumours and inflammations is succinctly treated, the illustrations of myomata uteri are especially good, and the discussion of the pros. and cons. of radium, the X-ray and operation in this trouble are given dispassionately, and the dangers of radium and the X-rays are clearly stated. The same is true of the discussion of carcinoma of the uterus, and one is glad to see that the writer gives no countenance to the effort to limit diagnostic curettage to patients who are prepared and have consented to radical operation.

There is no doubt that his dictum that "pressure manipulation of a cancerous area is much more productive of metastasis than simple excision of tissue or curettage with proper precautions" is sound. He advises radium treatment before operation and follows it up by deep X-ray therapy, and the discussion of the use and value of radium and the X-rays in the treatment of malignant disease is good.

The description of the symptoms and treatment of pelvic inflammations is clear, and the differential diagnosis of chronic pelvic inflammation is well given and well illustrated.

Pelvic tuberculosis and extrauterine pregnancy are shortly treated, and the treatment of the latter condition is sound. The section on the differential diagnosis of this condition is helpful, though the intense tenderness felt on vaginal examination is hardly sufficiently emphasized.

The section on fulminating pelvic edema is an excellent description of a rare condition which is a puzzling one but is occasionally seen.

The ovary and its tumours are clearly described including the rare Krukenburg tumours.

There is a short section on malformations of the uterus followed by an excellent section on menstruation and its disturbances.

The section on the internal secretory glands in relation to gynecology is written fairly, differentiating facts from theory and speculation, and the discussion of organotherapy is distinguished by the same judicial consideration. In the discussion on the relation of the nervous system to localized pelvic pain and extrapelvic symptoms supposed to be due in whole or part to some intrapelvic lesion, there is wise advice given as to the treatment of these cases.

Medico legal points such as rape, foreign bodies left in the abdomen, and other medico legal matters are shortly discussed and there is a good index added.

Taken as a whole the book may be most heartily recommended, and should prove very useful to men and women who have to depend much on their library for consultation purposes. It is well printed, on good paper, and strongly bound.

J. P. M.

Chininum Scriptiones Collectae. Anno MCMXXIV Editae.—Published by The Bureau for increasing the use of Quinine. Amsterdam.

During the years immediately following the Great War there was a distinct tendency to depreciate the value of Quinine both in the prophylaxis and treatment of malaria.

To a great extent this was due to opinions hastily formed and still more hastily expressed by young Army Medical Officers without previous experience in the treatment of malaria. To some extent it was also due to the wholesale and indiscriminate use of quinine by intramuscular injection in some of the units of the British Expeditionary Forces.

A book such as this is an excellent corrective to such mistaken impressions. The volume is one of some 250 pages and 56 articles, mostly by leading authorities on tropical medicine. Naturally all aspects of the use of quinine are dealt with but the impression that remains with the reader is that the oral route maintains its position as *facile princeps*. Manson opposed intramuscular injections unless made for good reasons. Ross has repeatedly expressed his opposition in ordinary cases. Fletcher in Kuala Lumpur injected 10 grains of the bihydrochloride in 22 minims of salt solution into each buttock of 22 patients. The shortest time in which quinine appeared in the urine of any patient was 20 minutes and the average time was 60 minutes. The same amount of the same salt was given by mouth to a similar group of patients, and the shortest time in which quinine appeared in the urine of any patient was less than 15 minutes, the average being 31 minutes.

In general, Fletcher's report is a plea for the restoration of faith in quinine in malaria, and for its oral administration. He does not say that an absolute resistance to quinine is impossible, but in a wide experience he has not seen one case of actual resistance.

The last few papers in this volume are devoted to the uses of quinine in non-malarial conditions.

J. L. M.

Physiology and Biochemistry in Modern Medicine.—J. J. R. Macleod, M.B., L.L.D., D.Sc. F.R.S. assisted by R. G. Pearce, N. B. Taylor, J. M. D. Olmsted and others.

Fifth Edition. St. Louis. The C. V. Mosby Company, 1926. Price G. $11.00.

