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BLEEDING IN WOMEN

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BLEEDING means escape of blood from a blood vessel, large or small, when broken. When the blood escapes outside, it cannot go to the tissues which were normally supplied by that blood vessel and which consequently suffer for want of blood. To all the tissues in the body blood conveys oxygen, nutriments, hormones and vitamins. These substances which are so essential to the life of the cells constituting the tissues are thereupon lost to them.

If the bleeding vessel or vessels are fine as capillaries the bleeding may stop of itself, either temporarily or permanently. Should the broken vessel be large, the bleeding would be considerable and unless measures are at once adopted to check it, the person may bleed to death.

A blood vessel may be broken by accident, or it may give way on account of disease that might have weakened the walls of the blood vessels and rendered them very fragile. In gynæcological practice an accident may be noticed of the nature of a fall on the buttocks, the woman bestriding a hard, sharp edged or pointed object, involving the external genitals or perineum. The patient may bleed profusely, as the parts are richly supplied with blood vessels. The hæmorrhage has to be controlled without much loss of time. As to the affection of the blood vessels, it may be seen in connection with the diseases of the blood or toxæmia which may involve the minute vessels and render them liable to bleed readily.

Besides, in child-bearing period, women sustain periodical loss of blood through menstruation, which is a physiological process. On an average, menstruation recurs every four weeks and lasts nearly four days, the quantity and duration varying in each individual. It is not unusual for some women to get their periods almost always at the end of three weeks, while in some at the close of five weeks. It is a usual course with them and they are no way worse for it. In the same way, some lose blood for three days and even for six or seven days; they look upon it as their usual course. But should there be greater aggregate loss of blood every month than usual from any cause, it invariably produces harmful effect on the individual.

Here it may be incidentally mentioned that a woman feels very happy when she gets her periods regularly and loses the usual quantity of the menstrual fluid. If it has been or if it becomes scanty and irregular, occurring at the interval of two or three months, she grows unhappy and grave, and begins to imagine that all her other troubles as headache, dimness of vision, pain in the joints, flatulence, constipation and even obesity are resulting from menstrual deficiency. It is usually considered that menstruation cleanses the body by throwing out regularly bad blood from it. When the blood is not shed at intervals and in adequate quantity, it accumulates in the body and gives rise to all these troubles. It need not be mentioned that there is hardly any truth in it.

Though undue significance has been attached to scantiness of menses, on the other hand excess of it occurring every month does result in poverty of blood and ultimately in pronounced secondary anæmia. Just as a person suffering from hæmorrhoids and having bouts of bleeding at intervals gets intensely anæmic, so does a woman with severe menorrhagia in course of time become.

Bleeding per vaginum may occur at any time of life. It may be noticed in infancy, in childhood, from puberty to adolescence, during youth, at the menopause or after the menopause.

Bleeding in infancy:—Soon after birth, in three or four days, blood may at times be noticed escaping by the vagina. In general it is slight in amount but the mother is frightened at its sight and with great concern shows it to the doctor and demands treatment. She may be assured that no fear need be entertained and that it will stop of itself. It is due to sudden disappearance of œstrin. The child had, while in the uterus, received from its mother a certain amount of œstrin which is stopped after birth. The consequence is the superficial layers of the endometrium and especially vaginal mucous membrane, which are thick and succulent at birth, for want of stimulus from œstrin, disintegrate and give way, giving rise to thick sanguineous discharge, consisting of blood, mucus and plenty of breaking down vaginal epithelium. It lasts for two or three days and then disappears.

It is the result of the disappearance of œstrin, which fact can be proved by one other affection. There is a very serious affection noticed soon after birth. It is nothing but neonatal hæmorrhage. In a few hours after birth a child begins to vomit blood, passes blood by rectum, and even by urethra. But then pure blood is not seen escaping per vaginum. The passing of blood through mouth and rectum is so great in amount that in the space of a few hours its life is imperilled. Even in such a case I do not remember to have seen a child that has passed pure blood per vaginum. It can be accounted for by the presence of œstrin derived from the mother which prevents bleeding by the uterus.

Bleeding in a girl before the onset of puberty:—It may be due to a foreign body in the vagina, or to an affection as gonorrhœa, trichomonas, yeast or to a malignant affection as sarcoma botryoides. In these there may be irritating discharge mixed with the spotting of blood.

Sometimes there may be regular monthly discharge of blood in a girl. It is brought on in such a case by precocious menstruation. In it, along with the regular bleeding, are other feminine evidences such as enlargement of breasts, growth of the pubic and axillary hair, rounding of the buttocks and shoulders and even alteration of the voice. Uterine bleeding may also be noticed when there has been the development of granulosa cell tumour of the ovary. Owing to the activity of these cells in the tumour, œstrin may be produced in great amount which may render the endometrium active and effect even separation of the superficial layers leading to bleeding.

TREATMENT.—The foreign body that is not unusually found is a slate pencil. It can be detected by rectal examination; and also by introducing a sound through the hymenal opening and feeling for it. Having ascertained the existence of it, by the finger in the rectum, attempts may be made to push it forward and when the end of the pencil can be seen, it may be caught hold of by the forceps and drawn out. When a foreign body is not removed soon after its introduction, and allowed to be in the vagina for some days, it sets up irritation and as a result discharge begins to come out. If still neglected, the discharge may sodden the mucous membrane and slight bleeding may occur.

I have seen inserted a slate pencil and a hair pin with the loop directed into the vagina and ends sticking out. The hair pin could be easily pulled out while the slate pencil was removed by pushing it forward by a finger in the rectum. The earlier a foreign body can be removed the better it is, as it avoids further trouble of discharge mixed with blood.

Affection—Gonorrhoeal:—Girls may be found affected with this disease. The infection is carried out by using a common towel or

bath-pan. There is a foolish, queer conception among the ignorant that by transmitting the infection to a small girl, the wicked sufferer is cured of it. In this way a poor innocent girl is afflicted by the disease.

Before the discovery of Sulpha drugs and Penicillin such a girl continued to suffer from gonorrhœal discharge for a long time. She was then given antiseptic douches through a rubber catheter and the parts were kept clean. The douches were afterwards combined with glandular therapy. She was given œstrin, which hardened the squamous epithelium of the vagina and rendered it resistant to gonococci. In this way the discharge could be controlled. But now if Penicillin is injected quite in the early stage, further advance may be at once arrested. If required, Sulfadiazine may, in addition, be given along with Sodii Bicarb. (gr. 15 of each).

Other conditions which may produce discharge mixed sometimes with slight blood are trichomonad and yeast.

Trichomonad vaginal vaginitis :—In a small girl trichomonad affection may be observed. It may be due to the parasite being carried from the anus to the vagina by the fingers. Those whose practice is to use paper for wiping after a motion, a girl in cleansing the parts may carry the paper from the anus to the vagina and may deposit the fæcal matter on the labia. Thus it may be the source of infection. Even in washing away with water, if fingers are carried from the anus forwards, the water may be splashed into the vagina, thus introducing the fæcal matter into it. Masturbation helps introduce the parasite in the vagina.

When once introduced in the vagina, the trichomonas set up vaginitis. It produces a profuse discharge, which is pale yellow usually containing bubbles of air. When vaginitis is active, even spotting of blood may be noticed.

Prophylactic treatment is most advisable and consists of care in the toilet of the parts.

Monilia—Mycotic vulva-vaginitis : —It is seldom seen in young girls. However the fungus may be noticed on the vulva in those girls who have recovered from a severe prolonged illness and whose general resistance of the tissues is below par.

Precocious menstruation: -Sometimes in small girls even between the ages of 5 to 9, regular menstrual periods may be observed. It may be due to early onset of œstrogenic function. With it the girl may prematurely develop femenizing characters. In the absence of any ill effect or any tumour in connection with an ovary, no treatment is necessary.

It must be remembered that at this time bleeding per vaginum may occur as a result of the development of the granulosa cell tumour, as stated before. Owing to excessive development of these

typical cells, œstrogenic hormone is produced in a great quantity, which influences the endometrium and produces bleeding. It is however irregular and more than ordinary menstrual bleeding. All the signs of sex activity may be developed and readily noticed.

With such bleeding, careful examination has to be made. In a girl, recto-abdominal examination should be done to find out whether the ovary on one side or the other is enlarged, solid to the feel and smooth on the surface. With the history of constant bleeding, if such a tumour is felt, it would warrant the suspicion of a granulosa cell tumour of the ovary. Its removal is indicated. Only the affected ovary may be removed in that at this age the other ovary, if not affected, has to be conserved along with the uterus since the affection is not highly malignant and there may be no metastasis.

Sarcoma botryoides :—On rare occasions we find in small girls sarcomatous growth from the cervix. It may soon grow to such a size as to protrude through the hymenal opening. It is attended with bloody discharge. It very soon produces constitutional symptoms and grave effects on the girl. The prognosis is grave.

Bleeding in adolescence :—From puberty onwards the girl may begin to menstruate and have regular periods and may lose blood in quantity which is usual with her. But a few girls are not infrequently seen who have abnormal bleeding any time during adolescence. All those conditions that may cause bleeding, little or much in small girls, may do so in adolescence. But the one which is not uncommonly noticed at puberty is functional hæmorrhage on account of dysfunction of the ovary.

Functional uterine bleeding : —This term is an unfortunate one and is objected to by many since it is the result of dysfunction of the ovary. But it positively suggests that the bleeding is not due to any pathological lesion of the genital organs, which fact must be ruled out before reaching the diagnosis of functional hæmorrhage. The functional uterine bleeding, though it may be manifest itself at any time in the sex active life, is most common at its commencement or at the close of it. It is characterised by continual prolonged bleeding lasting for days together or even three or four months, preceded and followed by periods of amenorrhœa of almost of the same duration. Its great peculiarity is, it is nearly always painless. The patient passes blood in clots, so that she soon begins to look anæmic. She may give the history that a week or ten days, she passes blood in a great quantity and then for five or six days the loss of blood becomes less and again becomes much.

At puberty when a girl happens to develop the trouble, she soon loses so much blood as to look very pale, to get out of breath on slight exertion, to feel giddy on sitting up in bed and even to become sick. In course of time the bleeding stops and she remains free from the trouble for three to even six months during which

time she may partly regain her health and colour. But the same phenomenon may be repeated. Thus for three or four years these episodes may continue to take place and then she may be fortunate to get rid of it and even to have the regularity of menstruation established, when she may have her periods every month, losing blood three or four days. She is however prone to have a relapse after a few years.

From the adolescence to the menopause:—Functional uterine bleeding at this period, though not so frequent as at *puberty* or at the menopause, is not uncommonly noticed. It, however, then presents a very difficult problem in that it has to be distinguished from other causes that give rise to bleeding. Of these the most important is pregnancy which is ever to be remembered and which must first be excluded in child bearing age, before arriving at the diagnosis of functional hæmorrhage. The clinical course of this affection is almost similar to that when occurring at the earlier or later life. This affection possesses one great peculiarity which is worth remembering. It is that while the trouble is in existence, the patient may not conceive at all.

At the menopause:—When the menopause is approaching some women may suffer from such bleeding until the change of life is permanently established. By bouts of hæmorrhage the patient may be rendered almost anæmic. At this period the diagnosis of functional bleeding should never be presumed first until malignancy of the cervix or the endometrium is positively negatived. Just as in child bearing period pregnancy is to be thought of first, so is malignancy at the menopause.

Diagnosis in adolescence:—From puberty onwards a girl may suffer from functional bleeding. But this diagnosis should not be at once reached until other causes are ruled out. Bleeding may be caused by granulosa cell tumour, malignant affection of the cervix as sarcoma botryoides, blood dyscrasia.

As in many cases at this age vaginal examination may not be possible, recto-abdominal mode must be resorted to. By it, ovarian tumour can be made out. Along with it there may be history of menorrhagia associated with little bleeding off and on between the periods. But in functional uterine bleeding the loss of blood is considerable and it is almost constant sometimes with frequent remissions of four or five days, when bleeding either stops or becomes less in quantity. In malignant affection of the cervix, it becomes necessary to make vaginal examination under anæsthesia. It is then possible to feel the growth at the cervix. It may be filling up the vagina and bleeding readily owing to trauma.

General systemic examination should not be neglected and thorough blood examination done including the determination of cholesterol. Even basal metabolism may be found out if the girl is obese

and hypothyroidism is suspected. In such a patient there may be dysfunction of the ovaries, producing bouts of bleeding after a prolonged period of amenorrhœa.

TREATMENT.—Functional uterine bleeding may stop by itself and the girl may even get regular menstrual periods. This fact should always be borne in mind in treating an adolescent girl. If the affection runs a mild course, the patient may be treated with iron tonics, good nutritious food, vitamins, rest during bleeding but regular light daily exercise when free from it. When the bleeding is pronounced, she may be put on hormonal treatment, administering Oestrogens which are now found to be more effective when given in sufficiently large doses. Diethyl-stilbœstrol may be given by mouth or by injection. This synthetic preparation may be given from 10 to 25 mg. a day by mouth to control the bleeding which in 2 to 3 days may stop. The hormone may then be reduced to 5 mg. a day and given for twenty days. On withdrawing Oestrogen the bleeding may occur in three to ten days. On the fourth day of this recurrence of the bleeding, 5 mg. of Diethyl-stilbœstrol may be given daily which may keep it in check. If not, full doses may be given as before. Usually after two or three courses regularity of periods may be established. Sometimes curettage in addition may be useful in effecting it.

Chronic Gonadotropin and Equine preparations have proved to be not so effective. The same is the case with Perandrin which cannot be administered long lest it should produce hirsutism.

As stated before, the affection is apt to cure by itself spontaneously, even without any treatment. Therefore at this age drastic remedies such as radium or rœntgen therapy should never be used. Instead of them, curettage may be repeated if required.

Treatment in child-bearing age:—When the diagnosis of functional bleeding is clinched, hormonal treatment as described before may be tried at first. Curettage may be resorted to early in this period of life and may help to relieve the patient readily. If the woman is in the fourth decade, has already had four or five children and is not desirous to have any more, vaginal hysterectomy should be the operation of choice. Radium or rœntgen therapy may relieve the patient for some time but the affection is sure to recur when surgery may not prove so easy, the patient having had deep therapy before. If the patient has not borne children, and both the husband and wife are desirous of having them, neither radium nor of course hysterectomy can be suggested, and therefore hormonal treatment and curettage may be advised. It may be combined with transfusion, especially when anæmic. She may be assured that the affection is subject to natural recovery for some years when the periods may become natural. During this space of time she may even have pregnancy and normal delivery.

Treatment at the menopause:—At this time of life hormonal treatment is not advisable unless the patient insists on having it. But at first curettage may be performed to exclude malignancy of endometrium; at the same time to control bleeding. If on microscopic examination of the scrapings, malignancy is not discovered, then the treatment resolves itself into radium application or hysterectomy. If the uterus is of the normal size and freely movable, radium may bring on the menopause and the bleeding will stop. But if the uterus is larger, has fibromyomas on it, is adherent and bound down posteriorly, the cervix is unhealthy, hyperplastic, has extensive erosion, polypoid growth, is much torn and its lips everted, vaginal hysterectomy if feasible or abdominal hysterectomy should be recommended. Should there be a tumour of the ovary, it will serve as a reason for doing abdominal hysterectomy, removing the affected ovary along with the opposite ovary if it be thought necessary. If with the functional bleeding there be cystocele and rectocele vaginal hysterectomy combined with the plastic operation on the vaginal walls will be necessary.

During child-bearing age:—The conditions that may give rise to bleeding are first pregnancy, both intrauterine and extrauterine, chorion-epithelioma, fibromyoma, especially of the submucous variety, endometrioma, adenomyoma, malignant affection of the cervix or the endometrium, inflammatory affection of the tubes and ovaries or malignancy in connection with them.

It is not advisable to discuss at length the differential diagnosis between diseases leading to bleeding. Only few essential characteristic points pertaining to each can be referred to.

Pregnancy:—Bleeding occurs whenever the ovum is in part or wholly detached. It continues until the whole of the ovum is completely detached and is expelled. When this happens and the uterus is quite empty, bleeding stops and the organ regains its usual size by a process called the involution. When bleeding just begins and is small in quantity the abortion is said to be threatened. When the bleeding is considerable and the patient feels the characteristic uterine pains occurring at intervals it indicates that the ovum is separated from its site of attachment to a great extent, that it is being forced out and that it may also be presenting at the external os, which may be made out by feeling through the vagina or observed by speculum examination. As long as the ovum is in uterine cavity, acting as a foreign body, it may provoke bleeding which would stop no sooner it is out. When the process has so far advanced it is then termed inevitable abortion. After much detachment and hæmorrhage, should the ovum be not expelled and be retained in the uterus, but at the same time for want of supply of adequate quantity of blood it has become defunct, this state is then said to be missed abortion.

TREATMENT.–When abortion occurs before the end of the twelfth week, in most of the cases the ovum that is expelled is found to be a blood mole with hæmorrhage in the choriodecidual space and without even a trace of the embryo. This must be the experience of those who had taken care of cutting the ovum every time as is seen expelled. Such being the state of affairs, how far it would be warrantable to treat a case of threatened abortion in the early stage with large doses of sedatives. It is not unreasonable to suppose that the sedatives by relaxing the uterine musculature will promote rather than prevent the formation of blood mole. Now the line of treatment is rather altered. Instead of advocating Progesterone in large doses, which favoured the relaxation of uterus, Oestrogens are recommended on the other hand. It has been found out that between 60 to 110 days of pregnancy, a period considered to be very critical, when the placenta has not fully undertaken the function of the ovaries and is not producing œstrogens and progesterone in adequate quantity and hence the proportion of oestrin in the blood gets less. As a result, detachment of the ovum and hæmorrhage within it occur, converting it into a blood mole. To raise the proportion of œstrin in the blood mild and less toxic preparations of Diethyl-stilbœstrol in 0·05 mg. doses may be given even every two hours. Now it has been found by experience that such a line of treatment controls bleeding in a majority of cases and patients are tided over.

Should abortion become inevitable, it is advisable to let nature work and effect expulsion instead of at once resorting to manipulations. At least in the first two months, the ovum being small, it is detached and expelled naturally without much loss of blood. In the next month as the ovum has grown in size, expulsion is attended with profuse hæmorrhage, blood being passed even in clots. Then the patient may begin to show the signs of loss of blood. Generally at this time the os may be found to have sufficiently dilated as to allow a finger to be introduced. Therefore to prevent further loss of blood and to forestall shock, digital removal of the ovum should be promptly done. In case the os does not admit the index finger, the vagina may be packed with all aseptic precautions. Pituitrin in 0·2 mg. units may be given and repeated every twenty minutes. Reliable preparation of Ergot may be given by mouth to excite uterine contractions. Meanwhile, if necessary, transfusion of blood may be done to make up for the loss of blood. If transfusion is not possible, plasma or aminoacids may be given intravenously. After eight or twelve hours, the patient would have got over the effect of loss of blood and then the pack may be removed. Many a time the ovum may have been expelled and lying on the top of the plug. Should this favourable effect may not have occurred, the os would have been dilated to allow the introduction of the index finger. It should be done and the ovum removed. This line of management is safer. On the other hand, on observing the condition of the

patient, in disturbed mind to proceed at once to perform curettage, would prove very dangerous, because in doing it there is invariably more hæmorrhage and in some cases injury is done to the uterine wall such as perforation. Several cases of such accidents have been observed. Conservative treatment is consequently safer and is decidedly in the interest of the patient as well as of the medical man whose reputation may thereby be saved.

Incomplete abortion :–This can be known from the examination of the cast-out contents of the uterus, both visually and microscopically. To get the material for the purpose the patient should have of her own accord saved them or when probable she should have been requested to do so. In the absence of it the diagnosis of incomplete abortion can be made by symptoms and physical signs. The patient continues to have almost constant bleeding which may increase in amount now and then. The uterus would be large but not in proportion to the supposed period of pregnancy, being relatively small. Aschhiem-Zondek test may be positive, though sometimes feebly so.

TREATMENT :—When abortion is incomplete and a part of the ovum is within the uterus, there is a possibility of infection occurring. So all care should be taken against infection following. As far as possible measures may be adopted for natural expulsion. The patient should lie in bed, have Calcium and Ergot by mouth and Stilbœstrol by injection. Ice bag may be placed on the hypogastrium when the bleeding is much. As time passes, the uterine wall may grow firmer. By the end of second or third week it may become feasible to perform curettage without doing harm to the uterine wall. As a prophylactic, before resorting to the operation, Penicillin and Sulphadiazine may be given to prevent sepsis.

While watching the case, should the hæmorrhage occur to such an extent as to imperil life, transfusion may be done, Penicillin injected and curettage performed with meticulous care, gently but thoroughly so that there is no need to repeat it. If there is already pronounced sepsis, no surgery should be undertaken but sepsis should be combated first by repeated transfusions and antibiotics.

Missed abortion :—It is safer to depend upon nature to effect evacuation. The defunct ovum is retained because the uterus is inert. So its excitability may be raised by administering Oestrogens. Stilbœstrol may be given 5 to 10 mg. every day. In general, in four or five days bleeding starts and even pains are felt, when Pituitrin (1 cc.) may be given in fractional doses at short intervals. With these measures the contents of the uterus may be expelled naturally and on sufficient dilatation of the os only, if a part of the ovum is noticed protruding, with ovum forceps the contents removed.

Missed abortion should, as soon as it is diagnosed, never be subjected to surgery because vaginal instrumentation may land the operator into peril. Abdominal route would be relatively safer than

the vaginal hysterectomy and should be the operation of choice on such an inert uterus, if the woman is of advanced age, is the mother of several children and is not desirous to have any more.