This edition of Professor Macleod's book witnesses a new departure. In previous editions the absence of sections on the Special Senses and on nerve-muscle physiology made the book unsuitable for use as the sole textbook on physiology for medical students. These deficiencies have been made good in the present edition with the result that we can now heartily recommend this book as a complete and up-to-date textbook for advanced students of medicine. For the beginner in physiology—the lack of diagrams showing the anatomy and histology of the organs of Special Sense will prove a drawback. For instance there are most interesting pictures of photo-electric currents in the human eye, but none showing the action

on the extrinsic muscles. Under "The Ear and Hearing" there are tracings of wave forms of the flute, violin, clarinet and oboe, but no adequate diagram to show the movements of the Ossicles.

The sections on the blood, respiration, ductless glands, and carbo-hydrate metabolism have been very thoroughly revised in view of the great advances which have been made in these subjects during the last four years.

We have nothing but praise for this book as a most readable review of recent developments in physiology. To the medical man who wishes to keep abreast of the subject it is almost indispensable.

D. S. R.

Principles and Practice of Oral Surgery by S. L. Silverman, D.D.S., F.A.C.D. Published by P. Blakiston's Son & Co., Philadelphia. Price G.$6.00.

Many books, besides useful information contain a considerable amount of padding; this book contains none: in places, rather it tends to err on the brief side.

The Dental Surgeon will find much useful information in this book. Mechanical dental work and other purely dental work does not come within the scope of the book; the reader is referred elsewhere for this information. The same applies to certain operations which belong to the General Surgeon rather than the oral Surgeon.

If in this book the Dental Surgeon is introduced to a more general aspect of the mouth and face, the General Surgeon is no less introduced to the Dental aspect of Surgery of the Jaws.

The writer bases his surgery on Sound Principles and has several original contributions to make to Surgery.

In the section on necrosis of the Jaw the reader is warned against operating for a sequestrum which has not been given time to separate from the living base.

In the section on Maxillary Sinusitis it is stated that the best method of diagnosis is by X-ray; this is certainly a method in use, but is by no means always reliable, and we rather depend on aspiration and examination of the fluid withdrawn, if any.

In partial excisions of the jaws, the Surgeon will find useful information in this book as to how to keep the remaining bone in a normal position and prevent deformity.

Undoubtedly the treatment for fractures of the lower jaw is by intermaxillary wiring where practicable. This method is described in detail and every General Surgeon should be acquainted with it.

Other useful information on plastic work on the jaws will be found in this book.

The section on Impacted teeth will also be of considerable interest to the General Surgeon. It is a condition we are constantly meeting, and which X-ray has shown to be by no means rare. Its surgical treatment is fully dealt with in the text;—the best approach, the best incision, etc.

Three Chapters are devoted to cleft lip and cleft palate including the after treatment when speech is defective.

The writer is an ardent follower of Dr. Brophy in his early operation for these conditions. He makes a good case for the operation "in the first few days or weeks after birth."

This operation and plastic operations on the lip are described in detail. If for any reason a late operation is performed, it will be necessary for the patient to undergo very careful training in speech. The chapter on this important subject is illuminating and is usually omitted from text books of Surgery.

This book is well illustrated and should be read by all General Surgeons who will find much useful information in a condensed space. It will be equally useful to Dental Surgeons who will get from it a good introduction to General Surgery as applied to the jaws and face.

D. J. E.

The Septic Problem and Immunity by D. Montgomery Paton, L.R.C.P., L.R.C.S. Edin. Publishers Bailliere, Tindall and Cox. Price 7/6.

The purpose of this book is stated by the author in the preface "There are many problems yet in immunity which have not been considered in the light of this theory (i.e., of immunity suggested) but it will have been something even if it only pioneers a fuller development at a future date."

Defense against invasion of organisms is classified into (1) specific and (2) non-specific. Under non-specific immunity are considered two elements (1) the endocrine glands and (2) the anti-tryptic content of the blood. "Natural immunity

is non-specific in character and is developed proportionally, in immune sera along with the specific. . . . Protein therapy is just a haphazard vaccine method of provoking this non-specific time reaction."