Ectopic pregnancy :—The fertilised ovum, instead of reaching the uterine cavity as happens normally, is arrested on the way and lodging there continues to grow, the pregnancy is regarded as ectopic. If the ovum is fertilised *in situ* in the ovary and develops there, it is called ovarian pregnancy. It is very rare. Should it happen, it ruptures very early and is attended with profuse hæmorrhage. If the fructification takes place in the tube but the ovum cannot advance further on account of some obstruction on the way or lodges itself in the tube and grows there, it is called tubal pregnancy. The ovum may be lodged in the ampullary part, which occurrence is the most common, or in the isthumial part or in the interstitial part.

The tubal pregnancy may terminate by tubal rupture or tubal abortion or the pregnancy may go on to term, the tube adapting itself to the growing ovum. The last occurrence is very, very rare. Tubal abortion is observed more in frequency with ampullary pregnancy while rupture is more commonly seen in the case of isthumial as well as the insterstitial variety. With rupture and also with tubal abortion the blood escapes into the peritoneal cavity, causing severe abdominal pain, referred more to one or the other iliac fossa. The pain is very severe and unbearable. Along with pain the internal hæmorrhage produces shock which is usually in proportion to the amount of blood that is accumulating in the peritoneal cavity. The patient shows all the signs of loss of blood. She is restless, her pulse is very rapid and is thready. She develops air hunger. Her temperature is very low and her body is covered with cold clammy perspiration. In this condition, if neglected, she would meet with fatal termination.

The tubal rupture or abortion may occur early between the 6th to 8th week, while in the case of interstitial or cornual variety rupture happens later between 8th to 12th week and the hæmorrhage is serious. On disruption of the ovum in the tube, the decidua in the uterine cavity, which develops under the influence of the chorion, though situated at a distance in the tube, begins to disintegrate, uterine bleeding begins. It may be constant but in general be not much hæmorrhage, this being a rare occurrence. Nevertheless the pain felt in the lower abdomen is excruciating. In tubal abortion attacks of such pain occur with each bout of hæmorrhage in the peritoneal cavity.

On examination of the abdomen, fulness of the lower abdomen may be noticed. When clots have formed and collected in the lower cavity, on close observation one side of the lower abdomen may be more prominent than the other. It has been said that when much blood has effused in the abdomen, a blue line may be seen at the

umbilicus. This sign is very seldom noticed, though the abdomen has become more prominent.

DIAGNOSIS.—It has to be arrived at promptly. The patient has to be removed to a hospital where operation can be performed at once if necessary or where she can be closely watched and the necessary steps taken as needed.

Tubal pregnancy has to be recognised from other conditions which may simulate it. In doing so reliance must be placed on physical signs; for in many a case it may not be possible to wait for laboratory reports. It has to be differentiated first from uterine abortion. In both there is bleeding per vaginum and pain in the abdomen. But in tubal pregnancy, bleeding by the vagina is comparatively less while the pain in the abdomen is very pronounced and most unbearable. In uterine abortion, vaginal bleeding is profuse and blood is passed in clots while the abdominal pain is rhythmical and in comparison with ectopic pregnancy less severe. On digital examination, which is itself so painful in tubal pregnancy, the patient exhibits her unwillingness to allow it to be carried on. To get the full information vaginal as well as rectal examination should be done. By vagina before disruption of the ovum, one or other of the tubes may be noticed as enlarged and felt as a soft mass almost oval in shape, on one or the other side of the uterus. The uterus itself is perceptibly enlarged and is pushed to the opposite side. Under the tubal mass the blood vessels going to it may be readily felt strongly pulsating. By the rectal examination all these signs can be more distinctly made out.

On rupture or abortion, the blood is poured into the peritoneal cavity and is collected in Douglas's pouch. In the early stage, besides fulness of the pouch, nothing else can be made out. But the uterus is however pushed forwards and upwards because of accumulation of blood and blood clots, in that pouch behind the uterus. It is a sign noticed many a time and is worth remembering. At this stage the rectal examination facilitates to recognise the condition, the pouch is felt full, the rectum somewhat flattened and the uterosacral ligaments tense. Later on when definite haematocele is formed, per vaginum the posterior fornix is depressed but the vaginal wall may be moved over it. By abdominal examination a greater mass is felt on account of the adhesions of the omentum but the upper part of this mass may be tympanic from involvement of the intestines in it.

Ectopic pregnancy must be differentiated from pelvic inflammation, from gonococcic or puerperal infection. In infection there is the history of it; appendages on both sides are involved; there are constitutional symptoms such as fever, rapid but full pulse, constant pain and tenderness in the lower abdomen, rigidity of the abdominal wall. Blood examination helps to know the inflammatory nature,

polymorphonuclear leucocytosis and high sedimentation rate may be present.

Appendicitis may simulate right tubal pregnancy, but the history of previous attacks may be present. The character of pain is very suggestive; it may begin in the epigastrium, soon felt around the umbilicus and then settle down in the right iliac fossa at MacBurney's point.

If a case of tubal pregnancy is not an acute emergency one and if it is kept under observation, Aschheim-Zondek or Friedman's rabbit test or frog test may clinch the diagnosis between inflammation and the pregnancy complication.

Other conditions giving rise to acute abdomen such as perforation or colic may have to be remembered while differentiating tubal pregnancy.

TREATMENT:—As soon as tubal pregnancy is suspected on convincing grounds, the abdomen should be opened. Transfusion should always be done just before and during the operation. If for some reason transfusion cannot be practised, plasma or better still reliable Aminoacids may be given intravenously. The operation may be finished expeditiously but at the same time not forgetting to ligate the round ligaments, or else troubles from fixation of the uterus may follow as a result of the accident.

Vesicular mole:—During pregnancy, the formation of vesicular mole may cause bleeding which may manifest itself early from about the third month. In it the bleeding is constant though slight. The chronic villi are involved and converted into cysts which together assume a large size. The uterus in consequence is enlarged and is out of proportion to the age of pregnancy, the organ at the third month appearing to be one of five months. It has the characteristic doughy feel. Since most of the villi are generally implicated and their inside matrix has disappeared along with the fine capillaries of the umbilical vessels of the cord, the embryo is dead and has also disappeared. It is then but natural that the fœtal parts and fœtal heart sounds cannot be felt or heard. In vesicular mole, it is common to find that both the ovaries are enlarged due to the lutein cyst formation.

Vesicular mole can be made out by the history and by the physical signs. The patient may sometimes complain of pain over the uterus and pass grape-like bodies, especially when the uterus is emptying itself. It can be definitely known by Aschheim-Zondek or Friedman's test, which is strongly positive even with very high dilution. It is because in hydatidiform mole the increased chorionic villi produce a great quantity of chorionic gonadotropin, much greater than what the ordinary placenta does.

The treatment consists in evacuating the uterine cavity when the existence of the vesicular mole is ascertained. If the cervix is not open to allow digital removal, it may be dilated by the use of

tents. Should the process of expulsion be in progress, by means of one or two fingers introduced through the canal, the mole may be detached from below up and at the same time pressure is made on the fundus from the abdomen to express the contents. Pituitrin 1 cc. may be injected to facilitate expulsion and to control the hæmorrhage. The evacuation is to be effected as quickly as it can be safely done. After emptying the uterus, a finger may be introduced to explore the uterine cavity to ascertain that nothing is left in. The uterus may be irrigated with hot water.

It is recommended that the uterus should be curetted a month after and the scrapings examined to make sure that chorion-epithelioma is not developing. Another means is to have the biological test of the urine done. Generally after two or three weeks Aschheim-Zondek or Friedman's test becomes negative. If it continues to be positive to a high degree or becomes positive after it has been negative, it would be a proof of chorion-epithelioma being present. As as a precaution the urine may be examined for three years, first more frequently and then less frequently.

Chorion-epithelioma :—It is seen developing after expulsion of the vesicular mole or even after an abortion or a delivery at time. In it the uterine wall is invaded by the chorionic epithelial cells which are rapidly growing by quick metamorphosis, and spreading deep and wide. With it the uterus enlarges and bleeding begins. The biological test of the urine is convincing. Aschheim-Zondek or Friedman's test is highly positive. Vaginal smear test gives definite results.

When the diagnosis of chorion-epithelioma is established, the total hysterectomy with removal of both the tube and ovary on either side and even the upper part of the vagina has to be performed. After operation, the urine will have to be examined every month or two for biological test. Should it appear to become strongly positive metastasis should be suspected and radiogram of the lungs, brain may be taken.

Endometriosis :—It leads to menorrhagia but very seldom intermenstrual building. Dysmenorrhœa is in many cases very pronounced and is developed after the lesions have spread deep and affected the surrounding structures. When the rectum is implicated the patient feels pain and difficulty during defæcation. The uterosacral ligaments may be affected and nodules may be felt along with them. In the same way rectovaginal septum may have deposits of endometrium. When the sacral nerves are pressed by surrounding affected structures, the patient experiences pain along the thighs and legs.

Endometriosis causes adhesions of the uterus and the appendages, to the surrounding structures such as intestines, omentum. Nodules may be detected at the uterine cornua, on the floor of the utero-rectal pouch, along the uterosacral ligaments. A prominent

swelling may be noticed on the posterior wall of the uterus. History of acquired dysmenorrhœa, menorrhagia may lend help to diagnosis.

TREATMENT.—At the early stage the conservative line of treatment may be adopted. If operation is undertaken, conservative surgery may be practised when the lesions are not extensive as found in the early stage.

Pelvic inflammatory affection:—It is frequently a cause of bleeding from the uterus, especially in the early stage. The inflammation may be brought on by infection from gonococci or strepto and staphylococci as after septic abortion or the puerperium. The infection soon spreads from the uterus to the tubes and ovaries and even to the pelvic peritoneum, setting up acute salpingitis, salpingo-oophoritis, pelvic peritonitis. In septic infection even general peritonitis may follow. In gonorrhœal infection, in general, the infection is located to the pelvic peritoneum.

In the acute stage the patient may have constitutional symptoms, such as fever, rise of pulse which in gonorrheal infection may be in proportion to the temperature but in the septic condition may be very rapid, out of proportion to the fever, pain in the lower abdomen, constipation or dirrhœa, the latter observed more in septic condition. The fever continues for two to three weeks in gonorrhœal affection. If localized pus is formed, the fever endures much longer. In septic condition, it may endure for several months.

In acute stage there may be continuous bleeding but in subacute and even in chronic condition menorrhagia may persist.

DIAGNOSIS.—In gonococcal infection there may be evidences of the affection of Bartholin's or Skien's glands, urethra, cervical canal. The pus may be seen exuding from these structures. The uterus may be bulky and very painful on movement. The uterine appendages may show induration, adhesions, and may be very tender, especially when the uterus is moved.

In chronic condition, the uterus is generally found immovable, fixed somewhat in the retroflexed position. There may be tubo-ovarian masses felt on either side and behind the uterus. Even in chronic condition the patient may feel severe pain on trying to lift up the uterus. The patient may have developed dysmenorrhœa, dyspareunia and in some cases menorrhagia.

From history and from physical findings the acute and chronic conditions may be recognised. In the acute stage blood examination is done to find out leucocytosis and sedimentation rate. Smears may be made of the discharge from the cervical canal to determine the kind of organism if present.

TREATMENT.—In the acute stage general treatment is followed. Rest in bed, antipyretics, relief of pain (Codein and Aspirin), ice bag to the lower abdomen, mild aperient or low enema, nutritious diet

and fluids freely given. Above all in these days Penicillin, 30,000 units every 3 hours, or 3,00,000 units every 12 hours or Procaine Penicillin every day or twice in a day may be injected. Sometimes it is advisable to give along with Penicillin, Sulphadiazine (gr. xv with Sodii. Bicarb gr. xv in water). By these biotics the affection may be subdued at the early stage.

Surgical intervention in the acute stage should always be avoided, unless pelvic abscess is formed. It should be dealt with by posterior colpotomy in order to let out the pus. In chronic condition, only to relieve the pain or bleeding if present that the operation is indicated. The prospects of conception are very seldom improved by any plastic operation on the tubes. When the abdomen is opened, conservative surgery may be done on the ovaries while the removal of the uterus along with the tubes may be found necessary to avoid opening the abdomen a second time.

Fibromyoma : —Fibromyoma of the uterus is at first interstitial and it grows out and becomes subserous or it grows towards the cavity and is then submucous. When the fibromyoma is interstitial, it usually leads to menorrhagia ; the amount of blood loss increases in quantity and endures longer when it approaches the cavity ; on the contrary, if it grows out towards the peritoneum and becomes subserous, the menstrual blood loss grows less and less. The submucous fibromyoma in course of time may get pedunculated, it is then called fibroid polypus. As a polypus, the fibromyoma may aggravate menorrhagia and may even produce metrorrhagia. The fibroid may be forced down through the cervical canal and may protrude through the external os. When the fibroid polypus is out of the external os, its pedicle may be gripped tightly by it. The portion below the grip may have poor blood supply and thus it may be easily infected by the pathogenic organisms in the vagina, which may cause inflammation and suppuration or it may become gangrenous. Besides this danger, a fibroid polypus causes bleeding, which is almost constant and is so much in amount as to render the patient gravely anæmic. A fibroid polypus protruding into the vagina can be recognized by the speculum examination by its appearance and feel. A fibroid polypus demands its early removal to avoid its infection and to prevent further loss of blood. After the removal, the cavity of the uterus should be curetted as endometritis is usually associated with it.

A fibromyoma when thus converted into a fibroid polypus gives rise to constant bleeding. It may as well be an indirect cause of bleeding since the endometrium on account of its presence in the uterine wall is prone to be affected by malignancy. This potentiality should always be borne in mind. The fibromyoma itself may become sarcomatous and may cause bleeding.

Here it may be mentioned that a mucous polypus growing from the cervical canal and protruding through the os may be a source of

bleeding especially after trauma. If it happens to be present in pregnancy, it many a time causes bleeding every now and then owing to congestion of the cervix. It is therefore necessary to make speculum examination every time that such a history is obtained, or the true nature of bleeding may not be known and the patient may be treated on a wrong basis.

If there be erosion around the os of long standing, when papillary condition may have been already set up. bleeding may follow on slight injury. It is apt to be mistaken for malignant affection. But biopsy and firmness of the tissue may help to distinguish the true nature and treatment should be given accordingly.

Malignant affection of the cervix, the endometrium or the uterine appendages :—In all these conditions bleeding by the vagina is invariably noticed. In cancer of the cervix, whether clinically of the ulcerative or growth variety, bleeding is observed on slight trauma and is almost the first symptom that is mentioned. As a little time passes, bleeding becomes free, hæmorrhagic and towards the end uncontrollable hæmorrhage may ensue. When the lesion has involved the vagina, even mere introduction of a finger may start hæmorrhage. Even at the beginning of the affection, when bleeding is not present, profuse leucorrhœa is complained of which may become offensive when the growth is invaded by the vaginal anærobic streptococci and is disintegrating. When the affection is so far neglected and advanced, constitutional symptoms may have already manifested themselves. Pain though a late symptom is unbearable and renders the patient miserable with agony.

When the endometrium is involved, profuse watery leucorrhœa tinged with blood may from the first be noticed. As the disease advances, the patient soon begins to experience cramp-like pain on account of the growth in the cavity. The body grows in size and becomes irregular. By that time the lesion extends to the serous coat and then involvement of the surrounding structures occurs and the mobility of the uterus gets restricted.

Diagnosis can be made by age, history of the case, easy friability of the tissues, appearance of the lesion, metastasis, fixation of the organ and above all biopsy. Microscopic examination gives definite proof. Local examination should never be neglected. Rectal examination sometimes gives valuable information as the finger can be reached higher.

TREATMENT.—The earlier the proper treatment is begun, the more hopeful are the results. For this purpose, public propaganda to educate the public on this point is most essential. The family physicians should endeavour to impress on their patients having irregular bleeding and that too on slight cause and exhort them to undergo the necessary examination. The specialist has always to bear in mind the possibility of malignancy and should

always attempt first to rule it out by all means available. With this process of exclusion carried out with sedulous care, the right treatment can be practised in time and patients saved. Cancer institutions are established all over the world and investigations are being carried out. Mysteries of the causation are sure to be unfolded in course of time, and the means to combat the disease effectively can be found out.

Now radical surgery at the early stage gives hopeful results. To begin with, radium treatment followed soon after by Wertheim's or Schauta's operation are done even for moderately advanced cases where extension of the surrounding structures is very little. In a far advanced case palliative treatment is to be adopted.

Besides the local pathological conditions, blood dyscrasia, as stated before, may be the cause of bleeding from the uterus. Therefore blood examination should be done to determine the nature of blood affection. Purpura and pseudo-hæmophilia may be the cause of uterine bleeding. Deficiency of vitamins and poor insufficient diet may bring about changes in the permeability of the walls of fine blood vessels and may lead to uterine bleeding. Diseases of the heart and liver, high blood pressure may promote bleeding from the uterus. So systemic examination, blood examination and pelvic examination are necessary to arrive at the proper diagnosis of the cause of bleeding per vaginum in women.

Intravenous Iron in Hypochromic Anæmia

Since Nissim showed in 1947 that a solution of saccharated iron oxide could safely be given intravenously, many articles have appeared on the success attending its use by others in treating hypochromic anæmias resistant to oral medication. Dr. Ramsey of Belfast records the results of many cases of macrocytic hypochromic anæmia treated with Ferrivenin, a proprietary preparation of saccharated iron oxide. There are two groups of patients with hypochromic anæmia who may require injections of iron ; a small number do not improve with large doses of iron by mouth, though there is no intolerance and a greater number suffer such gastro-intestinal distress when taking iron by mouth that adequate dosage is impossible. In both the indication is now to supply the iron by intravenous injection. Iron injected intravenously is used almost quantitatively in the formation of Hb and in the adult 25 mg. of the element is required for a rise of hæmoglobin of 1 per cent in the Holdane Scale. A system of dosage commonly used with gratifying results is to give 30 mg on first day, 50 mg on 2nd day, 100 mg on 3rd day and 200 mg on fourth day ; 200 mg is then given either daily or at longer intervals until the deficit is made good.—(*B. M. J.*, 13-5-1950, pp. 1109-1113 and p. 1127).

ABNORMAL VAGINAL DISCHARGES

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ABNORMAL discharge from the vagina is a common gynæcological condition. A third of all patients who come to a gynæcologist complain of this symptom. Whenever the vaginal secretion varies from the normal it is necessary to determine its source, nature of the organism if any causing it, or of the functional or organic disturbance which produces it. For an appreciation of the abnormal nature of the discharge it is necessary for one to know wherefrom the normal discharges arise.

We shall take the Fallopian tubes first. There are no gland structures in them but some mucous secreting cells are present. Owing to the flagellate movement of the cilia a small amount of serous fluid from the peritoneal cavity is carried towards the uterus, whether any considerable amount of fluid can in this manner be carried from the peritoneal cavity to the uterus and vagina is not yet known.

The endometrium of the uterus is moistened with a serous transparent slightly alkaline secretion usually just before and during menstruation. The racemose glands of the cervical canal secrete a thick stringy mucus, transparent in health, the reaction is alkaline P. H. 8. It becomes slightly more alkaline at the time of ovulation. It should be only just sufficient to keep the vaginal walls moist.

Vagina.—There are normally no gland structures in the vagina but there is apparently a transudation of an acid serous nature through the vaginal epithelium from the subepithelial capillaries and lymph vessels. It varies considerably in amount. It tends to be more fluid in parous women. Its reaction is acid P. H. 4 to 5 between puberty and the menopause. Before puberty and after menopause the reaction is faintly acid or even alkaline.

Bartholin's glands.—The Bartholin's glands are lined with goblet like mucus secreting cells and during sexual excitement a small quantity of alkaline mucous is secreted.

A few mucous glands are found close to the hymen behind the urethral opening. These secrete a thin mucus.

The occurrence of a more or less frequent or a constant vaginal discharge of sufficient amount to keep the external genitals moist and soil the underwear is abnormal and requires careful investigation. Such a discharge may vary greatly in consistency and colour. It may be thin or thick. According to the prevailing types of bacteria or other organisms and the amount of pus, blood or urine

in the mixture it may be white, yellow, or grey, or greenish. It may be odourless or more or less offensive. Excessive vaginal discharge is often the first symptom of cancer as well as of many less serious lesions.

A watery discharge may result in part from leakage from the urethra or from a urethral or vesico vaginal fistula. In other cases it may be serosanguinous and come from a malignant growth of the uterus. Rarely a large hydro-salpinx may intermittently empty considerable amounts of serous fluid through the cervix.

During the course of some constitutional and metabolic disturbances the vagina is very congested and abundant serous discharge results as a transudate from the superficial capillaries and subepithelial lymph vessels. The mixture of this serous transudate with large quantities of desquamated epithelial cells may form lumps of white cheesy material. Such a condition is most frequently noted in pregnancy. An abundant greenish yellow purulent discharge is frequently seen in gonorrhœa although it may be seen in some other mixed infections also. A purulent discharge may arise from infection and suppuration at any place along the entire genital tract. Vaginal fistulas frequently follow operations for pelvic tuberculosis. Pyometra is most frequently observed after the menopause.

A foul smelling vaginal discharge in a young woman is due to an infection, incomplete abortion or foreign body. A tampon or piece of gauze left in the vagina for a few days causes a very offensive discharge. In older woman the offensive discharge may be due to a foreign body, a sloughing fibroid or malignant disease. A retained pessary may also cause a foul smelling discharge.

An examination of the bacterial content of the discharge is of help in investigation.

The inside of the Fallopian tube and uterus are normally sterile. The secretion taken from inside the cervical canal is almost always sterile particularly the upper half. The smear shows scarcely any cellular elements and usually no organisms. The mucus is clear and translucent. These remarks do not always apply to the condition in the cervix after a gonococcal infection but even in these cases it is not uncommon to find no signs of any form of infection.