The author has experimented with normal, antidiphtheritic and antistreptococcic sera in a variety of diseases of septic origin, using the sera both orally and hypodermically. Good results have ben obtained by the oral use of the sera alone and the oral use of serum in combination with the hypodermic use has given better results than the hypodermic use alone. This the author attributes to the hormones in the serum which are absorbed by the gastro-intestinal tract even as thyroid substance in tablet form is absorbed. The effect of this oral administration is that the body gains the tonic effect of all these hormones just at the time when the hormones of the body are at a low level and thus the immunity of the tissues is increased.

The use of antidiphtheritic serum as a dressing for lacerated and septic wounds is of interest and seems to be worth of trial. The expenses of securing serum in sufficient quantity would be a question in mission hospitals but this might be compensated for by the shortened time of healing.

W. H. B.

Medical Report of the Hamilton Rue seventh expedition to the Amazon, in conjunction with the Department of Tropical Medicine of Harvard University, 1924-1925. Contributions from the Harvard Institute for Tropical Biology and Medicine; No. IV.

This report, beautifully got up and wonderfully illustrated, makes a special appeal to the medical reader from its exhaustive review of the diseases of the Amazon region. Many of these are common to all tropical countries and are dealt with so fully that the book becomes a very valuable addition to our medical libraries.

Among the affections that are of special interest to us are Tropical Sloughing Phagadoena illustrated by some remarkable photographs that are very typical of similar cases seen by ourselves in Formosa, though not so diagnosed. The whole subject and its causative pathology is very fully dealt with as also is Granuloma Inguinale (Ulcerating Granuloma of the Pudenda) a common enough disease in parts of South China.

The chapter on Splenomegaly is particularly interesting and shows again the wide distribution of the yet unexplained disease which in many respects closely resembles the Banti Syndrome and which is so frequent in many regions in this country.

We have only noted one statement in this book that calls for criticism and that is (page 66) that the Chinese firmly believe that leprosy is spread by sexual intercourse. We believe that this as a general statement is entirely incorrect. In special localities it may be true but we should like to have confirmation of this if it be so. We know that in one area at least the opposite is the case and that there is a belief that the disease may be cured by intercourse with a non-infected woman.

This trifling criticism in no way detracts from the value of this remarkable volume which might be well placed on the library shelves of every hospital in South China.

J. L. M.

Hospital Reports

MACKENZIE MEMORIAL HOSPITAL. L.M.S. TIENTSIN.

Medical Superintendent: Dr. Stuckey.
Resident Surgeons: Drs. C. H. Lei, E. J. Peill.
House Physician: Dr. S. K. Wang.
Consultants: Drs. P. K. and P. T. Liang.
Matron: Miss. A. R. Edmanson.

Inpatients 850. Dispensary visits 73,236.

The figures for patients constitute a new record for the hospital of which the staff may be justly proud in view of the fact that 1926

was a year of fighting when the city changed hands twice within six months.

Some interesting details of medical treatment are given, and a promise of a paper on a new treatment for leucoma and nebula of the cornea to which we shall look forward.

The need for new hospital buildings and further equipment is emphasized.

A list of operations is given at the close and this is the most disappointing feature of the report. It shows an enormous amount of work but so insufficiently classified as to be of little value for study. Thus "Tumours (innocent and malignant) 93" tells of plenty of work but is hopeless for study, whereas a hospital of this importance should furnish very valuable material for the scientific investigator.

GOOD-WILL HOSPITAL, NANHSUCHOW, ANWHEI. P.N.

Drs. Douglass and Chao. One Foreign and three Chinese Nurses. Inpatients 400. Dispensary visits 11,000.

A charming little report of the work of the hospital including a limited amount of Public Health Work. It is interesting to note the prevalence of Hookworm in a region considerably further north than the disease is ordinarily met in a severe form in China. Vesical calculus seems also to be a common disease, a case being reported in a boy of 18 months still nursing.

The report closes with a table of diseases about which we would repeat the complaint made in our review of the Tientsin Hospital.