Cultures of the mucus from Nabothian follicles are usually sterile. The excess of cervical mucus secretion which may constitute one of the elements of the discharge is usually derived from glands hypertrophied under the influence of a long past infection and usually not containing any organisms. The majority of cases commonly called chronic cervicitis are not examples of true inflammation. They are cases of old injury at labour with possibly a transient low grade infection at the time which quickly disappears, followed by hypertrophy and excessive secretion arising from greatly enlarged glands. But in a small number, infection may

still be found in "Chronic Cervicitis" and it is well always to take a culture from the cervical canal.

The compound racemose glands of the cervix have a large secreting area and when these hypertrophy the secreting area is increased and account for a superabundant secretion of the characteristic mucus.

Now coming to the vagina it was Doderlein in 1892 who first described the existence of a gram positive bacillus which he stated produced lactic acid in the vagina. The organism is now known as the Doderlein's bacillus or B. vaginalis. The vagina at birth is sterile, it becomes infected by the B vaginalis about the third day. Cultures prove its presence until about the 10th day after which it disappears in the majority of children, about 75%, till puberty. From puberty to the menopause it can generally be recovered from the healthy women. After the menopause it disappears. Where there is a specific infection either of gonococcus or trichomonas, the Doderlein's bacillus is not found. In general the bacillus is not found in association with cases of pyogenic or indeed any pathological infection. While the vaginal bacillus is the most important and constant feature of the vaginal flora, yet other pathogenic organisms are frequently found. One or other variety of the diphtheroid group is common. They are probably of no importance and exist purely as saprophytes. In normal health gram cocci are seldom grown. The highly acid reaction of the normal vagina P. H. 4 to 5 probably prevents active growth of coccal organisms, but where Doderlein's bacillus is absent, as before puberty and after the menopause, a coccal flora can very quickly be established.

Swabs from the normal cervix, as I have already said, are nearly always sterile. There may be an occasional contaminating colony derived from contact with the extent os, but if great care is taken it is seldom that a colony can be grown or an organism seen in the smear made of the clear white mucus. In grossly pathological conditions it is possible to find microbes in the smear such as streptococci or gonococci. But despite the slightly alkaline P. H. of the cervical mucus, it is normally sterile.

The mucous secretion from the Bartholin's gland is normally sterile. If the gland is infected, the usual organism being the gonococcus, it is rather difficult to isolate the gonococcus from the discharge from the gland, because of the preponderance of pyogenic organisms.

Smears from the vagina can be classified into three groups :

GRADE I.—Shows a large number of epithelial cells and gram positive acidophilic bacilli. Here and there an occasional leucocyte P. H. 4–5.

GRADE II.—There are occasional factors of the acidophilic type, epithelial squares, but also pyogenic cocci and leucocytes P.H. 5 - 5 - 6·5.

GRADE III.—Shows large number of pus cells and enormous masses of cocci both gram + and gram – and few if any epithelial squames P.H. 6·5–7·5.

In cases classed as Grade I there is no infection. Even though there may be quite a profuse discharge it is not due to active or present infection or inflammation.

Grade II indicates a mild low grade infection, probably a fæcal streptococcus.

Grade III is a true pyogenic infection associated with vaginitis and commonly seen after the menopause, in trichomoniasis or in subacute gonorrhœa. Vaginal and cervical cultures are necessary for a real understanding of excessive discharge.

ETIOLOGY.—Excessive discharge is a symptom which is common to many different conditions. The discharge may come from one or more places along the genital tract. The cause of the abnormal discharge must be determined before it is possible to institute a rational treatment.

The predisposing and local causes :—

1. Constitutional predisposing causes : Anæmias ; Endocrine disturbances ; Debilitating infections ; Cardiac diseases with stasis. Hepatic disease with stasis.

2. Local causes : *(a)* Trauma—R.V.F. V.V.F. foreign bodies in vagina or uterus. Lacerations of cervix.

(b) Displacement–R. V. and R. F. uterus.
Prolapse—inversion.

(c) Congestion with pregnancy.

(d) Subinvolution of uterus.

3. Tumours:—Benign—fibroids, polypi, maglinant disease of uterus, vagina, vulva and tubes.

4. Cervical conditions : Cervicitis, ectropion, erosion and laceration.

5. Infections of vulva, vagina, cervix, uterus and tubes.

(a) Venereal, pyogenic and catarrhal ; Vincent's bacillus.

(b) Rare infections like tubercle, diphtheria, tetanus and B typhosis.

(c) Protozoal infections : Trichomonas.

(d) Vermian infection : Oxyuris, ascaris and filarial.

(e) Yeast infection : Thrush and monilia.

(f) Streptothrix infections : Actinomycosis.

Clinical groups according to age.—*Infancy and childhood* : —In children excessive discharges usually come from the external genitalia. Vulva is red and swollen, Soiled diapers, acid urine, worms, gonorrhœa or other infection and masturbation are the usual cases. Gonorrhœal vulvo vaginitis is common. The infection

is usually indirect and accidental. Culture studies however suggest that the micrococcus catarrhalis is an infective agent in many cases. This must be borne in mind. Smears are often misleading and cultures are required for accurate diagnosis Yeast infections are also found to be the causative factor in a certain number of cases.

Occasionally a foreign body inside the vagina may be the cause.

Girlhood :—There is usually a vulvitis. Girls are less susceptible to the gonococcus after the tenth year and less apt to contract gonorrhœa accidentally. Yeast infections are common. Trichomonas is rare. Lack of cleanliness and masturbation must be considered.

Adults of child bearing age :—The cervix is responsible for the thick mucus discharge usually seen. Among married women labour and abortion are important predisposing causes. A profuse irritating discharge which recurs frequently and persists for a long time is usually associated with trichomonas or yeast infection. Gonorrhœa is a possible cause.

After the menopause :—An abnormal discharge which develops after the menopause is always suggestive of malignancy and a thorough examination is required. Trichomonas and yeast infections are common. Gonorrhœa in older women is usually limited to the urethra and vagina. Pyometra must be thought of. It may be due to cervical stricture or to malignancy. A watery discharge is an earlier sign of cancer than hæmorrhage.

Diagnostic procedure.—Since an excessive vaginal discharge is the objective expression of a diseased condition the patient must be thoroughly examined. The history is often suggestive. A complete blood count to show anæmia and the general examination to reveal a constitutional or circulatory predisposing cause of the discharge have to be done. A complete pelvic examination including inspection of vulva to find evidence of gonorrhæa also must be undertaken. Examine urethra for pus.

Inspect mucus membrane for redness, soreness or excoriations and Bartholin's glands for tenderness and enlargement. Inspection of vagina through speculum. In women before the menopause it is rare to find any vaginitis except in trichomonas or yeast infections. After the menopause senile vaginitis will show itself by red spots and pus especially round the cervix.

Inspection of cervix :—Note whether pus exudes from the os, presence of lacerations, ectropion, erosion or ulceration. Examination of cervix for enlargement, hardness, fixation, etc. Examination of smear of discharge is useful in showing the amount of pus. Most of the turbidity is found to be due to epethelial squames. Take a sample for culture and examine a hanging drop preparation for trichomonas vaginalis.

Examine P. H. by adding a drop of B.D.H. universal indicator to a swab wet with discharge. The P.H. can be read off by the colour

value table on the label of the bottle. A low P.H. 4—5 indicates no infection ; above 5·5, infection is present.

TREATMENT.—The treatment of the excesive discharge may be divided into a consideration of measures which may give some relief of acute symptoms and those which are directed towards the removal of the underlying cause. The measures for temporary relief of acute infection are all based on the principle of cleanliness. A cleansing, non-irritating irrigation is soothing and beneficial. Any of the following could be used for douching :

(1) Douches : 2 pints at 105°F. Alkaline, 60 grms. Soda Bicarb to 1 pint to irrigate purulent discharges; (2) Copper Sulphate 1% ; (3) Zinc Sulphate 1½% ; (4) Pot. Permanganate 1 m. 1000 ; (5) Salicylic Acid 2 in 1000 ; and (6) Lactic Acid ½% B.P.C. 60% Lactic Acid one teaspoon to a pint.

External cleanliness is essential in every case. Sitz baths afford great relief in acute conditions. Rest in bed is essential in the acute stages.

Excessive vaginal discharge in young girls.—The discharge in young girls usually comes from a vulvitis or vulvo vaginitis. Common causes are yeast infections, foreign bodies, lice, worms, irritating urine with resulting pruritis and irritation from scratching. Elimination of the cause and cleanliness usually result in prompt improvement. The difficult cases are those caused by masturbation and bacterial infection. In every case a fresh wet smear as well as a stained smear should be examined. In many cases, culture will be required for a correct diagnosis. The treatment depends on the causative factor.

Gonorrhœa requires Sulphonamides or Pencillin, Monilia Gentian Violet solution etc. A local instillation into the vagina through a small catheter of Glycerine in Flavine 1 in 1000 is very useful. The child is also benefited by injections of Oestrone about 10,000 units twice weekly for 2 or 3 weeks. The effect of Oestrone is to cause a deposit of glycogen in the vaginal epithelium which, in its turn, induces a growth of Doderlein's bacillus, an acid reaction of the vagina and also thickens the vaginal epithelium and so renders it resistant to infection.

Senile vaginitis :—After the menopause the vagina is thin and atrophied, the protective Doderlein's bacillus can no longer be found and the reaction is neutral or alkaline. In these circumstances the vagina can easily become invaded with pyogenic cocci. If Oestrone in doses of 50,000 units is given to these patients two or three times a week, the epithelium becomes thicker and more resistant to infection. The reaction becomes acid and the infection quickly subsides. Saline douches are an additional useful measure. Twice a day. No strong antiseptics. The woman must be warned of a possible oestrin withdrawal hæmorrhage about a week after the last Oestrone injection.

There is a condition known as *non-infective leucorrhœa of virgins.* In the majority of cases the condition is trivial and associated with depressed general health. In a few the discharge is profuse and sufficient to cause distress. The cervix contains thick viscid mucus, the vagina is highly acid, pale, pink, rugose and has a thick mucosa. The epithelium is thick and contains a large amount of glycogen. Many of these patients admit that they are only troubled by excessive discharge either in the middle of the month or just before the period. A congenital erosion is sometimes present. This is probably a sign of hyperœstrinisation. The treatment with corpus luteum is unsatisfactory and so if the leucorrhœa is troublesome the excessive secretion of the cervical glands must be controlled by cauterisng them.

There are two methods of cauterisation : *Electric Cautery and Chemical Cautery.*

Dilate cervix under anæsthesia. Burn mucosa with cautery until it is white and bloodless. If an erosion is present this must also be cauterised. The idea is to destroy as much of the glands as possible. Regeneration takes place rapidly. If too much is destroyed, stricture of the cervix results.

There are two sequelæ of cauterisation—one hæmorrhage and the other pelvic cellulitis.

Chemical cautery :—Zinc. pencil. A porous clay stick soaked in saturated solution of Zinc Chloride. There are four sizes of a clay stick. 1/8 to /1/3 in. thick and 1 in. long. Correct fit inside cervix is necessary and care should be taken to prevent solution dripping into the vagina. Pack vagina with gauze. Zinc Chloride necroses 2 mm. thickness of mucous membrane. Necrosis is immediate. The gauze and stick are removed in 3 hours.

All discharge ceases for the first three or four days. Later there is a slight serous exudate with a little blood. About the 8th day the slough separates. After this a sero-purulent discharge is maintained for a few weeks gradually getting less and it finally disappears about the 6th to 8th week.

The excessive discharge of the parous woman :—Both electric cautery and Zinc Chloride may be used for these cases, provided there is no deep tearing of the cervix. Where, by lacerations and ectropion, the cervix has become distorted, it must be either amputated or repaired.

The cautery should not be used during the acute or subacute stages of inflammation.

I usually treat them for a few days with douches and Sulphonamides or Penicillin and then only do the cauterisation. Some have used radium for cauterisation. This is not a satisfactory procedure since the effects cannot be localized to the endocervix.

Ultra-violet rays have also been used but it is a slow and expensive treatment.

Trichomonas vaginalis :—Donne in 1837 discovered it in vaginal secretions. It is practically impossible to determine the source of infection in any patient. Fæcal contamination, coitus and water used for washing may be the sources. In trichomonas infections, the vaginitis disappears rapidly during treatment. But if the treatment is discontinued too early the organism reappears.

The symptoms are malodorous purulent discharge which is persistent and constant. It is yellowish or yellow pink and often contains fine air bubbles. There is local soreness, sometimes pruritus and tenderness of the vagina. The vagina is uniformly red, smooth and liable to ooze points of blood on swabbing with dry cotton wool. It can infect females of all ages from early childhood to after the menopause and is particularly common during pregnancy.

TREATMENT.—Swab vagina dry and insufflate with Picragol (John Wyeth). Silver Picrate in Kaolin with special insufflator. Insufflate once a week for three weeks and each night a pessary of Silver Picrate is introduced. Three weeks usually required for cure. A simpler method of treatment is with S.V.C. pessaries morning and night for three weeks.

Swabbing vagina with Mercurochrome 2% solution is also effective. Washing vagina with green soap and drying and painting with Hexyl Resorcinol 1 in 1000 is a useful alternative. 1% Aqueous solution of Gentian Violet instilled into the vagina is successful in many cases. 1 in 1000 Merthiolate solution instilled in the vagina will eradicate the trichomonas.

The last three are instilled into the vagina and a dry tampon inserted. The tampon is removed next morning and the patient takes a douche of Perchloride 1 in 5000 strength afterwards.

Mycotic vaginitis or thrush infection :—Oidium albicans. Some call it monilia albicans. P.H. of vaginal secretion is 4·5. It is very common in pregnancy.

Presence of a scanty, often curdy, discharge with varying degrees of pruritis. Redness of vulva and deep red congested vaginal wall to which are lightly adherent whitish patches of false membrane. Vaginal examination is generally painful due to soreness of vulva.

Diagnosis from smears.—Vaginal flore Grade I. Doderlein's bacillus is present. After delivery or during menstruation vagina is alkaline or the oidium infection may disappear. The vagina stains dark brown with Lugol's Iodine showing high glycogen content which is favourable to the growth of the oidium albicans.

TREATMENT.—Swab vagina dry and paint with aqueous Gentian Violet 2%. Very quick disappearance of the fungus is ensured by the above treatment.

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ENDOMETRIOMA AND ENDOMETRIOSIS

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AN endometriosis is a new formation consisting of gland elements with a cellular connective tissue stroma, similar to uterine endometrium in appearance, developing in areas and organs where, normally, such tissue is not present; that is, beyond the limits of the Mullerian ducts. When this new formation is diffusely distributed over several organs in the female pelvis and abdomen, the condition is known as endometriosis.

History.—Such a new formation was originally recognised by Rokitansky, a Vienna Physician, in the early part of the 19th century. But it was not until the last decade of the 19th century that Thomas Cullen and Von Recklinghausen definitely described these tumours as occurring in one or other cornua of the uterine wall. They were first called *adenomyoma* by Cullen in 1896 to distinguish them from fibromyoma, commonly known as fibroid of the uterus. In 1893 Von Recklinghausen made a detailed study of adenomyomata of the uterus and suggested that the cornual position of these tumours could be explained by the facts that these tumours arise from embryonic remains of the Wolffian system. But it has since been proved to be erroneous, for the Wolffian system never lies in proximity to this part of the Mullerian duct at any stage of development. In 1893, Cullen, in a most comprehensive survey of pelvic adenomyomata demonstrated that most forms were produced by downgrowth of the endometrium of the uterus into the myometrium. So early as that Cullen had also proved that these proliferations of the uterine endometrium extended backwards into the recto-vaginal septum, the rectum, the round ligaments, etc.

The next advance in the knowledge of these tumours was in 1921 when Sampson in America called attention to the fact that the well-known chocolate cysts of the ovary were lined by glandular epithelium and cellular stroma similar to the uterine endometrium and it was in 1922 that Professor Blair Bell gave these tumours the more suitable terminology of endometrioma because outside of the uterine wall the myomatous element was completely absent and the term endometriosis is now used to denote the diffuse condition affecting organs and tissues far from the uterus and Fallopian tubes which originate from the Mullerian ducts.

Theories regarding the etiology of endometriosis.—As in eclampsia, the fact that there are a number of theories to explain the cause of these tumours suggests that its etiology is still imperfectly understood. Although several theories have been propounded and each has received a certain measure of support, no single

explanation has as yet been accepted to prove the origin of these tumours in all the different sites.

1. *Cullen's diverticular theory* was first propounded in 1908. According to this theory diverticuli of the mature uterine mucosa penetrated into the musculature of the uterine wall and as a result a localised or a diffuse adenomyoma developed. This *direct invasion theory* can only explain the occurrence of adenomyoma of the uterine wall.

2. *Implantation theory of Sampson* :—In 1921 Sampson put forth the dramatic theory of *retrograde menstruation or cellular spill* to account for the presence of endometrial-like tissue in the walls of the tarry hæmorrhagic cysts of the ovary. He said that this aberrant endometrium was the result of the grafting of endometrial fragments shed during menstruation and regurgitated along the Fallopian tubes. It is a well established fact that menstrual blood is often found in the pelvis during normal menstruation, menstrual debris containing living endometrial cells and stroma have also been demonstrated in it. Curtis, the American Gynæcologist, stresses the fact that this is a frequent occurrence especially if there is some degree of obstruction to the exit of menstrual fluid at the cervix such as is met with in a retrodisplaced uterus. Sampson claims that with this retrograde menstruation or cellular spill, living fragments of desquamated epithelium is deposited and grafted due to the surface of the ovaries and pelvic peritoneum and that these grafts possess the power of growth and invasion. By a process of erosion of the surface epithelium these endometrial grafts penetrate the ovarian substance and produce the well-known hæmorrhagic chocolate cysts of the ovary. Once grafted in these aberrant situations their proliferation and growth may be influenced by the hormonal control of menstruation. There is much evidence in support of Sampson's theory and it affords an excellent explanation of how the endometrial tissue may reach certain extra uterine situations such as the ovary, recto-vaginal space etc., but it does not offer an adequate explanation for the occurrence of endometriomata in extra-pelvic situations such as the umbilicus, inguinal canal, the appendix etc.

3. *Metaplasia or serosal theory* has been particularly elaborated by Robert Meyer to account for the presence of endometrium-like tissue in distant places such as the alimentary tract, the umbilicus, the round ligament, the inguinal canal etc. In these situations it is improbable that the endometrioma could have arisen either as a result of direct invasion by uterine endometrium or by implantation by "menstrual spill." This theory suggests that all forms of adenomyosis may be due to metaplasia of the peritoneal mesothelium. The epithelium of the Mullerian system is primarily derived from the primitive mesothelium of the cœlom, and it is well known that peritoneal mesothelium frequently undergoes metaplasia as a result

of chronic inflammatory lesions and becomes converted into high columnar epithelium. The serosal theory, therefore, postulates that adenomyosis of the uterine wall is also due to metaplasia of the surface serous epithelium and that chocolate cysts of ovaries, pelvic endometriosis and endometriosis in distant areas in the peritoneal cavity are all caused by similar conversions of the surface epithelium of ovaries and peritoneal mesothelium. The germinal epithelium of the ovary is held to be specially subject to metaplasia.

4. *Mechanical causation* :—It is evident that Rubin's test and other intra-uterine manipulations in the pre-menstrual phase predispose to endometriosis, even with the uterus in the normal position. It is also understandable that forcible dilatation and curettage, especially if the uterus is retro-displaced, may be followed by a spill of blood and endometrial fragments through the fimbriated ends of the tubes. Endometrioma reported in post-operative scars are due to direct implantation of the uterine endometrium, particularly noticed after cæsarean sections.

5. Curtis, the American Gynæcologist, suggests that endometrial tissue may produce *metastasis through lymph vessels and venous sinuses*, and that these tissue fragments have been demonstrated microscopically in the lymph channels and venous sinuses of the uterine wall and in those of the broad ligaments.

6. *The embryonic rest theory* has a few adherents. It suggests that endometriomata may arise from Mullerian fœtal rests.

7. *The hormone theory* is a very modern one and suggests that endometriosis is a manifestation of cellular metaplasia caused by glandular dysfunction. The fact that it occurs chiefly in single woman or married women with no children supports this view.

Classification of endometrioma.—According to the anatomical situation in which they arise, Eden and Lockyer divide all endometriomata into two divisions: Intrapelvic and extrapelvic.

I. The intrapelvic is then subdivided into—
   1. *Uterine*: (*a*) Diffuse; and (*b*) Circumscribed.
   2. *Extra-uterine*: (*a*) Ovarian—chocolate cyst.
      (*b*) Endometrioma of round ligament (intraperitoneal).
      (*c*) Endometrioma of recto-vaginal septum.

II. Extrapelvic.—1. Inguinal endometrioma—Extraperitoneal in the round ligament.
   2. Alimentary—in the appendix etc.
   3. Umbilical and abdominal scars.
   4. Liver, gall bladder, kidney etc.

Pathology of endometrioma may be studied in connection with the various organs and sites it affects.

UTERINE ENDOMETRIOMA.—*The diffuse type*:—According to Cullen, the epithelium in this type arises as diverticulæ from the mature uterine endometrium. Some authorities believe that this invasion of the myometrium by the endometrium is due to pre-existing endometritis. It is possible to trace downgrowths of glandular tissue into the myometrium. According to Wilfred Shaw some degree of diffuse adenomyosis of the uterine wall is met with in all cases of metropathia hæmorrhagica or Schroder's disease. There is no definite capsule in these cases as in the case of a uterine fibroid. They are usually met with in the posterior wall of the uterus. Cut section shows that the affected area is softer in consistence than a fibroid. When incised the cut surface has a peculiar striated appearance with tiny grey soft areas interspersed among the striations giving a honey-combed appearance. Sometimes small collections of dark blood, about the size of pepper corns can be distinguished which, on microscopical examination, are found to consist of gland spaces filled with blood.