JENKINS-ROBERTSON MEMORIAL HOSPITAL. B.M.S. SIAN.

Drs. B. C. Broomhall, C. J. Stockley, H. G. Stockley, Ruth M. A. Tait, Djiang and Li Pen.

3 Foreign Nurses. Beds 100. Inpatients 1140. Dispensary Visits 20,000.

The report for 1925 is commemorative of the 25 years of the hospital's work. A history of the hospital is given by the Rev. A. G. Shorrock. It is a striking commentary on the work of a mission hospital that three of the doctors died from typhus, two of them within three weeks of each other. Stormy indeed has been the past of the Sian Hospital. The Revolution filled it with wounded, at one time as many as 600 being accommodated at once, to be followed by siege, explosions and earthquakes.

The report contains an interesting account of some of the cases and an encouraging description of the evangelistic work.

Correspondence

Eclampsia

Tsingtau, March 19, 1927.

To the Editor, C.M.J.

DEAR MR. EDITOR,—The articles on Eclampsia which appeared in the China Medical Journal, February number, 1927, proved to be very interesting reading for me and therefore I should like to express to you the opinion of this disease and its treatment as is generally held by the majority of gynecologists in Germany.

We believe that Eclampsia is a result (product) of the pregnancy; and the danger of a serious conclusion to this is directly proportional to the length and frequency of the convulsions. For this reason we believe that an early evacuation of the uterus is highly desirable as being the correct treatment. That is to say, delivery with forceps if the head is in the pelvis (*Zangengerecht*) or version after dilatation of the cervix, other conditions of the pelvis and soft parts being normal, and then extraction. Under other conditions, the abdominal cesarean section (*Sectio caesarea cervicalis abdominalis*); or if fever is present or the child is not capable of life, the vaginal Cesarean section (*Hysterotomia vaginalis*) should be made at once.

Respectfully yours,

P. WEISCHER.

Economy in Drugs

March 24, 1927.

To the Editor, C.M.J.

DEAR SIR,—Exactly what the position of an Editor writing to himself is I do not know, but I presume that he may take this method of expressing his opinions as an individual doctor. The method seems a fairer one than that of criticising an article in an Editorial when particular problems and not general principles are involved.

The February issue of the Journal contained a very interesting paper by Dr. Owen Chapman on Economy in Drugs. As a medical man who for many years had to run his own hospital without any financial support from home, this is a subject on which I have been long deeply interested, but my conclusions have not been in all cases the same as those of Dr. Chapman. In certain directions his paper appears to me to be too iconoclastic and he ventures on one or two *ex cathedra* statements which we believe would be warmly disputed by many physicians of experience.

Is a drug necessarily inefficient because we cannot at the moment demonstrate its therapeutic action? For myself I would venture to maintain that this is far from being necessarily the case. Space will not allow of doing more than giving one example of this. We wish to prescribe a mixture of which the principle element is Nitro-hydrochloric Acid. It is an unpleasant drug to take, but one that may be of great value in certain cases. For instance combined with Liq. Strychnine it forms a very excellent tonic, but an even more nauseous mixture than the Acid alone. Add infusion or tincture of orange to this, and you get a mixture that is at least tolerably palatable; personally I consider it not unpleasant. But according to Dr. Chapman tincture of orange is to be excluded because it has no demonstrable therapeutic action. I reply it is a very valuable drug as making other more powerful drugs palatable. I am trying to argue merely from Dr. Chapman's point of view, for myself I would believe that bitter stomachics have a real value whatever the pharmacologists say.

Dr. Chapman says that all infusions without exception may be dispensed with in favour of the corresponding tinctures. Yet I can hardly picture any of us giving an enema of tincture of quassia for thread worms. Apart from this I would maintain that in a large country hospital doing a big O.P.D. work there is an immense and unnecessary waste of alcohol in the use of tinctures. Infusions are easily made and where the amount of mixtures dispensed is large there is little fear of their going bad before use.

Dr. Chapman again has nothing but wholesale condemnation for the preparation of Tinctures in our dispensaries. He forgets that he is at present working in a country where import duties are low. They would appear to be likely to rise rapidly and in any case the cost of transport to many inland stations is so high that all imported drugs must be costly in such places. Excellent

alcohol of local manufacture, is very cheap he says, then why for instance in places where capsicum is growing wild at my doors should I not use cheap alcohol and the plant which costs practically nothing to make my Tinct. Capsici. This is but one example of quite a few tinctures that can be made with ease locally, either out of home grown products or easily imported dry materials.

A very valuable little brochure was published in England some years ago entitled "How to cut the drug bill". Through many loans I have lost my copy, but it is well worth getting by any one interested in drug economy.

We shall all agree that this subject is one of great importance to our hospitals and Dr. Chapman deserves our thanks for bringing the matter forward and for the many useful suggestions that he makes. It seems hardly fair to complain of what seem to be the few flaws but the subject deserves such careful attention that I hope he may pardon my criticism.

JAMES L. MAXWELL.

Obituary

Dr. Jeannie Isabelle Dow was born at Fergus Ontario, Canada, in 1870

An exceptionally alert child mentally she passed the entrance to High School examination at the early age of ten, and was teaching at sixteen. The call for workers among those to whom Jesus Christ was not known as Lord and Saviour, came very strongly to the heart of the young girl, who had, coupled with a highly intellectual mind, a fervent spirit. The bodily needs of those without medical aid was also pressed home to her mind, and she decided on a medical course, graduating from Toronto Medical School in 1895. In the fall of that year she accompanied Miss M. McIntosh, the first nurse sent out by the Canadian Presbyterian Mission, to North Honan.

With a natural aptitude for acquiring the difficult language, she studied Chinese under Mr. Fan, a Chinese scholar. His advice "If you have a message to deliver you must learn not only to deliver it, but to deliver it with efficacy" acted as a spur to her own desire to acquire facility in Chinese, to such purpose that she became one of the best speakers in the mission, and was for many years a valuable member of the Mission Language Study Committee. Listening to her preaching to the patients in the chapel was a delight, as she had none of the faulty constructions, and unidiomatic expressions which mark even fairly proficient Chinese speakers.

Fond of music, Dr. Dow early associated herself with the development of a singing church in North Honan, teaching music in both Boys and Girls Schools, with such good effect that pupils going to their homes carried with them the tunes taught them, and largely through her efforts, praise in song, has become an integral part of worship even in small congregations in this part of China.

As a Medical woman her work was of a high order. With high ideals of efficiency she used her furloughs for further advancement, doing postgraduate work in both the United States and Great Britain. She was a good all round surgeon, but was particularly efficient in Eye work of all kinds, life in the interior bringing abundance of material to hand. Her work among Kala-azar patients formed an important part of her clinic during later years, and her name will long be remembered with blessings for her unsparing ministry of service to needy maternity cases during the last famine. During her thirty one years of medical work in China she had many and varied experiences. Beginning in a small hospital in Chu Wang, where she was associated with Dr. Wm. McClure now of Shantung University, she saw the wreckage of her work, and passed through the Boxer uprising, sharing with others the perils of the journey to the coast. She returned from furlough to establish a Woman's Hospital in Changteho, Honan, which from a small building, grew to a commodious plant which was just being opened, part only of the building being occupied, when a necessary operation made a journey to Peking imperative. She died in the P.U.M.C. on January 17, 1927.

Dr. Dow has had a unique place in the hearts, and esteen of all associated with her. Wise in counsel, considered in judgement, constant in friendship, reserved herself, yet with a ready and sympathetic ear for the problems, perplexities and troubles of others, her safe sound judgement, her ready humour, her kindly criticism, sometimes destructive but more often constructive, won for her love honour, and something more akin to reverence than is accorded most men.

While much more might be said of her as linguist, sweet singer, physician and friend, more than all these she was an evangelist, her greatest work, the work she loved best was in chapel and in ward; patiently telling again and again the old old story, so that the Way of Life might be made plain to the blurred vision of those who had never seen Him. She herself had given Christ His preeminent place in her life, and she "allured to brighter worlds and led the way." Splendid in every form of service, she was most splendid, as a messenger of the Cross, and it is as an ambassador of Christ we shall remember her.