Under the microscope the epithelial invasion takes the form of tubules which show repeated branching and which are lined by columnar epithelium. These branching tubules run in connective tissue spaces between muscle bundles, and the tabules are surrounded by hyperplastic connective tissue which is very cellular; the whole structure being identical with the glandular spaces and cellular stroma of mature endometrium. The connective tissue stroma is called the *cystogenous mantle* and undergoes marked decidual reaction during pregnancy, should pregnancy supervene on such a uterus. This cytogenous mantle surrounding the glandular spaces is said to be a diagnostic feature of an endometrioma.

Clinically uterus which is the seat of an endometrioma is enlarged to about the size of a 3 months' gestation. Often the enlargement is asymmetrical. It is common to find small fibroids in association. Adhesion to neighbouring structures is common and adnexal inflammation is more frequent than in the case of fibroids.

The circumscribed uterine endometrioma is less common. According to Von Recklinghausen, it forms a small nodular growth situated near one or other cornua of the uterus, generally on the posterior wall.

Endometrioma of the ovary:—Chocolate cysts of the ovaries represent the most important clinical manifestation of the ectopic endometrial proliferations. In a typical case the affected ovary is enlarged, it and the Fallopian tube are prolapsed into Douglas' pouch and are densely adherent to the back of the uterus, the pelvic colon and the rectum. Separation of the adhesions is very difficult and during separation the cyst invariably ruptures and discharges a dark brown, tarry fluid from which it derives the name of chocolate cyst. The fluid is similar to the retained thick, viscid, tarry collection of a hæmatacolpos in a case of cryptomenorrhœa. After rupture, the rough ovarian tissue is seen surrounding the gaping site of perforation. The walls of the perforation are blackish, thick and do not collapse. The origin of this blood is said to be partly derived from hæmorrhage from the vascular walls and partly from the response of the endometrial tissue lining the walls to the stimulus of menstruation.

The lesion is bilateral in about a third of the cases. There is usually co-existing disease of the uterus and Fallopian tubes. The cysts are usually not of a large size, the average size of a cyst is about 2 inches in diameter, or about the size of a fist. Occasionally a cyst of this kind may become large enough to fill the whole pelvis. One must here admit that all tarry cysts of the ovary are not endometrial in origin. Theca-lutein cysts and corpus luteum hæmatomata also contribute to a few blood cysts of the ovary, and only on microscopic examination of the walls of the cyst, it may be decided whether the wall of the cyst is lined by endometrial or lutein tissue. In many large cysts where the ovarian tissue is completely destroyed by pressure of the fluid, the nature of the cyst must remain in doubt. Where the cyst is clearly an endometrioma the cyst wall is lined by epithelium which is columnar in type showing branching papillæ and beneath this epithelium is a layer of large connective tissue cells, which also undergo a decidual reaction should pregnancy occur.

The manner in which these invading endometrial cells reach the ovary has already been discussed. Many observers favour the view originally expressed by Sampson that during menstruation a back flow of menstrual lochia occurs along the Fallopian tubes leading to a cellular spill and implantation of endometrial fragments on to the surface of the ovary. It has also been demonstrated that this is more likely to occur in cases of retroversion. Sections of small chocolate cysts of the ovary have shown frequently minute pieces of endometrium attached to the surface of the ovary. Upholders of the serosal theory, however, maintain that endometrium never infiltrates normal healthy tissue, that this aberrant tissue is produced by the metaplasia of the lining epithelium of the chocolate cyst. It is also suggested that chocolate cyst of the ovary may serve as an intermediate host, and spilling of its contents, spontaneously or during operation, may cause the tissue to be scattered to other parts of the pelvis.

Adenomyoma of the round ligaments and inguinal canal.—The round ligament is usually affected in the inguinal canal, occasionally in the labium majus. Tumours as large as 2" in diameter have been described, they contain plain muscle tissue as well. Areas of endometriosis are sometimes found in hernial sacs, both in the inguinal and femoral canals, where a tender swelling is produced in the sac which usually swells and causes great pain during

menstruation. The swelling consists mainly of dark altered blood with vascular adhesions. On microscopic examination it is found to contain glands similar to those of endometrium.

Adenomyoma of the recto-vaginal septum or, as Eden and Lockyer call it, endometrioma of the recto-genital space. The cellular tissue space between the rectum behind and the cervix uteri and the vagina in front is one of the sites of election for extra-uterine endometrioma. It forms a nodular, infiltrating but non-malignant mass, situated in Douglas' pouch and invading adjacent tissues. It may involve the muscular and submucous coat of the rectum, producing stricture, constipation and painful defæcation; the muscular wall of the cervix, the cellular tissue at the base of the broad ligaments and the utero-sacral ligaments. Adhesions between these become so dense that they become welded into one inseparable hyperplastic mass. The vaginal wall becomes soon fixed to this mass, the posterior fornix is invaded. Soon the vaginal mucous membrane shows a red papillary surface which exudes a watery serous fluid and bleeds on examination. In these cases dyspareunia is an important symptom. If pregnancy occurs in such a case this mass becomes soft and elastic in consistency and increases in size per rectum, a hard tumour can be felt in the anterior and antero-lateral walls, but the rectal mucous membrane is movable over it, which distinguishes it from a malignant tumour of the rectum.

Incision into this mass reveals fibro-myomatous tissue containing islands of greyish red tissue within which are found cystic spaces of varying size. These cystic spaces are lined by glandular tissue and are filled with chocolate contents, consisting of old menstrual blood. Endometriosis of the bladder is met with as extension of the disease from the recto-vaginal space and may cause monthly hæmaturia corresponding with menstruation.

II. Extrapelvic endometrioma.—1. Inguinal and endometrioma of round ligaments have already been dealt with.

2. *Endometriosis of the alimentary tract*:—Small tarry cysts or nodular raspberry-like tumours may be met with in the bowel wall, chiefly colon, or the appendix, mesentery etc. If they invade the bowel wall to any large extent they may cause intestinal obstruction.

3. *Adenomyoma of the umbilicus* cannot be explained by the theory of implantation, therefore, it is probably due to metaplasia of the peritoneum.

4. *Endometriosis in laparotomy scars* are fairly frequent. Although the tumours usually develop after operations on the uterus such as cæsarean section, ventral fixation etc., they have also been known to occur after removal of ovarian tumours. Eden and Lockyer describe a case of an endometrioma with a blood discharging sinus developing in a laparotomy scar 15 years after

removal of a large cystadenoma. When the tumour and sinus were excised, the pelvic cavity was found infiltrated fixing the uterus and adjacent viscera.

Usually, a diffuse indurated fibrous tumour develops in the scar which is known as a dermoid, and which swells up and becomes painful during menstruation. At other times a sinus forms and menstrual blood is discharged from the sinus coincident with menstruation. Endometriomata may also develop in the post-salpingectomy tubal stumps and adjacent tissue.

Clinical features of pelvic endometriomata.—The majority of cases of both uterine and extrauterine endometriomata occur during the period of active sexual life, between the ages of 30 and 50 years. There are usually so many coincident conditions such as fibroids, adherent retroversion, adnexal inflammation etc., that it is difficult to assess exactly how-much of the symptoms manifested are due to the associated conditions. A previous history of retroversion or dilatation and curettage are met with. However, these are the main clinical features:—

1. *Sterility* is to be twice as common as in fibroids. Majority of patients with endometrioma are absolutely sterile, or have borne only one or two children several years previously.

2. *Menorrhagia*:—Menstruation is excessive and prolonged in about 60% of the cases.

3. *Dysmenorrhœa*:—Severe menstrual pain is also met with in 60–70% of the cases. In fact, if a middle-aged woman who had previously had no dysmenorrhœa or menorrhagia develops these two symptoms after the age of 30, endometrioma should be strongly suspected. Dysmenorrhœa in these cases is of the congestive type, being pre-menstrual in character and persisting during the first two days of menstruation.

4. *Intermenstrual pain* (mittelschmerz) is also not uncommonly present, especially when the ovaries are involved.

5. *Rectal pain*, worse during menstruation, chronic constipation and attacks of partial obstruction are commonly met with in endometrioma of the recto-vaginal septum.

6. *Dyspareunia* and backache are also met with as constant symptoms in endometrioma involving Douglas pouch and the vagina.

On physical examination, in adenomyosis of the uterus, the organ is usually asymmetrically enlarged to about the size of a 12 weeks' gestation but it is softer than an intramural fibroid. This bulky uterus is usually retroverted and adherent. It may be associated with chocolate cyst of the ovary or chronic salpingitis. Chocolate cysts of the ovary are usually met with between the ages of 30 and 40, about a third of the cases arise in single woman. Of the married women, a third of them are sterile. Conversely, it is rare for women who have borne a number of children to develop

this condition. Here also menorrhagia is the rule. The most characteristic symptom is abdominal pains, situated in the lower abdomen and back, usually dull in character but much worse before and during menstruation. In some cases the cyst ruptures during menstruation when the abdominal pain is so violent that it necessitates immediate laparotomy. Torsion of a chocolate cyst is very rare because of dense adhesions, adhesion to rectum and vagina will also cause dyspareunia and rectal pain.

The physical signs are those of a cystic thick walled tumour found behind the uterus, above the utero-sacral ligament, which is slightly tender and fixed. Hard nodules due to pelvic endometriosis may also be found in Douglas' pouch. If the condition is bilateral, the same signs are found on both sides.

DIFFERENTIAL DIAGNOSIS.—Uterine endometrioma have to be distinguished from:—(1) fibromyoma (fibroid); (2) chronic metritis; and (3) metropathia hæmorrhagica. All of these may be associated.

Extra-uterine endometriomata have to be differentiated from chronic tubal and tubo-ovarian inflammations such as pyosalpinx, tumours of the ovary, pelvic abscess, pelvic hæmatocele etc. Rectogenital tumours may be easily mistaken for carcinoma of the rectum. When the rectum is involved it is important to note that unlike in cancer the rectal mucosa is normal in appearance and never adherent. Microscopic examination of a small excised portion of tissue is the only certain mode of diagnosis.

TREATMENT.—1. *Prophylactic*:—(*a*) Curtis, the American Gynæcologist, says that retro-displacements with fixation posteriorly should be kept under close observation than we have hitherto thought necessary.

(*b*) Forcible dilatations of the cervix are to be deprecated.

(*c*) Diagnostic curettage and Rubin's test and all intra-uterine manipulations during the premenstrual and early menstrual phases should be avoided as they tend to force endometrial tissue into the pelvis where they may become implanted.

(*d*) Salpingectomy operations should include thorough excision of the uterine ends of the tubes to ensure against the development of endometriosis in tubal stumps. A wedge of the uterine wall should be excised preferably.

(*e*) Cervical strictures may cause retention and backflow of menstrual blood and predispose to endometriosis. Therefore, drainage of uterus should be free.

2. *Curative treatment*:—In the past, extensive surgical operations such as pan-hysterectomy, with even excision of portions of bowel, were practised, but the principle now accepted is conservative surgical treatment, keeping in mind the fact that the maintenance of ovarian function is an important factor in a woman under 40 years of age. The modern treatment of endometrioma

is also influenced by the present day knowledge that a number of localised cases of uterine and pelvic endometriosis and even small chocolate cysts of the ovary, all retrogress after the creation of an artificial menopause by radiological means. Similar remarks apply to the extensive adenomyoma of recto-genital space where small doses of radium implanted into the growth, taking care to protect the rectum by suitable gauze packing, causes a remarkable disappearance of the growth. Therefore, *radiation* (including deep X-rays as well as radium) has a very important place in the treatment of endometriomata.

SURGICAL TREATMENT is indicated in the following cases:—

1. Small localised nodules at the cornua of the uterus may be excised in a wedge shaped manner and the edges sutured. Even these small localised nodules are now encapsulated, therefore enucleation is not possible.

2. For the diffuse variety causing asymmetrical enlargement of the uterus, in a woman near 40, total hysterectomy is the treatment of choice.

3. Chocolate cysts of the ovary.

(*a*) Resection of the cyst alone is seldom possible unless the cyst is very small, owing to the ragged and friable nature of the ovary due to adhesion and perforation.

(*b*) If the condition is unilateral, the affected ovary and the Fallopian tube on that side alone should be removed.

In this connection a great many factors should be taken into consideration:

(i) The drawback to this conservative line of treatment is that a similar condition may develop in the opposite ovary at a later date, necessitating a second operation as it may cause distressing recurrence of menorrhagia, dysmenorrhœa etc.

(ii) On the other hand, the removal of both ovaries in a younger woman near 30, who is anxious to have a child, is a drastic treatment.

(iii) But while considering these factors it is also wise to keep in mind the fact that a woman with extensive pelvic endometriosis is not, as a rule, going to bear children.

(iv) On the other hand, should pregnancy occur, as it may rarely, pelvic endometriosis and allied conditions tend to retrogress during pregnancy.

(*c*) If both ovaries are affected by chocolate cysts castration should be done by removal of both ovaries; and if there is associated uterine and pelvic endometriosis, total hysterectomy should be done at the same time, that is, pan-hysterectomy.

4. In localised extrapelvic forms such as endometrioma of umbilicus of incisional scars, of vulva, inguinal canal etc, local excision and suture are all that are necessary.

5. Castration is preferable to resection of the bowel in cases of dangerously extensive growth in the region of the rectal cul-de-sac, for the artificial menopause so brought about is usually followed by gradual atrophy of the endometrial tissue, with eventual spontaneous recovery. If this drastic procedure has to be performed in young women, necessitated by extensive endometriosis, implantation into the abdominal wall of thickly shaved sections of healthy portions of the removed ovaries may, to a small extent, preserve the internal hormonal secretion of the ovary.

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Oxygen in Cardiac Infarction

Infarction of the myocardium results from occlusion or narrowing of a coronary artery. Atherosclerosis is the commonest cause; syphilis of the aorta produces similar effects. The signs and symptoms of cardiac infarction vary widely. The entire episode may be "silent" or stormy followed by shock. In myocardial infarction it is primarily the central pumping station that fails and not the peripheral circulation as in surgical shock. The infarct results not only in an area of anoxia in the myocardium, but also in hypoxia of all the organs and tissues of the body. Passive congestion in the lungs impairs their function as regards oxygen absorption owing to the œdema of the alveolar walls. The blood passing through the lungs is not adequately aerated.

Oxygen is not indicated in every case with cardiac infarct. Its usefulness has been demonstrated in the following conditions: (1) Cyanosis; (2) shock; (3) severe and persistent cardiac pain; (4) dyspnœa; (5) acute pulmonary œdema; (6) congestive failure; (7) certain cardiac arrhythmias; (8) rising heart rate; (9) sharp fall in blood pressure; (10) marked leucocytosis; (11) hyperpyrexia; and (12) Cheyne-Stokes respiration.

Technique of administering oxygen:—The nasal catheter, various types of mask, and the tent are the usual modes of administration. For prolonged therapy, the modern tent is the most comfortable and effective method of administering oxygen. To relieve hypoxia in the ordinary case of cardiac infarction a concentration of 45 to 50% suffices. This can be achieved with a flow of 12 to 13 litres per minute. The mask is useful when the tent is not readily available, or when relatively high concentrations are required. Pure oxygen will sometimes relieve pain of a severe type when a mixture fails but it should not be given for more than 6 hours at a time. A concentration of 70% can be maintained indefinitely without toxic effects.

Administration of oxygen by inhalation relieves distress quickly and helps in restoring circulatory balance. In certain cases, its effective use is the crucial factor in saving life.—(Levy, R.L., *Bull. N. Y. Acad. Med.*, June, 1950, Vol. 26, No. 6, pp. 394–401).

INVESTIGATION AND TREATMENT OF THE STERILE COUPLE

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THE problem of sterility is a very common one, about 25% of the patients attending the gynæcological out-patient department are cases of sterility. According to Novak no less than 10% of marriages are sterile.

The investigation is a tedious process, it involves considerable expense as many laboratory tests are necessary. The desire for child is so strong that the majority of the sterile couple are prepared to undergo the necessary tests. Before starting the detailed investigations the physician should make sure that the woman is healthy enough to cary the load of pregnancy. Women approaching menopause should be discouraged from starting the investigations as the chances of pregnancy in these are very small. The best age for treatment of sterility is, according to Siegler, between 20-30 years. It is useless to study the wife unless the husband is willing to co-operate.

As a rule the wife consults the physician for her inability to conceive and she is examined first.

Examination of the wife.—1. *History* :—A detailed history is important including detailed menstrual history, habits, diet, previous illness, previous operations, use of contraceptives, history of vulvovaginitis in childhood, venereal disease, or pelvic inflammation.

2. *General examination* :—A thorough systematic examination should be carried out. Note also any evidence of sub-thyroid deficiency, distribution of fat, development of breasts and hirsutism.

3. *Vaginal examination* :—Note any congenital abnormality, evidence of vaginitis, endocervicitis, salpingitis, or tumours. Any displacement of the uterus may be corrected but retrodisplacement of the uterus very seldom causes sterility. The vaginal pH should be tested.

4. *Examination of blood and urine* :—Complete blood count and Wassermann or Kahn test are necessary and a complete urine analysis should be carried out and also the basal metabolic rate.

In a very large number of cases no cause is found in the above routine examination. Before subjecting the woman to any further investigations the husband must be examined because if he is sterile there is no point in subjecting the wife to investigations which are time consuming and some of which have a certain amount of danger to life. According to Walter Williams the responsibility

for reproductive failure lies with the male in nearly 50 per cent of infertile marriages.

Examination of the husband—1. *History*:—Here again history is important. Previous illness like mumps, venereal disease and operations are important. Certain occupations like working for a long time with radium, or working in overheated atmosphere as in engine driving and working in a furnace may produce azoospermia. Mental worry, overwork and diet deficiency often produce oligospermia and lack of sexual desire.

2. *General physical examination*:—General debilitating diseases are important. Look for any evidence of venereal diseases. Particular attention must be paid to deformities and diseases of genital organs.

3. *Semen analysis*:—The method of collection of the semen is important. Hotchkiss advises abstinence for three days, the specimen should be ejaculated directly into a clean, dry, wide mouthed bottle with cork stopper. Semen may be collected by coitus interruptus or by masturbation. The specimen should be brought for examination within 1–2 hours. During the cold weather it should be carried in the vest pocket to keep warm.

The volume of seminal fluid is important for two reasons. Deposition of the semen in the vagina is not enough, cervical insemination is necessary. With an ejaculate of small volume intimate approximation with cervix is unlikely. The second reason is when the pH is lowered sperm activity is reduced. The final pH resulting from mixture of semen with vaginal secretion is important and this pH is reduced when the volume of the ejaculate is low. Normally volume varies from 2–4·5 cc. Total number of spermatozoa per cc. is about 100-150 million. Highly fertile men have over 100 million per cc. It has been found that when the sperm concentration falls below 60 million per cc. the chances of pregnancy are very, very low.

Morphology of the sperm is also very important. In fertile men not more than 20% are abnormal. The fertilization value of the specimen falls with increase in abnormal forms.

Motility depends on the time after collection, the temperature at which the specimen is kept and the method of collection. Motility is well established after liquefaction of the specimen. When collected in a clean bottle and kept at 60°F—70°F, 70–80% are actively motile for 6 hours in a normal specimen.

Specimens from infertile cases often show leucocytes, various types of tissue cells and crystals.

If the husband's seminal fluid is found defective, his W.R., total and differential count and sedimentation rate of blood, urine analysis, urethral smear examination after prostatic massage and basal metabolic rate must be done and any disease discovered must be treated.

4. *Testicular biopsy*.—When no spermatozoa are in the ejaculate testicular biopsy may show adequate spermatogenesis and indicate obstruction in epididymis or vas. Surgery may establish patency but the result of surgery are not encouraging. If biopsy reveals poor or almost no sperm formation, the case is hopeless.

If the husband is found healthy further examination of the wife is carried out.

Examination of the wife (*continued*).—5. *Huhner test*:—Even though the sperms are healthy and actively motile they are of no use unless they enter the cervix. The test should be carried out about ovulation time, and this is the difficulty about this test. Cervical mucus is drawn into a pipette any time up to about 12 hours after coitus and examined on a slide. In a fertile couple 15—50 sperms are found per high power field. If there are more than 10 sperms per high power field the husband is very unlikely to be at fault.

6. *Tubal patency test*:—The best time for doing this test is from the 8th to the 16th day of the cycle. Towards the end of the menstrual cycle the uterine opening of the tube may be closed by hypertrophied endometrium. Now occlusion of the tube may be due to spasm of the tube, hence it is important to repeat the test. It is not advisable to raise the pressure of the gas above 200 mm. of mercury for fear of rupture of the tube.

Injection of opaque media like Lipiodol or Visco-Sayopahe 7–10 cc. into the uterine cavity and X-ray will show the site of block. If the block is at the ampulla or fimbriated end of the tube, surgery to restore the patency of the tube may be of value.

Patency test should not be done if there is any evidence of infection of the vagina, cervix or tubes because there is danger of peritonitis. Hystero-salpingography has, in addition, the danger of oil embolism.

7. *Endometrial biopsy*:–Where no cause is found with the above investigations it is necessary to find out if the woman is ovulating. For this endometrial biopsy is done within a day or two of the next expected menstrual period, or at the onset of menstruation. If there is secretory activity of the glands ovulation has taken place. If no secretory endometrium is found the biopsy should be repeated in at least three consecutive cycles before one can say that the sterility is due to an ovular menstruation.

TREATMENT.—Sterility is caused by a variety of functional and structural disorders and the treatment must be directed to the factors which, after a thorough study, are believed to be responsible for sterility.

The general health of both the partners should be improved by proper diet, adequate physical and mental rest, regular exercise, abstinence from excessive alcohol and tobacco. Advice should be

given about sex life and the optimum time in the cycle for conception.

In the woman, vaginitis, cervicitis, or any inflammatory disease of the adnexa, if found, should be treated. Retroversion of the uterus hardly ever causes sterility, if this is suspected as a cause the uterus should be replaced and a Smith or Hodge pessary inserted for 2–3 months.