NEWS AND COMMENTS

To Advertisers.—Our apologies are hereby tendered to any of our advertisers who have asked for changes in their advertisements in this month's issue. Owing to the exigencies of printing under strike conditions it has been impossible to make any changes in this month's Journal.

Proposals for Membership.—For the same reason it has been necessary to print the proposals for membership that appeared in the March issue a second time. New proposals will be found in the letter press of the Journal at the end of News and Comments.

Dr. J. Whitfield Guinness.—As we go to press the sad news has reached us of the death of Dr. G. W. Guinness, C.I.M. of Kaifeng, Honan. We understand that Dr. Guinness left that place feeling ill and was found on reaching Peking to be suffering from typhus from which he died.

We hope to be able to publish a notice of his work in China in an early issue of the Journal.

Dr. R. C. Beebe.—Our old friend Dr. R. C. Beebe to whom the Association owes so much for his long and enthusiastic labours as Secretary left for the States on April 23rd.

The warm wishes of all the members will go with him for such measure of renewed health and strength as is yet possible for him.

Dr. and Mrs. Todd.—Dr. and Mrs. Todd of Canton passed through Shanghai in the latter part of this month on their way to the United States for a holiday Dr. Todd holds a unique place in Canton where he has established himself in private hospital work since he was compelled to leave the Kung-Yee Medical School.

Mrs. Todd has resigned the Presidency of the Nurses' Association of China in view of her departure to the States.

Miss Lilian Wu.—Our congratulations to Miss Lilian Wu, R.N., Matron of the Red Cross Hospital, Shanghai, on her assumption of the office of President of the Nurses' Association of China.

Cause and Effect?—A lady came in with her husband the other day and told me she had been married 11 years with no children. I had been to the village, preached outside their house and given her six pills. Result: return of menstruation next month and a child within a year. Present request: six more pills!—Letter from a Doctor.

Some Treatment!—I heard of a small child with pneumonia the other day (niece of one of our nurses) who was getting oxygen continuously and a hypodermic every half hour day and night! The nurse said that he did not seem very bad, but the doctor thought he might become so. I thought so too if the treatment were persisted in, but did not say so.—Id.

White Ants.—To demonstrate the absolute insurance against white ants by chemical treatment of wood, the Bureau of Entomology in co-operation with the American Wood Preservers' Association has recently erected a model building in the Panama Canal Zone. It is constructed entirely of wood, not a block of which is untreated. It stands very close to the water where the white ants naturally find plenty of moisture to keep them alive. The foundation timbers were treated with coal tar creosote and the interior woodwork with chemicals such as zinc chloride which does not injure the surface for painting.—*Can.: Med.: Ass.: Jour., February, 1927.*

NEW MEMBERS PROPOSED

Cunningham, Gladys S.	M. D. Manitoba U. C. C. Proposers : Dr. A. B. Speers Smith Dr. Wallace Crawford	Seoul, Korea
T'ien Wen Pin	M. D., P. U. M. C. A. B. C. F. M. Proposers : Dr. W. A. Hemingway Dr. Percy Watson	Taiku, Shansi
Faulkner, Dorothy	M. B., Belfast P. C. I. Proposers : Dr. Emily M. Crooks Dr. James L. Maxwell.	Peking, Chi.

NEW MEMBERS ELECTED

Dr. W. Ellermeier	W. M. Tsining, Sung.
Dr. Ilse Ellermeier	W. M. Tsining, Sung.
Dr. Ethel M. James	S. D. A. Waichow, Tung.
Dr. E. R. Killmier	Aus. Ch. M. Hweihchow, Sze.
Dr. Marion Yang	P. U. M. C. Peking.
Dr. E. H. Clay	M. E. M. Peking.
Dr. C. L Pannabecker	M. G. C. Peking.
Dr. J. W. Unis	Aug. Hsuchow, Ho.
Dr. H. St. J. Whitting	P. N. Tengchow, Sung.