Now occlusion of the tubes is a very common cause of barrenness. It can be demonstrated by insufflation which is such a simple procedure that it can be carried out at the out-patient department or in the private clinic, provided there are facilities for proper sterilization of the instruments. Anæsthesia is not necessary. Lack of patency may respond to repeated insufflation as a therapeutic measure. Lipiodol studies also acts as therapeutic measure in 10–15% of cases, but this requires elaborate apparatus and can only be carried out in well-equipped institutions.

Gonorrhœa and syphilis in both male and female often cause sterility. In the female, gonorrhœa causes cervicitis with unhealthy mucus which prevents the spermatozoa from entering the uterus, closure of the tubes, or even failure of ovulation. In the male syphilis and gonorrhœa cause oligospermia, or non-production of sperms, or closure of the vas preventing the spermatozoa from passing into the urethra. Hence it is important to treat venereal disease properly.

Endocrine therapy is unsatisfactory. Oestrogenic therapy or combined Oestrogen and Progestrone may be of some help in cases where the sterility is due to under-developed uterus but the results are not very impressive. Gonadotropic hormone derived from the blood semen of pregnant mares have a follicle stimulating effect and may be of use in stimulating ovulation in non-ovulating women given in three doses of 400 I. U. on the 9th, 11th and 13th day of the cycle. This is a very expensive treatment and the results are not encouraging.

The empirical use of thyroid has yielded the most satisfactory results in the treatment of sterility in both sexes. Small doses ½–¾ grain once daily are sufficient, this may have to be continued for several months. These patients should have their pulse rate taken once daily at least and if the resting pulse rate goes above 100 per minute thyroid therapy should be stopped or the dosage should be reduced.

Often more harm than good is done by unnecessary operation. It is still the usual custom all over India to perform dilatation and curettage without doing any investigation whatsoever. Some conceptions do occur after this operation but more often these operations have resulted in permanent sterility either because of the scarring and failure of regeneration of the endometrium following the curettage, or because of infection of the cervix or Fallopian

tubes. Dilatation alone may be of some use because with the introduction of each dilator a column of air is pushed up which may act as gentle insufflation of the tubes. Besides, passing any instrument into the uterine cavity stimulates uterus to its full development.

In cases where the husband's seminal fluid is below par careful timing of coitus to the period of ovulation is of great help particularly if preceded by a period of abstinence for about two weeks. Basal body temperature charting helps in knowing the date of ovulation. The woman should keep the thermometer by her bed side and take her temperature in the mouth or rectum for 4 minutes first thing on awakening. From the onset of menstruation until the day of ovulation the variation in temperature is less than 5/10 of a degree, on the day of ovulation the temperature drops by ½–1 degree or more. This is followed by a rise of 1–1½ degree the next day with a daily variation of 5/10 of a degree after this.

Artificial insemination from a donor involves moral and legal questions and is best not done. In cases of severe oligospermia or hypospadias, or where coitus is not possible for any reason, artificial insemination timed to the day of ovulation may be carried out using the husband's seminal fluid. The results are not encouraging as reported by Siegler and other American workers.

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Arterectomy in Treatment of Intractable Pain

Freeman and his co-workers point out that after recovery from acute occlusion of a major artery to the extremity, even though the circulation is sufficient for tissue nutrition the patient may still have rest pain of a very severe type, with paresthesias and numbness of the extremity. This pain is termed "*ischemic neuritis.*"

Temporary relief may be obtained by blocking the sympathetic nerves to the leg but sympathectomy is contraindicated. The site of obstruction was visualised by arteriography in 10 patients. Excision of a segment of the thrombosed artery was followed by immediate relief from the pain. There was no noticeable increase in circulation after this procedure. Arterectomy is of value in the treatment of this type of pain through the interruption of some nervous reflex that has its origin in the thrombosed artery.—(*Am. Heart. Jour.*, 38, pp. 329–336, 1950).

TUBAL GESTATION

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ECTOPIC Pregnancy means gestation outside the uterine cavity. The possibilities of a pregnancy occurring in the ovary or primarily in the peritoneal cavity, and in rudimentary horns of the uterus have been proved and cases reported of such occurrences. We are more often confronted with tubal gestation because this is the most common type of ectopic gestation and the others are comparatively rare and therefore I deal mostly with this condition.

Mistakes have been many and sometimes with fatal results. It is said that 2% of all gynæcological cases consist of ectopic gestation —and only 50 to 75% of them are diagnosed correctly.

For fear of making this paper too long, I do not propose to discuss the ætiology and pathological anatomy of this condition except for a brief mention of the causative factors. It is almost always of the nature of an accident and the contributory factors may be several, and broadly classifying them these may be grouped under :—

(1) Conditions which interfere mechanically with the downward passage of the ovum.

(2) Inflammatory disease of the tubes.

(3) Physical and developmental abnormalities which favour decidual formation in the tubes.

Symptoms and clinical features.—This is of interest to every one called to make a diagnosis in acute abdominal conditions which produce sudden abdominal pain and severe shock. Not infrequently in cases diagnosed and operated on as such the operation has revealed that the trouble was not tubal pregnancy, but some entirely different condition. On the other hand, many cases of tubal pregnancy with less severe symptoms are treated as pelvic inflammation or as threatened miscarriage, until the persistence of the trouble or a severe attack arouses suspicion of something more serious. A long period of primary or secondary sterility is often mentioned. Symptoms pointing to tubal pregnancy but not pathognomonic of it are :— (1) Missed menstruation ; (2) sudden onset of pain with or without shock ; (3) bloody vaginal discharge ; (4) a tender mass beside the uterus ; (5) only slight fever (if any) ; (6) evidence of internal hæmorrhage ; (7) exacerbations of pain and enlargement of the mass without corresponding elevation of temperature ; (8) symptoms of early pregnancy : (9) positive Aschheim-Zondek test ; and (10) exclusion of intrauterine pregnancy.

We must remember that some of these may be absent and some very much modified, thus confusing the clinician. For example, a missed period is mentioned in only 50% of cases or the first onset of

pain might have been mistaken for a colic and forgotten, or the mass felt may be mistaken for an inflammatory mass and temperature may be subnormal and the P. V. findings inconclusive. Therefore a detailed history, the findings on clincial examination, as well as close watching of the patient are often required to come to a conclusion.

Special conditions.—There are two special conditions or stages of extra uterine pregnancy in which the symptoms may so closely stimulate normal pregnancy, that the true condition is overlooked, namely : (*a*) before rupture ; and (*b*) near term.

Before rupture :—Previous to primary rupture the symptoms are practically those of an early pregnancy. The patient goes over her menstrual time without the menstrual flow appearing. There is some nausea usually most marked in the morning and perhaps some tenderness of the breasts. Pain is not necessarily present. There may be some soreness in the pelvis, either general or localised to one side, but this is rarely troublesome enough to arouse suspicion of anything abnormal, for some soreness in pelvis is common in normal pregnancy owing to the marked congestion of the enlarged uterus and of the new corpus luteum.

Pelvic examination at this stage shows some tenderness about the adnexæ of one side and perhaps a small mass due to the enlargement of the tube. Normal ovaries are however usually tender in early pregnancy and the tenderness is frequently marked on one side. The small mass in the tubal region is really the only positive evidence of any abnormal condition within the pelvis, and as far as is known this mass may have been there for a long time due to some previous trouble. Unless a previous examination has shown the pelvis clear, making it certain that the mass is of recent development, the diagnosis of tubal pregnancy is hardly justified, for there is not sufficient evidence to establish it.

Mrs. M., aged 36 years, was admitted to hospital complaining of discomfort in the pelvis. She gave no history of amenorrhœa and had no symptoms of pregnancy. A soft tender mass was felt in the right fornix and the uterus was not appreciably enlarged. Cervix was not soft. It was diagnosed as a twisted ovarian cyst, and operated upon when an unruptured tubal gestation was found.

It is always safe to make a pelvic examination in every case of early pregnancy in which there is sufficient pain or soreness in the pelvis to arouse suspicion of some abnormality.

Near term :—It is well to be suspicious of extra uterine pregnancy when your obstetric patient has "false pains" a great deal or fails to go into labour on time, or when some of the examination signs are not clear. One expects a history of a stormy course in an extra uterine pregnancy, but occasionally the early trouble is of short duration and after that the fœtus develops with surprisingly little disturbance. Also the patient's plausible assumption that the

various abdominal discomforts were due to common ailments. may throw one off guard. In all cases it is important to determine definitely that the fœtus is really in the uterus. X-ray examination and careful bimanual examination may be of help. Recently one case was reported of a full term abdominal pregnancy. The patient was attending ante-natal clinic regularly from the 4th month. About the 6th month her doctor got doubts and called in a consultant who said that everything was alright. At term, after pains started, os was not dilating. He called in another consultant who diagnosed abdominal pregnancy, did abdominal section and delivered a live healthy baby, and the mother and child went home on the 18th day. Now leaving these uncommon types we come to the more common types when a condition, disturbed tubal gestation, can, and should be diagnosed. In many cases, the first manifestations of abnormal pregnancy occurs when a rupture or tubal abortion takes place. The severity of the symptoms and the seriousness of the prognosis depend on the site of gestation and the extent and rapidity of the hæmorrhage that follows the event of rupture or abortion.

These can be divided clinically into 4 groups :—

(1) The fulminating type—Where there is sudden acute pain and collapse.

(2) The usual type of recurrent attacks of abdominal uneasiness and pain associated with hæmorrhage, vaginal discharge and fainting attacks.

(3) Large pelvic hæmatocele.

(4) Advanced to later week of pregnancy.

TYPE I.—*The woman is suddenly struck down with acute abdominal pain and profound collapse.* There are no premonitary symptoms and often no history of a missed period. She is perfectly well one minute and is suddenly seized with acute abdominal pain and the feeling of something having given way and then collapses. These are tragic cases. Such severe and persistent hæmorrhage is most likely to occur when the ovum is developing in the narrowest part of the tube at the isthmus —where the muscle fibres are very scantily developed and easily give way as early as the 4th week or even before. Tubal wall tension and tissue erosion by the trophoblast of the ovum cause this rupture. In the vast majority of cases, the bleeding cases when the patient passed into complete shock, which is Nature's provision for checking hæmorrhage. In exceptional cases, however, the patients actually bleed to death either from the first free flow, or from a renewal of bleeding due to vomiting, bowel movement, sitting up or other disturbances of the newly formed clot. Luckily such cases are very rare.

I remember a case who was discharged from the hospital after an abdominal operation. She went home. Exactly 28 days later she was brought back to hospital in a collapsed condition. She was

perfectly well till 9 a.m. in the morning and was cutting vegetables when the acute pain occurred and she collapsed, She was rushed to the hospital and operated within half an hour; yet it was too late. The rent was in the region of the isthmus and the peritoneal cavity was flooded with blood. Transfusion of blood was given but she did not survive.

Several patients say that while passing urine or defecating they had a sudden catch in one or other iliac region and they fainted. When seen they are pale, cold, and often restless. (All signs of internal hæmorrhage are evident). The palms of hand are pale, pulse rapid and of low tension. Subnormal temperature, some distension of abdomen, but not marked rigidity. Shoulder pain is complained of by some. By P. V. nothing much can be made out. Tube is collapsed, and the fluid blood has not clotted, but sagged into the loins—perhaps there may be some fullness in the fornices. Size and position of uterus may be difficult to make out. But the patient cries out when cervix is moved and tells us it is exquisitely painful. Pulsation may be more evident in one fornix than in the other. Shifting dullness can sometimes be elicited but for the patient it is very uncomfortable. One never relies on the history of menses in such cases. Victor Bonney writes about this: "There is no class of case in which symptoms supervene with more dramatic suddenness and intensity than in acute tubal rupture nor any in which prompt or determined surgical measures are rewarded with more pleasurable success. If one is able to recognise and stop bleeding and replace the lost fluids the patient's life can be saved in the great majority of even these fulminating cases." The chief signs are therefore:—(1) Distension and absence of rigidity; (2) rapidly developing toxæmia; and (3) pallor and shock.

DIFFERENTIAL DIAGNOSIS.—1. *Fulminating appendicitis*:—Here rigidity is more marked and is more localised. Temperature is present.

2. *Rupture of a gastric or duodenal ulcer*:—A long history of digestive trouble gives the clue here. Often if the pain is referred to iliac region it may not be easy to make out. Signs of peritonitis develop later.

3. *Torsion of a pedunculated tumour*:—A distinct mass, tender and with definite outlines may be palpable. In an ovarian cyst, bleeding per vaginum may be present, but the outline of the cyst can be made out. Collapse is not so marked in all these conditions as in ectopic.

TYPE II.—*The woman suffers for some time from recurrent attacks of abdominal uneasiness and pain, haemorrhagic vaginal discharge and occasional fainting.*

In these cases the implantation has occurred mostly in the widest and muscular part of the tube, *i. e.* the infundibulum. The

ovum may be retained in the tube for a longer period than at the isthmus and so amenorrhœa of 6 to 8 weeks is quite common. This is the most common type of ectopic we meet with. They have premonitary symptoms of a warning character (pain, fainting, etc.) and they seek medical advice. Tubal abortion or tubal rupture may occur, the former is less dangerous. However the warning signals must be recognised and given due importance. The history is always similar—attacks of pain—bleeding per vaginum—faintness—and often, if not always, a period of amenorrhœa. Yet, it is sometimes difficult at the patient's bed side to appreciate fully the significance and gravity of the symptoms prior to collapse.

At an early stage, the vaginal hæmorrhage is apt to be attributed to a delayed menstrual period—or abortion, and the pain if slight—to intestinal colic. While the faintness and sickness, not being peculiar to ectopic pregnancy, are considered as the ordinary discomforts of a uterine gestation, the pain, dull and constant, is due to intra mural hæmorrhage. The acute pain at intervals is due to colic in the tube or uterus. The pain may disappear or be considerably less if the sac goes on growing and the muscle fibres are destroyed or after abortion or rupture has occurred. If blood has effused, pain continues as a constant ache or soreness due to irritation of the peritoneum by the effused blood. Scapular pain is also complained of. Pain is more marked on one side of the abdomen, though it may extend to the other side. Rigidity, if present, may not be so marked as in appendicitis. Two points to distinguish this pain from intestinal colic are (1) that pressure relieves intestinal colic; and (2) the patient is free of discomfort between the colics. In ectopic, pressure does not relieve and there is discomfort in between the acute attacks of pain.

Amenorrhœa, if present, directs our attention to a complication of pregnancy and is helpful. But, if associated with lactation, or anæmia or chlorosis one cannot be certain.

Haemorrhagic discharge per vaginum is scanty, peculiarly dark in colour preceded by abdominal pain and discomfort. This discharge may be attributed to an abortion. Patients have been curetted for supposed abortion. When they suddenly collapse ectopic gestation is diagnosed and immediately abdominal operation resorted to, when the diagnosis of ectopic is proved.

Faintness, nausea and sickness are due to irritation of peritoneum.

Expulsion of a uterine decidua:—This is a late event and when present is of great help in cases of doubt. It is a late sign and appears only after several attacks of pain and the tube has aborted or ruptured. Only in about 30% of cases may this be noted.

I remember a patient who was treated for one week as a case of appendicitis. One morning, during the usual rounds, the nurse showed the doctor a typical decidual cast. The diagnosis at once changed and the patient was immediately operated and the affected tube removed.

Ordinary symptoms of pregnancy such as morning sickness, pain in the breasts and mammary changes cannot be relied upon in ectopic as they are very much less marked than in normal pregnancy. Irritation of the bladder and rectal tenesmus may be present if there are large collections of blood in the pelvis. Anæmia and pallor of the palms may be marked.

Bimanual examination should be done very gently and with extra care in such suspected cases for a gravid sac very readily gives way if roughly handled. I have seen a patient walking into the out-patient department of a hospital complaining of pain. She came alone because her disability was not much. A pelvic examination was done. She cried and collapsed and was carried in a stretcher straight to the theatre and operated upon for a ruptured tubal.

The margins of an ectopic sac are indefinite, there is marked tenderness. Pulsation in one fornix may be more marked than in the other. Uterus is generally pushed to the one or the other side.

A rectal examination is often very helpful in such cases and should not be omitted as we can feel the Douglas' pouch better by rectum than by the vagina. These patients give us some time to keep them under observation (of course in hospital), never at home. The pulse rate and general condition can be watched and patient operated upon as early as possible.

DIFFERENTIAL DIAGNOSIS is important and these are the conditions for which this may be mistaken.

1. *Intestinal colic* has already been considered. (*a*) Pressure relieves intestinal colic; and (*b*) patient is usually free of discomfort between the colics.

2. *Uterine abortion*:—Size of uterus corresponds to pregnancy; cervix is soft, fornices empty, bleeding is generally more and is associated with back ache.

3. *Retroflexed gravid uterus*:—Symptoms usually seen in the 4th month of pregnancy may be present and in addition dysuria or retention of urine. After catheterisation the patient should be examined. Fundus is not felt anteriorly and the body is felt in the Douglas' pouch in continuation with the cervix.

In a woman during child bearing period an acute abdominal condition must always make us think of an ectopic gestation. Detailed history, careful and gentle bimanual examination (after catheterisation) carefully watching the patient for signs of internal hæmorrhage, recording pulse rate every ½ hour, noting range of temperature, looking for other signs such as rigidity examining blood for leucocytosis, hæmoglobin percentage, all these will be very helpful.

TYPE III.—*The woman suffers from a haematocele.* She may tell us of *previous attack* of pain and now a *discomfort and soreness in the pelvis.* On P.V. the clot in the Douglas' pouch gives a peculiar and characteristic sensation. The swelling is elastic, semi-solid, in parts hard, in others soft. Limits are not defined. This displaces the uterus to one side or upwards. There may be low temperature due to the disintegration and absorption of the blood. She may complain of dysuria and rectal tenesmus. If posterior fornix is aspirated, blood may be drawn out. Most important complication of this is infection.

DIFFERENTIAL DIAGNOSIS.—1. *Pelvic cellulitis* :—History of purulent discharge. Puncture of posterior fornix may show pus on aspiration. Aschheim-Zondek test is negative. Leucocytosis is marked.

2. *Pelvic peritonitis and effusion* :—Rigidity, temperature and leucocytosis are present.

3. *Retroverted gravid uterus* :—Catheterise and carefully do P. V. Cervix is continuous with the body of uterus which lies in Douglas' pouch and no mass is felt anteriorly.

4. *Any tubal swelling* :—Pyo, hydro, or hæmo-salpingitis. These are usually bilateral.

5. *Chocolate cysts of ovary* :—These are difficult to diagnose. But there is a longer history of severe dysmenorrhœa.

TYPE IV.—*Cases in which ectopic pregnancy advances to later months.*—History is of great importance and early symptoms suggestive of rupture must be enquired into. Vague pains and discomforts are felt and fœtal movements are marked and cause uneasiness. Abdominal distension is usually more marked on one side than on the other. There is one difference. The gravid uterus can be pulled over to the middle line, while a gravid ectopic sac is generally fixed. On P. V., the cervix is not so soft and is often displaced slightly. Radiography is at times helpful. When spurious labour occurs, there is severe abdominal pain. Slight dilatation of cervix and often expulsion of the uterine decidue with a hæmorrhagic vaginal discharge. The foetus, if alive, gives evidence of distress, its movements being extremely active, later they quieten down, and cease altogether. Rupture of the sac very seldom occurs at this stage because it is well supported by the adhesions it has contracted to the surrounding structures. After the death of the fœtus the natural terminations are mummification, adipocere formation, calcification or lithopoction, or, if infection occurs, disintegration and escape of contents through bowel, vagina, rectum or bladder. This termination is rare now-a-days for cases are diagnosed sufficiently early and treated. Less than 1% of ectopic reach full term and majority of them are deformed.

TREATMENT is operation, and the results in the large percentage of cases are most gratifying. Lawson Tait in 1883 was the first

to undertake abdominal operation for checking the hæmorrhage in ruptured ectopic, and prior to this the mortality for this condition by expectant treatment was nearly 86%. Now, since operative treatment has been universally accepted, the mortality is considerably less and ranges from 1 to 5%. Prompt laparotomy and checking hæmorrhage, immediate clamping of vessels, and judicious use of blood transfusion from a suitable donor, or from the peritoneal cavity of the patient herself, are life-saving measures. In acute cases the operation must be quickly done and the anæsthesis may be local, or gas and oxygen. The opposite adnexæ should always be examined, for gestation may simultaneously occur in both tubes, or the other tube and ovary may be diseased and predispose to a repetition of this accident. Conservation of tube is risky.

For type 2 *cases also*, operation and removal of affected tube are the best. For hæmatoma, broad ligament should be opened and clots let out. If there is infection drain through posterior fornix.

Type III. For pelvic hæmatocele :—An abdominal operation is favoured by most gynæcologists, while some may let out the clot by the vaginal route.

Advantages of the abdominal method are :—1. Better evacuation of the clots.

2. The tubes and ovaries can be inspected and dealt with at the same time. Disadvantage of abdominal is that sometimes lot of adhesions to the bowel (which forms a roof over the hæmatocele) has to be torn through to reach the Douglas' pouch.

By vaginal route :—Opening and letting out the clots through the posterior fornix. The operation is limited to the removal of clot only. If a second hæmorrhage occurs during this process one will be in trouble and abdomen may have to be opened to deal with the bleeding vessel. It is advantageous when infection is present for the peritoneal cavity is thus avoided.

Type IV. *Abdominal pregnancy near or at term* :—Hæmorrhage is the most important consideration here. Controlling the hæmorrhage due to separation of the placenta and dealing with the sac is very difficult at times for there may be formidable hæmorrhage. Immediate interference ?, or wait till term ?, or wait till death of the fœtus ? These questions become controversial. In later weeks rupture rarely happens, and if, after explaining the risks the mother still wishes to get a live child, even if it be deformed, then delay is permissible, provided the patient is placed under such conditions that immediate operation can be performed should this become necessary. There are some cases now on record in which a living healthy child has been secured.

If the fœtus is dead, delivery is, of course, purposeless. The ideal treatment is to remove the sac entire, fœtus, placenta and membranes. This is generally simple if the child has been dead for

some time as a "dead" placenta is easily stripped off and any little bleeding that occurs can be readily controlled. But the site of a 'living' placenta may bleed very freely when the latter is separated because the site, being usually on cellular tissues, is non-contractile. Besides, in the process of separation, if the placenta is attached to the mesentery, serious injury may be done to the blood supply of a portion of the intestines. Occasionally the arterial supply may be cut off by ligating the ovarian and uterine vessels before proceeding to separate. In other cases separation of the sac by degrees and carefully understitching bleeding points has proved successful. Marsupialisation is now given up for suppuration toxæmia and protracted convalescence is the result. When severe bleeding is anticipated, modern gynæcologists just leave the placenta *in situ* and close the abdomen without drainage, as much as possible of the sac is removed, and the cord is cut flush with the placenta. The mass left in, undergoes autolysis, and is later absorbed and becomes a fibrous structure.

The Value of Estrogen Therapy in the Treatment of Varicose Veins Complicating Pregnancy

Varicose veins developing during pregnancy may cause severe pain and considerable disability. Operative treatment during pregnancy rarely gives satisfactory results, and injection treatment is indicated only in special cases and for some definite reason. The fact that varicose veins developing during pregnancy often disappear after the termination of the pregnancy indicates that they may be a true complication of that condition. There is considerable evidence to indicate that rapid development of varicose veins in pregnancy is associated with changes in hormone metabolism. Several authorities have reported good results with estrogen therapy. The author reports the treatment of 34 cases of varicose veins complicating pregnancy with Estinyl tablets (estinyl estradiol) given by mouth or with Progynon B (alpha-estradiol-benzoate) or Estroluten (estradiol and progesterone) given by injection for patients with severe nausea and vomiting. Four of these patients complained of pain in the labiocele and in all cases, this was relieved within a few days after beginning treatment. The feeling of pressure and fullness and pain in the legs was completely relieved in 41 per cent of patients; 50 per cent reported that the development of varicose veins had been checked. A total of 58 per cent of the patients were pleased with the results. Many of these 34 patients were seen so late that treatment could not be expected to be of much benefit. In all cases supportive bandages on the lower legs were worn; such bandages should be worn all the time to give the best results.—H. O. Mc Pheeters, Minneapolis, Minn., *Journal Lancet*, 69 : 2–4, Jan. 1949.—*Quarterly Review of Obstetrics and Gynecology.*

MENOPAUSE—
ITS COMPLICATIONS AND MANAGEMENT

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THE word menopause means stoppage of the menstrual periods permanently, as against temporary stoppage, *e.g.* during pregnancy and lactation, occurring during the reproductive period of a woman's life. Thus menopause marks the end of the reproductive life of a woman at about the age of 45. The age at which natural menopause occurs varies widely, and, under different conditions, it may come on as early as the age of thirty-five, or may be delayed to fifty-five. Women who have given birth to many children often have late menopause, while single woman, and specially young widows, are often seen to get early menopause. Hard work, wasting diseases and excess of fat predispose to early onset of menopause.

Physiology.—When natural menopause occurs there is a gradual failure of the ovary, which is then steadily coming for senile changes; and when the loss of follicles and ova is complete, the ovary becomes inactive as an endocrine organ. It may be remembered here that, during adult life, although one Graafian follicle matures in every menstrual cycle, numerous other follicles simultaneously undergo degenerative changes, called follicular atresia, causing atrophy of both the follicle and also of the ovum. In this way, the ovaries of women are gradually depleted of all their ova—through loss from ovulation and a much larger number from atresia—by the time they reach the end of their reproductive period of life. This absence of ova and also of follicles is characteristic of the ovaries of post-menopausal women. At menopause, this gradually falling ovary is unable to respond properly to stimulation from the pituitary, which itself shows cytologic evidence of hyperactivity. The aging ovary at menopause can no longer act as an inhibitor to excess of gonadotrophic secretions, nor can it utilise some portion of the gonadotrophic hormones, as it may do during the years of full functional activity. Although there may not be a total absence of œstrogen, the result of such senile changes in the ovary is that it brings about a gradual diminution of œstrogens and a consequent tremendous increase of the amount of the gonadotrophic hormones of the anterior pituitary. This increased amount of hypophyseal gonadotrophins, during the menopause, do not however appear to have any other functional significance. Thus it appears that the various changes evidenced at menopause are directly brought about by the atrophy of the ovary with consequent sharp decline or absence of œstrogen secretion.

Anatomical changes.—As a result of the fall in the ovarian follicular hormone, involutionary changes in the genital organs and the breasts are initiated at the onset of the menopause and steadily continue through subsequent years. There is a gradual atrophy of all pelvic organs along with the loss of muscle tone and strength of fasciæ. The vulval mucosa loses its vascular velvetty appearance, becomes thin and pale. There is flattening of the vulva and the mons veneris due to disappearance of the fat, the clitoris almost disappears due to atrophy and the urinary meatus appears granular. The rugosity of the vagina disappears and the organ is converted into a narrow smooth tube with firm walls; the fornices of the vagina become shallow and narrow. The epithelial layers, specially the cornified cells of the vagina, diminish in depth with corresponding relative increase of fibrous tissue in the wall of the vagina. The muscular elements become scanty, and there is progressive obliteration of the blood vessels with hyaline degeneration of their walls. The loss of epithelial thickness is also evidenced in smears from the vagina which shows a large number of the deep or basal cells with numerous leucocytes brought in by their unhampered migration through the thin epithelial walls. Erythrocytes are frequently seen in the vaginal smear. After menopause glycogen disappears from the epithelial cells with rise of pH making the medium alkaline in which the protective flora of the vagina cannot thrive or function properly, with the result that the Doderlein's bacilli, the scavengers of the vagina, cannot exist and many other potentially pathogenic organisms predominate. The thinned epithelium is itself a weak defence against invading bacteria and other toxic agents, thus predisposing to inflammation which is often aggravated by accumulation of the discharge in the narrowed vagina devoid of its muscle tone. The above mentioned changes—anatomical, biochemical and bacterial—may easily be exaggerated and become pathological, giving rise to senile vaginitis, or, sometimes, circumvaginal stenosis. After menopause, the body of the uterus becomes gradually atrophied and ultimately resembles a small fibrous nodule. The cervix also atrophies and its canal is gradually obliterated. The endometrium becomes thin but the pattern may vary somewhat. The Fallopian tubes become shorter and thinner, and the fimbriæ disappear. The ovaries also atrophy and ultimately become reduced to white scarred nodules with less than half of the adult size.

Clinical features.—The principal event at menopause is, no doubt, permanent stoppage of the menses, but there is more in menopause than only this permanent amenorrhoea. Moreover, the way in which the menses stop finally varies in different individuals and has to be taken note of. In most women the menstrual phases become more and more scanty and infrequent, ultimately coming to a stop. In some others, usual regular types of menstrual phases are interrupted by varying and increasing periods of amenorrhœa

leading to permanent stoppage. In others again, periods of amenorrhœa alternate with episodes of free and heavy bleeding often forcing the patient to seek medical advice either for the bleeding as such or for a supposed abortion. This last group must not be disposed of lightly, for while the symptoms might really mean the onset of menopause, they might as well, in all probability, be caused by gross pelvic pathological lesions including malignant disease. Besides these variations in the method of final stoppage of the menses, various other symptoms also occur at menopause and about 75% of all menopausal women are found to suffer from one or more of these symptoms. These symptoms of menopause may sometimes precede the disturbances of the menses even by two years.

The climacteric disturbances are of various types and referable to various systems. The commonest are vasomotor disturbances—hot flushes, usually of the face but may be of the entire body. These may be followed by chills or a freezing sensation, sometimes also by sweating. These vasomotor episodes occur at varying and unpredictable intervals during the day or night and become a source of great discomfort. It must however be stressed that such vasomotor disturbances must not always be assumed to be due to endocrine imbalance until all other possible organic factors have been excluded.

Other symptoms are, emotional instability accompanied by self-consciousness, insomina, anxiety, exaggerated depression with crying on occasions, or general irritability particularly towards members of her immediate family *e.g.* the husband, a pet child or grandchild. Vertigo, tinnitus, headache, paræsthesia and causeless apprehensive fear are also often seen. Menopausal arthralgia is sometimes seen, meaning pains in joints, with existing osteoarthritic changes or rheumatoid arthritis being exaggerated at menopause, or sometimes pains in joints without any apparent lesion. The intensity of these symptoms vary a great deal in different individuals and the temperament of the woman has much to do with it. These symptoms are generally less severe in the active and energetic woman. An unemotional type, as is very often found in the docile rural womenfolk, will usually suffer little and may not complain at all, while the nervous, irritable, peevish woman will complain bitterly. For most women there is a readjustment of the mental outlook and emotional balance at this time. The single or barren woman and the widow with none to depend on, will regard the approach of the menopause with an entirely different attitude than a mother in a happy family. Psychologically the essential feature of the menopause centres round the anxiety at realising the end of biologic utility, the gradually reducing size of her social circle because of the aging, or death of old friends and acquaintances, and, finally, in many instances, on the decreased economic security of advancing age.

Symptoms of lesser frequency and importance are also seen. Gastric symptoms such as increased flatulence, eructations and a

feeling of being bloated are sometimes complained of. A slight hypertension, such as 140 to 150 systolic, is often seen, but it readily responds to usual treatment.

While the preceding paragraphs relate to natural menopause, these physical and mental complications are also possible in women suffering from artificial menopause. Women with surgical removal of the uterus do not menstruate subsequently, and this fact alone has been found to upset some women, but they soon get settled with the "new order" once it is explained to them that in spite of the permanent stoppage of the monthly periods they can and should continue with their regular normal and healthy life. Women from whom both the ovaries have been surgically removed may be expected to exhibit all the above mentioned climacteric symptoms including putting on fat, often rapidly. Investigations have been undertaken about the reactions of women with menopause induced by radium *e.g.* for benign uterine hæmorrhages. In a recent paper McLaren reports high incidence of loss of libido, sexual dysfunction with greatly diminished sex urge, failure to achieve orgasm and dyspareunia; besides the usual flushings, sweatings and premature senile changes. It is reassuring to note that most of these were subsequently controlled with proper treatment.

MANAGEMENT.—The average woman passing through the menopause very often needs no medication. But it is essential to investigate any unusual symptom or unnatural bleeding at this age to rule out the possible co-existence of other illnesses. It is only after such a thorough investigation that we are justified in presuming the approaching climacteric to be the cause of all her troubles. If no other disease is present, reassurance to the patient with an explanation of the mechanism involved, the temporary nature of the symptoms, and their tendency to disappear spontaneously after a variable period of time, is very helpful. The patient should be told that the higher the standard of health and body resistance with which she enters the menopause, the better are her chances that she will pass through this period of "change of life" and its crisis with comparative comfort and safety. The patient often takes some time to understand and accept these things as "normal" but most patients with insight and some intelligence will respond more to uuderstanding and persuasion than to medication. Attention should be directed to proper diet, relief of constipation, assuring adequate sleep and, above all, the avoidance of worry and anxiety. Periodic examinations by a competent doctor should be undertaken to guard against the very real danger of overlooking some underlying disease. The patient should be told that it is never normal to bleed profusely, and that should this happen, she must consult her gynaecologist without loss of time whereupon a thorough examination with diagnostic curettage or biopsy may be necessary to exclude malignancy. Constipation is relieved by taking a proper component

of water and green vegetables in daily-diet and, if necessary, by "Bicolates" or "Veracolates" one tablet at bed time every night; or by salines *e.g.* Soda. Sulph., Mag. Sulph, one ounce, or one and half teaspoonful of "Effersal" in the morning, once or twice a week. Proper sedation may be assured by "Calcibronat" granules, one teaspoonful in a glass of water, 3 times a day or by a suitable barbiturate, *e.g.* "Soneryl", one or two tablets, at bed time. Persistent insomnia may be managed with an occasional (once or twice a week) dose of "Dial", one tablet taken with a draft of warm water half an hour before the night meal. The use of Morphine must not be indulged in, and valerians should better be avoided.

Occupational therapy, although not in the usual meaning of this term, is also a form of psychotherapy and should be used to supplement what the doctor can do. By this it is meant that the patient should be asked and encouraged to do something useful and creative to occupy her time. It is very often found that time hangs heavily on these menopausal women. For, their children have grown up, household duties greatly lightened and unless they have, or find, some preoccupation to keep them busy, they usually become thoughtful and introspective with consequent mental exaggeration of even slight symptoms. It has already been observed above that the climacteric symptoms are usually less severe in the active energetic and busy woman. Hence an attempt should be made to divert the energy of the patient to some creative and useful activity that would keep her busy. Women with education may be directed and helped to engage themselves with educational and social uplift activities specially amongst children of poorer people; or to activities in cottage industries like sewing and knitting themselves and teaching others. We have known many such menopausal women helping themselves and benefiting others—by activities in connection with the Red Cross, Community Kitchens, Refugee Rehabilitation, Widows' Homes, Children's Homes, sewing and knitting for poor children, displaced persons and prisoners of war etc. With a little foresight, it is not usually difficult to help menopausal women to find and get busy with some such interest, job or project.

It must however be stressed that when symptoms become really troublesome, Oestrogen therapy is specific and hence must be undertaken. Under these circumstances, witholding Oestrogen would be similar to denying Insulin to a diabetic; but unfortunately it is sometimes seen that the practitioner does not take any serious notice of the patient's complaints, because there are not many objective signs, and thus refuses to prescribe any treatment for her—thereby perhaps intensifying the morbidity and mental depression in the patient. Hence it is necessary that we must investigate into, and assess, the complaints of the menopausal woman, and in the absence of other diseases try to control symptoms by the methods referred

to in the previous paragraphs. If such measures fail to give proper relief or ameliorate the symptoms to a great extent, we must not hesitate to administer Oestrogens in proper dosage. The objective of Oestrogen therapy, however, is only to minimise the intensity and duration of the distressing symptoms, and to tide the patient over the period of physiological adjustment. The oral route of administration is distinctly preferable, for besides being more economical, this obviates frequent visits to the doctor which would naturally make the patient more introspective and hence make it difficult for her to settle down quickly with her condition. The Oestrogen should be given in the least possible dose that would control the symptoms, and should be given for a limited time and then gradually withdrawn. Any of the numerous varieties of oral Oestrogens may be used, and the same drug may not be equally efficacious for every patient. The average dose is Stilboestrol *e.g.* "Clinestrol", 0·1 mg. tablets, starting from 1 tablet daily, gradually increased, till the symptoms are controlled. Alternately, Oestrone, *e. g.* "Menformone" tablets, 0·1 mg. (1,000 units) may be given similarly by mouth; this variety of Oestrogen is less likely to cause undesirable side-effects. Another effective Oestrogen with low toxicity is Diœnestrol, *e.g.*, "Neo-clinestrol", 0.1 mg. tablets. A potent Oestrogen, with low toxicity, small dosage, and fairly low cost, is Ethinyl Oestradiol, *e g.* "Estinyl", in 0.01. mg. tablet dosage. As mentioned above, whichever form is chosen, the dose is to be steadily increased till symptoms are under control. For this purpose, the frequency and duration of the hot flushes, sensation of chill and sweats may be taken as guides in increasing or steadying the dose of the drug. Two to 8 tablets (average 4 tablets) a day are usually necessary in checking the flushes and then reducing these to 2 to 4 in a week. After this is achieved, the patient should be stabilised with the minimum dose compatible. This optimum dose should be administered for 3 weeks after the menstruation, if menstruation is still occurring, and then stopped, to be resumed after the next menstruation. If the patient is not menstruating then this optimum dose should be carried on for 3 weeks with one week's interval after that; and in this way up to a total of 6 to 12 weeks, after which the patient must report for further examination, check up and gradual reduction of dosage. It must be emphasised here that the prolonged and excessive use of Oestrogens in the menopausal woman is unnecessary and is potentially dangerous. For this reason some doctors prefer to keep a check by administering once or twice a week injections of aqueous suspensions of Oestrone, 2 mg. The withdrawal of Oestrogens, when this medication is stopped, sometimes induces uterine bleeding in the post-menopausal woman. If such a thing does happen, we must not rest content by attributing such bleeding to ovarian dysfunction or to the previously administered Oestrogen, but must search for carcinoma of the uterus. Oestrogen therapy, specially in women with radium-induced menopause, have been seen to give rise to

complications such as leucorrhœa, vaginal spottings and minor tension in the breasts.

Oestrogens are however contra-indicated, in view of possible dangers, in women with menstrual irregularities, those with history of endometriosis, patients with a family history of cancer or a personal history of mammary or uterine tumours and also in those with hepatic insufficiency.

Thyroid extract, by mouth, is sometimes of benefit in menopausal disturbances—specially in the exhausted, depressed patient with failing concentration. These patients may not exhibit all the classical symptoms of thyroid deficiency. The average dose required is 1 to 2 gr. daily, in divided doses of ½ gr. each, gradually increased from only one ½ gr. tablet a day.

In recent years, vitamin E is being used with success for climacteric symptoms in patients who cannot tolerate, or are unsuitable subjects for, œstrogen therapy. Although not so efficacious as the Oestrogens, Vitamin E, nevertheless, is beneficial to patients in relieving the symptoms to a great deal. It may conveniently be given as "Ephynal" tablets in doses of 20 to 100 mg. (average 30 mg.) daily, given in divided doses. The duration of administration varies from one to two months. As mentioned above, although useful, this therapy is not as effective as the Oestrogens.

Sometimes the atrophic changes in the vulva, vagina and the urethra give rise to distressing symptoms, with pruritus and pain. These may be relieved by local application of Oestrogen in vaginal suppositories (*e.g.* "Colpon"), 5 mg., inserted on alternate nights, or with Oestrogen containing ointment (*e.g.* Menformon ointment in addition to the oral medication with Oestrogens.

In conclusion it may be recalled that we doctors have a duty to perform in relieving the physical and mental distress of the menopausal woman. It has aptly been said that "few other patients appear to get so little professional consideration as some of these menopausal women and yet their symptoms can be easy and gratifying to treat". What is really needed is a sympathetic understanding of the position of the elderly woman with climacteric, and giving a patient hearing to her complaints. For, then only can we hope to gain her confidence and thus induce her to listen to our advice, and this need not always be a treatment with medicines—as already said before.

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THE USE AND ABUSE OF PITUITRIN

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THIS short paper is an attempt to set forth as concisely as possible the clear cut indications for the use of Pituitrin employed so commonly in obstetric practice. This communication is meant only to the general practitioner and not to the specialist. As such all controversial issues will be avoided and only well established and safe facts put forth.

I intend discussing the use of the Posterior Pituitary Extract, because of its extensive employment in obstetric practice, often without a proper understanding of its indications and resulting many a time in obstetric disasters.

The posterior pituitary secretes two hormones. Pituitrin and an Anti-diuretic Hormone. Pituitrin has two components—(1) Vasopressin, and (2) Oxytocin. Vasopressin has a pressor effect on the circulatory system and is found in the chemically pure extract Pitressin. Oxytocin has its main action on the uterus and is present in the pure form in Pitocin. The dosage is in terms of units. Units of pressor activity refer to an action on the blood pressure of anæsthesised dogs, while units of oxytocic activity refer to the action on the excised uterus of the virgin guinea pig. Each c.c. of the undifferentiated extract contains usually ten oxytocic units. The pressor activity of the extract is about 5 to 10 units. Though a substantial separation has been effected in Pitressin and Pitocin, still each contains 10% of the other in units of respective activity. It has been proved experimentally that both Pitressin and Pitocin have oxytocic properties. In obstetrics it is the oxytocic property that is made use of.

One of the very much discussed problems even to-day is the place of Pituitrin in obstetric practice. I shall first deal with its uses about which there is no controversy.

I. During pregnancy.—One of the most important uses of Pituitrin is in the management of inevitable or incomplete abortions in the early trimester. Where the uterus is already trying to expel its contents by itself, Pituitrin augments those uterine contractions to a considerable degree and helps the uterus to empty itself without any interference on the part of the obstetrician. Usually a dose of five units is enough, but if necessary this may be repeated in half an hour. Perhaps a better practice would be to give two units every half an hour till in all a total of five to ten units are given. This line of treatment is most useful where the cervical canal is partially open and the ovum is being expelled. *One must realise that during the early months of pregnancy any amount of Pituitrin administered with*

the idea of inducing abortion is and will always end in failure. It is just wasting the drug.

Another common indication for the use of this drug in pregnancy is in the management of ante-partum hæmorrhage due either to placenta prævia or accidental hæmorrhage. In the incomplete varieties of placenta prævia, where it is decided to effect delivery per vaginum, the artificial rupture of membranes is often selected as the line of treatment. To promote uterine contractions and thus hasten delivery, small doses of Pituitary Extract can be administered to the patient with good result. Only small doses should be administered—1 to 2 units every half an hour and not more than 5 units should be given. There are some who advise that Pituitrin is best avoided in these cases. My experience has been that it is quite a useful procedure and practically without any danger. In cases of accidental hæmorrhage also Pituitrin can be administered in small doses as in placenta prævia; but one must realise that often accidental hæmorrhage is found in association with hypertension and pre-eclamptic toxæmia. Under such circumstances it is best to avoid Pituitrin because of its pressor effect. Even Pitocin has some pressor effect. It must however be borne in mind that all cases of ante-partum hæmorrhage are best treated in well equipped institutions and wherever possible such cases should not be treated on the domiciliary service.

Pituitrin is the main drug used in the medical induction of labour. After a dose of castor oil and a large warm soap and water enema Pituitrin in doses of 1 to 2 units is administered deep subcutaneously or intramuscularly every half an hour till uterine contractions are well established, or in all not more than ten units are given. It is better not to exceed this dose as sometimes the uterus may go into tetanic contractions even though the membranes are in tact thus producing fœtal asphyxia. Medical induction is not always a success but all the same it is a very useful procedure especially at term and over, and Pituitrin is the key drug in this procedure.

During labour.—One cannot but enter the realms of controversy when discussing the place of Pituitrin in the management of labour. I shall however try to limit this to the minimum. The drug is undoubtedly a powerful stimulator of uterine contractions and hence one is tempted to use it in those conditions where the uterine forces are weak from the very beginning, or have failed towards the last stages of labour. What is the place of Pituitrin in the management of those cases complicated by uterine inertia? There is a strong opinion gaining ground of late that small doses of Pituitrin—one unit every half an hour till uterine action is well established, not more than 5 units to be given under any circumstances—administered in cases of primary uterine inertia is a very useful procedure. Before one takes to this line of treatment, it

must be fully realised that sometimes even in very small doses Pituitrin gives rise to very strong uterine contractions, sometimes resulting in tonic contraction of the uterus. The result of such an action on the part of the uterus will certainly result in fœtal death and at times, if delivery is not effected immediately, it might even cause the greatest obstetric disaster, namely rupture of the uterus. It is true that such an event is not common with the very small dose that is advised in the management of uterine inertia; but the danger is there and therefore the safest procedure would be to avoid the use of Pituitrin in such cases in domiciliary practice. In institutions where there are facilities for constant skilled supervision and nursing attention, this line of treatment may be adopted; but the general practitioner working under conditions which are anything but satisfactory will never have to repent for not having used Pituitrin. If he uses it as a routine as some do, even with the best of luck he may not get away with it; one time or other his luck will fail and he will have to face some of the worst of obstetric tragedies for which he alone is responsible. I may therefore be permitted to repeat that the general practitioner is very safe in avoiding Pituitrin in the management of these cases of primary uterine inertia. This should not be taken to mean that Pituitrin has no place in the management of labour. It has a very small limited place in domiciliary midwifery.

Perhaps the safest use of Pituitrin—if one is keen on using it in labour—is in those cases where the fœtal head is at the outlet but the delivery is not completed because the uterine contractions have waned. The alternative is to deliver by the application of outlet forceps. Pituitrin can therefore be used to replace an outlet forceps delivery. Whenever Pituitrin is employed for such purpose, it is best to have the forceps ready to effect delivery in case Pituitrin fails. Further, the fœtal heart should be carefully watched after the administration of Pituitrin and at any sign of fœtal distress delivery must be completed by forceps.

In domiciliary practice Pituitrin must never be administered if there is the least suspicion of cephalo-pelvic disproportion; it should be avoided in the presence of malpresentations of the fœtus, *e.g.* face, brow, breech, shoulder, etc. Pituitrin must not be given when the greater diameter of the head is above the brim of the pelvis and when the cervix is not fully dilated and taken up. In other words, before Pituitrin is administered one must make absolutely certain that there are no obstacles to delivery—immediate delivery if required. Only a small dose is required, 2 units, not more.

Next to prolonged and obstructed labour the injudicious use of Pituitrin holds the pride of place in the causation of rupture of the uterus where even now the maternal mortality is so high. It is within the experience of all working institutions of this kind to come across a fair number of cases of rupture of the uterus due to

the indiscriminate use of Pituitrin. How many more of these cases die before they reach an institution, one can only imagine. In practice in the rural areas the doctor is usually called in very late after the patient has been in labour for a long time. The uterus has either gone into a stage of tonic contraction or is in a state of inertia, especially in a multipara. Because the prolongation of the labour is attributed to failure of the uterine forces the doctor administers Pituitrin hoping to effect delivery. He may succeed in those cases where the head is low down and the cervix is fully dilated; but what unfortunately happens—on many an occasion—is that he administers Pituitrin when the major portion of the head is still above the brim, the cervix is perhaps insufficiently dilated, the position is an occipito-posterior and what he saw at the outlet was a very large caput on the head. Needless to say Pituitrin under such circumstances will not only cause the health of the child but also of the mother by causing the uterus to rupture.

Therefore I repeat again Pituitrin is best avoided in domiciliary practice, in the second stage of labour except it be for the replacement of an occasional outlet forceps delivery.

The third stage and after.—Of recent years Pituitrin is being more and more frequently employed in the management of the third stage of labour. Especially in America there are many obstetricians who give Pituitrin as a routine soon after the delivery of the fœtal head. It has been proved by them that Pituitrin administered at this stage reduces to a significant extent the amount of blood lost during the normal process of separation and expulsion of the placenta and after. They advise giving the patient an injection of five units as soon as the head is delivered and are very enthusiastic about its results. It is no doubt true that Pituitrin does reduce the amount of blood lost; but there is the occasional danger of the drug giving rise to an hour glass contraction of the uterus which will cause retention of the placenta for which the only treatment is manual removal. Manual removal of the placenta should be considered as a major operative procedure and if possible must be avoided in domiciliary practice. Hence in rural practice one is on very safe grounds if Pituitrin is *not* administered till the placenta is expelled.

The most important use of Pituitrin is undoubtedly in the management of post-partum hæmorrhage. Where the hæmorrhage is due to an atonic uterus and not due to trauma Pituitrin administered intramuscularly or sometimes directly into the uterine muscle through the abdominal wall in doses of five to ten units checks the bleeding in a few minutes by promoting uterine contractions. At cæsarean sections this drug can be injected directly into the uterine muscle to control post-partum hæmorrhage.

Pituitrin can be usefully employed in the puerperium in cases of subinvolutions due to retained bits of membranes or placenta which

prevents the uterus from involuting normally. The contractions produced by the drug help the uterus in getting rid of the retained products which are cast off in the lochia. In cases of secondary post-partum hæmorrhage also Pituitrin is a life-saving drug.

It will be evident from what has been said that Pituitrin is a most useful drug in obstetric practice; as such one is likely to employ it freely in practice. I wish to emphasize that in domiciliary practice, it would be very much safer if the use of this drug is limited to absolutely safe indications, *i.e.*, use it only (*a*) in cases of incomplete or inevitable abortions; (*b*) in induction of labour; (*c*) in the treatment of post-partum hæmorrhage—primary or secondary; and (*d*) in the treatment of subinvolution.

An occasional use of this drug in the second stage of labour is in cases where the head is stuck on the perineum and the uterine forces have diminished in intensity. One may sometimes administer a small dose of Pituitrin—2 units—to replace an otherwise outlet forceps delivery. Even under such conditions it would be safer to have the forceps ready in case the Pituitrin fails to effect delivery. *Never use Pituitrin when the major portion of the head is above the pelvic brim, when the cervix is insufficiently dilated or where there is a malpresentation. It would be folly to use Pituitrin if the uterus is acting normally in labour.*

If in domiciliary practice Pituitrin is used only for the very safe and correct indication mentioned above and avoided in all other conditions, the attending doctor will never have to regret his action. On the other hand, if this most useful but dangerous drug is used on flimsy indications and indiscriminately sooner or later, the practitioner will undoubtedly come to grief.

There is no doubt that Pituitrin in cases of post-partum hæmorrhage is sometimes a life-saving drug. It behoves on the obstetrician therefore to keep a stock of this drug in his bag. Unfortunately there are at present on the market any amount of the so-called Pituitrin but few of them are really potent. Hence the doctor attending to labour cases must make sure that he is in possession of a reliable brand of Pituitrin. Else he will be let down badly in a crisis.

Electric Shock During Pregnancy—A Report of Seven Cases

In all 7 cases the voltage was set at 120, and 60 cycle current was applied for .1 to .2 of a second. Each treatment produced a major convulsion. Curare was injected before each treatment in doses of 2·0 to 3·5 cc. to soften the convulsions. The shocks were given 2 and 3 times per week. One patient was treated in the first trimester, 4 in the second, and 2 in the third. In all cases the pregnancy was not complicated by the treatment, and uneventful delivery of normal infants was accomplished at term. A follow-up report 18 months after birth of one of the children indicated no abnormalities in development. On the basis of this experience together with the 9 cases previously reported by others, in which treatment was restricted to electric shock, it would seem that pregnancy *per se* is not a contra-indication to electroshock therapy. From our experience it also appears that curare may be used with safety.—D. I. Doan and R. E. Huston, Psychopathic Hospital, State University of Iowa, Iowa City, Ia. *Psychiat. Quart.*, 22: 413-17, July 1948.—*Quarterly Review of Obstetrics and Gynæcology*

OBSTETRIC SHOCK

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IN spite of all advances in the knowledge of obstetrics, there are many unsolved problems in this realm of medicine. Obstetric shock is certainly one of them, the solution of which tries the experience and the skill of the obstetricians.

The term 'Obstetric Shock' is loosely applied to all clinical conditions of vascular collapse following upon hæmorrhage and/or shock. However, it is desirable that this term should be restricted to the condition of vascular collapse incident upon shock with or without hæmorrhage. The death in obstetric shock is not due to the mechanical loss of the blood as in a case of post-partum hæmorrhage and is not accompanied by air hunger and restlessness. Predominant feature of the obstetric shock is the *profound depression of all the vital centres of the body* and the respiratory centre is not an exception to this rule.

Hence shock is a clinical syndrome characterised pathologically by diminished volume of the circulating blood and clinically by the depression of all the vital functions of the body, the principle sign being a sustained reduction of the blood pressure.

Forms of shock.—For clinical purposes shock is divided into two forms, primary and secondary, but it is usually a continuous phenomenon.

PRIMARY SHOCK.—It is, in most cases, sudden in onset and follows immediately upon trauma (painful stimuli, mental trauma etc.,) and is probably due to cerebral anæmia. It is a sort of fainting like vaso-vagal attack and the principle signs are pallor, slow pulse of poor volume, unconsciousness and low or unrecordable blood pressure. It passes off quickly and does not need any treatment. There is no reduction of the blood volume as in secondary shock but it is due to marked fall in blood pressure on account of the sudden inhibition of the vasomotor centre from a stimulus to the nervous system and is usually temporary. Once the tone of vasomotor system is restored there are no after effects. If, however, the fall in the blood pressure is great—falls to and remains at 70 mm. Hg. or less for some time, then the effects of cellular anoxæmia occur.

The sudden onset of shock which forms a predominant symptom of concealed accidental hæmorrhage is not caused by blood loss in the uterine cavity but by severe and continuous pain resulting from the suddeu increase in the intra-uterine pressure. It is of the neurogenic origin.

As regards the treatment, it requires at the most injection of Morphia, flat position, low level of the head and a little fanning.

SECONDARY SHOCK.—What is usually meant by the term 'Obstetric Shock' is the secondary shock. It appears some time after the injury and reaches its climax several hours after the injury. In some cases there may not be any cause clinically detectable. Cases showing restlessness and air hunger should be excluded from this group as the deaths in such cases are due to hæmorrhage though the shock may ensue as a terminal event.

There are two types of cases of obstetric shock:—In the first type in which the patient has been quite healthy during pregnancy, labour is normal and immediately after such a labour the patient goes into the condition of shock. Such cases are rare and the shock comes on unexpectedly and proves very serious and very difficult to treat. The second type of cases are those in which the patients suffered from some debilitating disease during pregnancy, the labour had to be interfered with and the complications were such that they exhausted the patients leading to the state of shock. These types of cases are common.

'Pure obstetric shock' is described as a condition of shock where no demonstrable lesion of such sufficient degree so as to cause the death, is found on thorough post-mortem examination. Hence the group of cases which are clinically grouped under the term 'Obstetric Shock' are not the cases of pure shock as post-mortem evidence is lacking in such cases. Sheehan[1] after careful study of such 97 cases of deaths from so called obstetric shock, was not able to find a case of pure obstetric shock.

Aetiological factors.—Any factor that reduces the volume of the circulating blood plays its role in the causation of shock.

I. CONTRIBUTING CAUSES.—1. *Dehydration*:—In this condition there is deficiency of the extra-vascular fluid and hence the mechanism of draining it into the vascular system is relatively ineffective.

2. *Anaemia*:—Blood supply to the heart is defective and with further reduction in the blood pressure, coronary circulation gets lessened and consequently the heart suffers in its efficiency.

3. *Anaesthesia*:—There is vaso-dilatation of cutaneous and splanchnic blood vessels under general anæsthesia. Chloroform is toxic to the heart in the condition of shock. Nitrous oxide, if given with less than 20% oxygen, depresses the respiratory centre along with the vaso-motor centre. Spinal analgesia gives rise to vaso-dilatation in the area below the level of analgesic effect.

4. *Excessive loss of fluids*:—Perspiration on account of heat and vomiting reduces the fluid part of the blood.

5. *Withdrawal of fluids*:—When fluids are not given freely to a patient who is in labour, it renders her dehydrated.

6. *Exhaustion*:—Exhaustion and prolonged labour induce dehydration, starvation and the fatigue of vital centres.

7. *Factors of less definite character*:—(*a*) Accidents like rupture of the ectopic pregnancy and accidental hæmorrhage are known to give rise to shock.

(*b*) Certain operations like manual removal of the placenta, forcible instrumental delivery and rapid dilatation of the cervix, are particularly attended with the onset of shock.

8. *Toxins*:—Severe bacterial infections and the toxæmias of pregnancy tend to accentuate the fall in blood pressure. Gas-gangrene and anærobic organisms have got particular effect to depress the blood pressure.

II. Exciting causes.—1. *Mental trauma*:—Fear, reception of bad news and the anxieties play an important role in the causation of shock in cases where no other demonstrable clinical factors could be found. A case of shock where mental trauma was the only factor responsible for the onset of shock was as follows:—Patient had strong apprehension of her not surviving the labour. The first stage was normal. In the second stage, she took a bed pan, suddenly collapsed and died.

2. *Tissue trauma*:—It gives rise to the increased capillary permeability for about 34 to 36 hours after injury. Plasma oozes out of the capillaries and the surrounding tissues increase in volume and get œdematous. When one thinks about the vast amount of cellular tissue in the pelvis—immensely increased in the pregnancy —when subjected to trauma of prolonged labour or interference, one can easily conceive how it can precipitate the condition of the severe shock.

3. *Haemorrhage*:—Shock is avoided or retarded by minimising hæmorrhage. Either internal or external hæmorrhage, if acute, reduces the volume of the blood and shock ensues. Even in healthy human beings the condition of shock ensues, when there is 25% reduction in the volume of blood. If the same loss occurs in a patient in labour (prolonged), the condition of the severe shock may be precipitated.

Symptoms and signs.—It is convenient to divide shock into two varieties: (1) Shock without hæmorrhage; and (2) Shock with hemorrhage.

1. *Shock without haemorrhage*:—There is no single symptom or sign to detect its onset. Hæmo-concentration is the only reliable method known at present to detect it, at its inception before clinical symptoms and signs develop. Pulse may be slow or normal at the onset. Blood pressure may be normal due to the vaso-constriction, a natural phenomenon occurring at the onset of the shock.

When the shock is established the clinical signs and symptoms are as follows:—

Patient is in a state of mental and physical depression. The skin is cold and moist from profuse perspiration. Respirations are

slow and shallow. Pulse is fast and of low volume. Blood pressure is usually 90 (or below) m.m. Hg. systolic, and unrecordable diastolic. Pulse pressure is high. Pulse is fast and of low volume. Patient is semi-conscious but is able to answer questions when roused. Pupils are dilated and the reaction to light is sluggish. There may be vomiting. Urinary outflow is diminished in direct proportion to the severity of shock.

2. *Shock with haemorrhage*:—The hæmorrhage itself is not of sufficient amount to precipitate the condition of shock. The clinical features of this variety of shock are the mixture of symptoms and signs met with in the above variety and the symptoms due to blood loss—restlessness, rapid pulse, and clear consciousness. Particular features predominate depending upon the preponderance of the shock or hæmorrhage. The fall in blood pressure is a fairly reliable guide in this variety of shock for judging the severity of the same.

Pathology.—On post-mortem examinations frequently no characteristic lesions can be demonstrated but the following are the few changes usually noted:—(*a*) Multiple petechial hæmorrhages; (*b*) generalised congestion and the œdema of the viscera; and (*c*) chromatolysis in the nerve cells of the brain.

1. *Arteriolar constriction*:—It is regarded as a conservative mechanism to increase the blood pressure and to maintain the circulation in the vital organs brain, heart etc. This gives rise to low pulse pressure which may be even 10 mm. Hg. in severe shock.

2. *There is constriction of the veins*:—There is a reduction in the venous flow.

3. Capillaries are dilated.

4. Output of the heart is lessened on account of delayed venous return and deficient coronary circulation.

5. Urinary output is diminished on account of the fall in blood pressure.

6. Characteristic findings in all cases of shock are:—

(*a*) Reduction in systolic blood pressure, sometimes to 90 mm. Hg. or below.

(*b*) Changes in the blood:—(i) Hæmo-concentration *i.e.*, increase in the hæmoglobin content and the cell count due to the diffusion of plasma from the vascular system to the cellular spaces; (ii) diminution in the alkalies and reserve in the blood due to tissue anoxæmia. It is an important factor in the maintenance and the aggravation of the state of shock.

Mechanism of shock.—There is no one theory which can explain all the cases of shock. The following are the common theories in the genesis of shock. All the theories aim at the explanation of low blood pressure or hæmo-concentration met with in the condition of shock.

1. Vasomotor theory (Crile[2]):—There is widespread vaso-dilatation especially in the splanchnic area due to the fatigue of the vasomotor centre on account of painful and other stimuli. It is accepted as the mechanism in the condition of primary shock, but not in the secondary shock in which vaso-constriction is the rule.

2. Widespread capillary paralysis and dilatation (Bayliss and Canon[3]:—According to this theory, absorption of toxic substances, developed at the site of injury, causes capillary dilatation and paralysis. The authors were able to demonstrate that the clamping of the vessels from the traumatised limb in animals resulted in the delay in the onset of the state of shock. Such substances were named 'histamine-like substances' by Lewis[4]. However, with delicate methods available at present, one is not able to demonstrate the presence of such substances in the blood of a patient suffering from shock.

3. Theory of local fluid loss (Person[5], Blacklock[6] and Phenister[5]):—The authors of this theory have demonstrated that the onset of the shock is brought about by the release of the clamp on the artery and not due to the release of the clamp on the vein of the traumatised limb in animals, proving that the shock is due toic inflow of the blood into the limb and not to the out-flow of tox substances. Further, the loss of blood from effective circulation into the traumatised limb was equal to half of the calculated total volume of blood in the animal. The same was sufficient to account for the severe degree of shock and the increase in the volume of the traumatised limb in comparison with that of the other non-traumatised limb. Whatever theory we may accept, the condition of shock once established increases in severity on account of contributing factors.

Differential diagnosis.—Vascular collapse due to hæmorrhage. The following are the characteristic features of this condition:—

1. The predominant symptoms are clear consciousness, restlessness and irregular and deep breathing.

2. The neuro-vascular system is intact (uninjured) and as such once the blood volume is restored by blood transfusion (before the injury is done by cellular anoxæmia), the patient quickly recovers.

Prognosis.—It entirely depends upon the degree of shock, the stage at which it is detected, promptness with which it is treated and the presence of factors—removable or non-removable—which have precipitated the shock. In short if the shock is detected early, its treatment is easy and the results are gratifying.

Treatment.—Prophylaxis:—'Prophylaxis is better than cure' is well exemplified in the case of shock. To predict its onset and to start the treatment avoids the onset of the shock in many cases. Greater the hydration of the patient and the prevention of exhaustion in labour, the lesser are the chances for the onset of the shock.

(*b*) Manipulations:—All the manipulations should be stopped so as to avoid the painful stimuli reaching to the brain and thus causing further fall in blood pressure.

(*c*) Warmth:—Patient should be kept warm but excess of heat should be avoided as it induces perspiration and cutaneous vaso-dilatation, the factors which increase the severity of shock.

(*d*) Anæsthetics:—As far as possible general and spinal anesthetics should be avoided. The best anæsthetic is the local one. Second best is Ether given by open method.

(*e*) Alkalies:—They should be given to combat the bad effects incident upon acidosis resulting from tissue anoxæmia.

5. *Urinary Secretion*:—Patient should be hydrated in such a way that the free secretion of the urine is maintained. Secretion of the urine is a fairly reliable guide to the degree to which the patient suffering from shock should be hydrated.

Summary and conclusions.—1. Obstetric shock is a clinical entity by itself.

2. Shock is a continuous phenomenon and as such the symptoms and the signs are usually followed by those of secondary one.

3. There are multiple eitiological factors in the causation of the shock.

4. The earliest sign of shock is the hæmo-concentration. Remaining signs and symptoms appear after the shock is established.

5. Cases of vascular collapse as a result of mechanical loss of blood from the patients should be excluded from the group of cases which are included under the term of 'Obstetric Shock'.

6. The mechanism of shock is still obscure.

7. The 'prophylaxis is better than cure'.

8. The treatment of shock consists of: (1) Mental and physical rest; (2) restoration of the blood volume and then steady supply of fluids till the patient is totally recovered; (3) maintenance of the activity of the vital centres of the body; and (4) removal of all the factors that increase the shock.

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RIGIDITY OF CERVIX DURING LABOUR

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HERE is a statistical report and review of cases of rigidity of cervix where the treatment differed in different cases according to the position of fœtal head, the degree of dilatation of cervix and whether the latter was completely taken up or not. Ages of patients who underwent treatment varied from 17 years of age to that of 38. Majority of them were in good labour pains for a long time.

Old and antiquated methods of dilatation of cervix by Pozzi's dilators are discarded. Judicious application of treatment is of great value as it checks post-partum hæmorrhage and lessens the risk of complications that may arise during puerperium. With correct diagnosis of the cause of cervical rigidity and with application of proper treatment (treating the case on its own merits) the obstetrician will get good results and not only the mother will be saved but a living healthy child will be born as well.

The operative techniques are simple with skilful manipulations on the part of the obstetrician, the trauma inflicted on the mother will be minimum and practically no injury to the child though caput may be seen to a certain extent in prolonged second stage of labour.

The necessity and importance of discussing the subject of such obstetric emergency lies in the fact that early diagnosis reduces the maternal complications during puerperium and sometimes the maternal mortality due to this cause. Secondly fœtal mortality is reduced as well. This question is of great importance especially in cases of elderly primipara.

As failure of the function of the cervix (relaxations and dilatation) leads to this pathological condition, it is desirable to know something about its anatomy and physiology before we actually start with the subject.

In early embryonic life the development of uterus and cervix takes place from the caudal portion of the Mullerian ducts. (Hence at the time of labour the cervix merges into the uterus and both together form an ovoid and after the os is opened out the fœtus is expelled). Cervix is divided into supravaginal and vaginal portions. The supravaginal portion is cylindrical in shape. Bladder is loosely attached to it in front, behind is Douglas' pouch, laterally there is parametrial tissue and ureters pass downward, forward and inward to the bladder and lie ½" to ¾" away from the lateral border. (These anatomical relations have to be borne in mind during operative interference).

Vaginal portion of the cervix is small, cone shaped and narrow and terminates at the external os. The length of cervix *i.e.* both the portions included is one inch. In parous women cervix is larger,

external os is transversely slit and often some tear is detected. The consistency of the cervix is firmer than that of the body, as compact fibrous tissue is more than muscle tissue. The stroma of the cervix is mainly formed of spindle cells. As the internal os is approached there is an increasing admixture of muscle tissue in the deeper portion of the cervix.

Histologically the mucus membrane lining the cervical canal is high columner in type and thrown into folds. The glands are of racemose type. Vaginal portion of cervix is lined with stratified squamous epithelium. Cervix uteri hypertrophies to a certain extent during pregnancy. This hypertrophy is nothing when compared with the hypertrophy of the body of the uterus. The length of the cervical canal is fairly constant during pregnancy and does not differ much from the nongravid uterus.

The mucosa undergoes such great proliferation that at the end of the pregnancy it occupies half the bulk of cervix. Decidual reaction occurs as early as the tenth week and later endocervical glands increase in size. There is syncytial like arrangement of epithelial cells and goblet cells (mucus secreting) are seen in between. Mucus plug which fills the cervix prevents the spread of organism from the vagina to the uterine cavity. Softening of cervix is due to great increase of the gland space beneath the epithelium of the canal. Connective tissue becomes loose and vascularity of the area increases. Violet colouration of cervix during pregnancy is due to venous congestion.

The arterial supply to the cervix is from the cervical branch of the uterine vessels. The arteries run through the connective tissue of cervix and towards the external os and give off multiple branches.

The nerve supply of the uterus and cervix is not properly understood and there is no clear understanding of the physiological function of the autonomic nervous system in respect of the uterine and cervical activity. Parasympathetic nerves are supplied by pelvic splanchnic nerves. These nerves are formed by the union of 2, 3, and 4th sacral nerves. They supply the uterus and the cervix with visceromotor fibres. Sympathetic supply is from pelvic plexuses which are formed by the continuation of hypogastric plexuses and a few fibres from first two ganglia of the sacral part of the sympathetic trunk.

Transverse lower segment cæsarean section has a definite place in the treatment of this type of dystocia. Although it has been noted by some that elderly primiparity is not a major factor in the etiology, still according to our experience it forms one of the important indications as well in as in other morbid conditions of the cervix. This is the operation of choice.

In a non-pregnant uterus the line of demarcation between the upper and lower segment lies above the level of the internal os. The area of 4 to 6 mm. in depth above the level of the internal os

is called isthmus. The epithelial covering of this area is similar to that of the body. Cells are flatter, nuclei larger, and glands less abundant. During premenstrual phase the mucus membrane is not swollen nor the glands tortuous. The glycogen content of epithelium of this area is less than that of the epithelium of the body of the uterus.

The structure of upper 1/3 of the cervical canal is different from the lower 2/3. It consists of little plain muscle and more of connective tissue.

Due to the action of uterine contraction and retractions and upward pull of retractions the vaginal portion of the cervix is taken up. During the process the cavity becomes distended and cervix becomes effaced and thinned out. In a primiparous uterus a few circular fibres can be identified around the external os and these fibres tear through when the cervix is taken up. Hence external os offers great resistance and undergoes little dilatation until the canal is completely taken up. Because of the phenomena of polarity of uterus when labour pains start the circular fibres at the level of the internal os relax and edges separate. As the internal os is dragged open, cervix dilates from above downwards, becomes shorter and ultimately there is no projection of cervix in the vagina. The internal os first begins to open, then the area round the internal os forms a continuous surface with the uterine wall above. In succession each succeeding horizontal plane of the cervix is unfolded until finally the external os is reached. After this only the dilatation of external os begins. This is called effacement of cervix. In a primipara external os, as has been said above, offers great resistance and undergoes little dilatation until the canal is completely taken up. In a multipara the taking up of the canal and dilatation of the external os proceed simultaneously.

During labour the womb becomes marked out into upper contracting and thickened portion and lower dilating and thinning portion. This lower area is called lower uterine segment. It is passive and less muscular and is made up partly of the lower part of the body of the uterus and from the cervix. From the 4th month of the pregnancy onward the lower uterine segment becomes definitely defined physiologically and becomes properly defined after the onset of labour pains. One of the important features is marked absence of power of contraction of muscle fibres. The condition of rigidity of cervix is classified into: (1) Functional or spasmodic; and (2) Organic.

FUNCTIONAL OR SPASMODIC RIGIDITY.—This condition is also known as trismus uteri. It is seen more commonly in primiparas than in multiparas. Cervix dilates slowly and margins may be firm or tense. Uterine pains may be weak or irregular. The clinical manifestation of functional rigidity is prolonged in the first stage of labour. The time taken when the true pains start till full dilatation of os when membranes may rupture is definitely prolonged and may be delayed

for many hours or days. Consequently the mother gets fatigued. On internal examination the cervix may be found either hard or tense, and hanging margins are generally seen in multiparas. Oedema that complicates is not due to pressure but is due to congestion.

This type of dystocia may be encountered where the action of uterine musculature is at fault.

The expectant line of treatment is justifiable, and must be resorted to before operative treatment is thought of. Sometimes even a dose of sedative mixture may give good results. In this group of cases the expectant line of treatment was given in 30 cases and they came off normally and some of them needed episiotomy. After the expectant line of treatment has failed manual dilatation of cervix or incision of cervix may be useful.

Manual dilatation was done in 7 cases, incision of cervix in 4 cases, lower segment cæsarean section, L. S. C. S. in 16 cases.

ORGANIC RIGIDITY.—In this group of cases some morbid condition is present to which the fault may be attributed. It may be due to some disease recognisable independently of labour *e.g.* carcinoma of cervix. Inspite of strong and regular uterine contractions the cervix is inherently rigid as in some elderly primipara. The cervix dilates slowly or there may be no dilatation at all.

Following are some of the conditions where organic rigidity is met with:

1. *Constriction at the os internum*:—Though described in some books this condition is hardly encountered. Descent of the presenting part is prevented due to this obstruction and there is a possibility of ring developing round about.

Though to cite this case is inconsistent with this subject, recently we came across a case Para 6, age 36, where on doing an exploratory laparotomy the tumour consisted of hæmatometra primarily and hæmatosalpinx and hæmatocele as a sequela. The constriction was at the level of internal os, and round about it. Patient did not menstruate after she gave birth to a child 10 months back.

2. *Constriction at external os*:—The external os is abnormally slow in dilating. The condition is encountered in primipara and sometimes in multipara. In multiparas chronic hypertrophy of the cervix is met with and may be due to old standing chronic inflammation or congestion. Fibrous tissue developed after amputation of cervix or else extensive colporrhaphy may be responsible.

3. *Inflammatory rigidity*:—Inflammation is generally accompanied with great thickening and elongation of the canal and hence the process of dilatation is retarded. Surprisingly enough hypertrophied and elongated cervices and even cicatricus soften to a considerable extent during pregnancy and parturition.

These days heavily infected portio vaginalis of cervix is treated with Sulpha drugs and Penicillin injections. Application of antiseptic swabs, Sulphonamide with Glycerine 5% and vaginal diathermy sittings have reduced the incidence to a great extent. With such prophylactic treatments the spread of infection and the resulting fibrous tissue formation is retarded.

4. *Cicatrical rigidity*:—Though designated as such, the cause is development of cicatrix following the use of caustic applications, repeated cauterisation, or cicatrix developing after amputation of cervix or application of radium in the canal. When labour pains have started and after a reasonable time dilatation does not occur the case should be treated on its own meritis. Operation or excision of scar tissue, forcible stretching when possible and incision of cervix are advocated by some. Cæsarean section is the safest for the mother and the child. Whatever may be the cause when fibrosis of the cervix forms the major abnormality the operation of choice is that of cæsarean section.

In one of our series we came across one case where Fothergill's operation was done and external os would not dilate and hence Duhrresen's operation of cutting the cervix was done.

5. *Rigidity due to carcinoma of cervix*:—These cases are dealt with by cæsarean section followed later on by hysterectomy.

6. *Rigidity due to tumours fibromyoma of cervix*:—We came across one case of fibromyoma of cervix which hindered dilatation of cervix. The cervix was hanging. Manual dilatation was done, forceps applied and the child removed. Besides the fibrosis in the cervical musculature, pressure of the tumour was also the cause.

7. *Prolapse of uterus accompanied with rigidity of cervix*:—Fibrous tissue in the cervix retards the process of dilatation. After the expectant line of treatment has failed cæsarean section should be undertaken.

Three cases were treated on the expectant line and had normal labour ; 3 cases by cæsarean section.

III. There is a group of cases where it has been observed that both the conditions may be present side by side, that is to say, there is a certain amount of fibrosis present in the cervical muscle tissue and there may be abnormal functioning of the uterine musculature.

Oedema of the cervix:—The condition of the œdema of the cervix is to be distinguished from the rigidity of the cervix.

(1) In cases of contracted pelvis the cervix may be pressed on the back of symphysis pubis so that the vaginal portion becomes œdematous and the dilatation of the cervix becomes difficult. These are the cases of cephalopelvic disproportion and do not come under the subject.

(2) Oedema of the anterior lip of the cervix.

The swelling due to œdema may be considered, the cause being prolonged second stage of labour. It is dealt with by injections of

Penicillin. Softened lips of cervix may be pushed beyond the presenting part and treated according to the merits of the case by application of forceps etc.

Acute œdema of cervix with prolapse:—These cases give good results with expectant line of treatment. Rest in bed, raising the foot end of the bed and local application of Glycerine and Mag Sulph pack may help and œdema subsides.

IV. Constitutional rigidity.—In this condition the condition of the mother and the rate and character of fœtal heart sounds should be taken into consideration. In an elderly primipara, after the expectant line of treatment, forceps may be applied if necessary. In selected cases, if the skilful obstetrician desires, he may resort to cæsarean section. As far as possible incision of the cervix, manual dilatation of the os and application of the forceps should be done with caution.

Achalasis of cervix:—The uterine forces are not sufficient to cause a relaxation of cervix. Uterine inertia is responsible for it, hence the condition of uterine inertia is to be treated.

Spasm of muscle fibres in cervix:—It is an unlikely incident. It has been our observation that in some cases where there is sepsis the cervix does not dilate inspite of the uterine pains being present and that in the other group of cases the uterine pains are not effective. As soon as the course of Penicillin injections is given labour progresses normally.

We came across 4 cases wherein the spasm was relieved by injections of Penicillin.

LINE OF TREATMENT.—In the antenatal care general health of the patient should be maintained. Late work and lack of sleep should be avoided and patient asked to take physical and mental rest.

Stilbœstrol 5 mg. by mouth and Quinine Bihydrochloride was administered with the idea of strengthening weak uterine pains. The latter drug should be used with caution. It may lead to fibrillar and irregular contractions of uterine muscle fibres.

Since the efficacy of uterine contractions is hindered by flocking of doctors and relatives round about, the patient should be hospitalized in a quiet room. Repeated internal examinations should be avoided and psychological treatment given. During labour 5 mgs. of Stilbœstrol by mouth or 50,000 units by injection may strengthen uterine contraction.

SEDATIVE DRUGS.—A simple mixture consisting of Potassium Bromide and Chloral Hydras will have good sedative effect.

(2) Per rectal administration of Potassium Bromide grains 30 and Chloral Hydras grains 30 in 6 ozs. of water may bring about cervical softening and dilatation.

(3) Per rectal administration of Paraldehyde was tried.

(4) Injection of Morphine grain ½ with Atropine 1/100th grain may be given only in those cases where delivery will not take place within six hours of its administration.

(5) Injection of Hyoscine Hydrobromide grain 1/100th given at repeated intervals will have no bad effect on the child.

(6) Pethidine has a double effect *i.e.* analgesic, and secondly it brings about the dilatation of the cervix. The initial dose is 100 milligrams and if not effective 50 mgs. dose may be repeated at hourly intervals. 300 milligrams is sufficient but according to the discretion of the obstetrician 400 to 500 milligrams may be administered.

(7) Pituitary extract in 2 units doses is good for initiating labour pains.

(8) Intravenous injections of Calcium Gluconate 10 c.c. 10% with Glucose is supposed to have good effect on the patient.

(9) Under the influence of continuous caudal anæsthesia the cervix dilates very satisfactorily.

(10) Effects of Acetyl Choline and Vit. C. 100 mg. 4 hourly are under trial.

(11) In practically every case of prolonged labour prophylactic use of antibiotic and chemotherapeutic drugs should be made.

(12) During labour the patient should be given sips of glucose water, milk, tea, coffee, or orange juice and should not be starved. The fluid balance of 3 pints should be maintained.

(13) If necessary intravenous Glucose-saline should be given in those cases where the patient cannot take (vomiting) sufficient nourishment or that she is dehydrated and undernourished. 49 cases were treated on expectant line of treatment and delivered normally.

Dilatation by Bossi's dilator.—This operation is of historical importance only. In modern obstetrics there is no place for such instrument. The operation is accompanied with great risk of injury to maternal passages and the tears may extend into the lower segment of the uterus. Maternal and fœtal mortality is very high.

Dilatation with hydrostatic dilator.—The conditions to be fulfilled before using this dilator is that the cervix should be sufficiently dilated to allow the entrance of the dilator. It is unsuitable for rapid delivery. Hence it is not of much value in this type of dystocia.

Manual dilatation.—Manual dilatation was done is 6 cases and in 4 cases forceps was applied. 2 delivered normally.

This operation should be undertaken in those cases where the cervical canal is obliterated and external os left with thin soft and dilatable margin. This method is useful in the condition known as dilatable os and is easy and gives satisfactory results in multipara. In primiparas the results are not encouraging.

It should be taken for granted that there is no Cephalopelvic disproportion; uterus contracting normally.

Serial number.	Position: Age	Parity	Vertex	Breech	Examination: Local.	Internal: Type of cervix: Tense.	Rigid or atretic	Hanging.	Relation of presenting part to cervix.
1	37	I	L.O.P.	..	Uterus tense and contracting.	...	P.V. Cx. atretic.	...	Vertex floating.
2	32	I	R.O.P.	...	Uterus hard and contracting.	Tense Cx 4 fingers dilated.	...	...	Head well adapted to the cervix.
3	17	I	Do.	...	Do.	...	Rigid and one finger dilatation not taken up.	...	Vertex floating.
4	30	I	Twins	...	Do.	..	Rigid.	...	Floating.
5	21	III	R.O.P.	...	Uterus contracting.	..		Hanging.	Not adapted.
6	17	I	R.O.A.	...	Do.	...	Rigid no dilatation.	...	Floating.
7	28	II	L.O.P.	...	Do.	...	Rigid 3 fingers dilatation.	...	Vertex fixed.
8	23	I	R.O.P.	...	Do.	Tense.	...	...	Floating
9	24	III	Do.	...	Do.	..	Rigid.	...	Floating.
10	20	I	Do.	...	Do.		Rigid 4 fingers dilatation.		Well adapted.
11	30	I	L.O.P.	...	Do.	..	Rigid no dilatation.	...	Vertex floating.
12	25	I	R.O.P.	...	Hard and contracting.	Tense.	..	...	Do.
13	35	I	L.O.P.	..	Uterus hard and contracting.	..	Rigid 3 fingers dilatation.	...	Do.
14	28	III	L.O.A.	..	Do.	...		Hanging.	Vertex fixed.
15	18	II	Do.	...	Do.	..	Rigid 4 fingers dilatation.	...	Vertex fixed well adapted.
16	28	V	Do.	...	Uterus contracting.	...	Rigid.	...	Vertex fixed and well adapted.
17	26	I	Do.	.	Do.	...	Rigid 2 fingers dilatation.	...	Vertex floating.

There are 49 cases on record where for this condition expectant line of treatment was given and labour terminated normally.

Stages of labour: First stage	Second stage	Weight of child	Method of treatment	Blood transfusion.	Complication.	Mortality: Foetal	Maternal
20 hrs.	...	7½ lbs.	L.S.C.S. ...	Nil.	Nil.	Nil.	Nil.
24 hrs. (at home).	...	6½ lbs.	(i) Manual cervical dilatation, (ii) Craniotomy and (iii) Cervical tear repaired.	Do.	Sepsis.	Stillborn.	...
20 hrs.	..	7 lbs.	L.S.C.S. ...	Do.	Nil	Nil	Nil.
31 hrs.	...	5 lbs. 4 lbs.	Do. ...	Do.	Do.	Do.	Do.
10 hrs.	...	5 lbs.	Hyoscine Hydrobrom. 1/200 gr.	Do.	Do.	Do.	Do.
21 hrs.	...	7 lbs.	L.S.C.S. ...	Do	Do.	Do.	Do.
14 hrs.	..	6 lbs.	Expectant line of treatment Duhressen's incision.	350 c.c.	P.P.H. (Traumatic).	Do.	Do.
22 hrs.	...	8¼ lbs.	L.S.C.S. ...	Nil.	Nil.	Do.	Do.
15 hrs.	..	7 lbs.	Do. ...	Do.	Do.	Do.	Do.
20 hrs.	...	6 lbs.	Duhressen's incision with forceps.	Do.	Do.	Do.	Do.
30 hrs.	...	5 lbs.	L.S.C.S. ...	Do.	Do.	Do.	Do.
25 hrs.	...	7 lbs.	Do. ...	Do.	Do.	Do.	Do.
20 hrs.	6 hrs.	8 lbs.	Do. ...	Do.	Do.	Do.	Do.
10 hrs.	4 hrs.	6 lbs.	Manual dilatation. Cervical tear resutured.	Do.	Do.	Do.	Do.
10 hrs.	3 hrs.	5½ lbs.	3½" Duhressen's incision.	Do.	Do.	Do.	Do.
6 hrs.	3 hrs.	7 lbs.	L.S.C.S. ..	Do.	Do.	Do.	Do.
20 hrs.	...	6 lbs.	Do. ...	Do.	Do.	Do.	Do.

It should be taken for granted that there is no Cephalopelvic disproportion; uterus contracting normally.—(*Contd.*)

Serial number	Age	Parity	Position: Vertex	Position: Breech	Examination: Local	Examination: Internal: Type of cervix: Tense	Examination: Internal: Type of cervix: Rigid or arteric	Examination: Internal: Type of cervix: Hanging	Examination: Internal: Relation of presenting part to Cervix
18	35	IV	R.O.P.	...	Uterus contracting.	...	...	Hanging 2 fingers dilatation.	Vertex floating.
19	26	I	Do.	..	Do.	...	Rigid no dilatation.	...	Do.
20	35	I	Do.	...	Do.	...	Do.	...	Do.
21	38	III	L.O.P.	..	Do.	...	Rigid 1 finger dilatation.	...	Vertex fixed.
22	26	III	R.O.A.	...	Uterus soft.	Tense 2 fingers dilatation.	...	...	Vertex floating.
23	22	I	L.O.A.	...	Uterus contracting and hard.	...	...	Hanging,	Vertex fixed,
24	30	II	R.O.A.	...	Uterus contracting.	..	Rigidity of cervix (Traumatic).	...	Do.
25	17	I	L.O.A.	...	Do.	...	Rigidity 4 fingers dilatation.	...	Do.
26	19	I	R.O.P.	...	Do.	..	Rigidity.	...	Vertex floating
27	26	II	...	Breech.	Uterus soft.	...	...	Membrane ruptured Cx. hanging and 1 finger dilatation	Breech fixed.
28	30	I	L.O.P.	..	Uterus contracting.	Tense.	...	...	Vertex fixed. and well adapted.
29	22	I	R.O.P.	..	Uterus hard and contracting.	Do.	...	...	Well adapted and engaging vertex F.H.S. not heard.
30	28	I	L.O.P.	..	Do.	Do.	...	...	Well adapted. Engaging vertex.
31	38	VII	Do.	...	Do.	Do.	...	...	Do.

There are 49 cases on record where for this condition expectant line of treatment was given and labour terminated normally.—(*Contd.*)

Stages of labour: First stage	Stages of labour: Second stage	Weight of child	Method of treatment	Blood transfusion	Complication.	Mortality: Foetal	Mortality: Maternal
24 hrs.	..	7 lbs.	L.S.C.S. ...	Nil.	Nil.	Nil.	Nil.
36 hrs.	..	6 lbs. 2 ozs.	Do. ...	400 c.c.	Do.	Do.	Do.
25 hrs.	...	5 lbs.	Do. ..	Nil.	Do.	Do.	Do.
36 hrs.	4 hrs.	5 lbs.	Hyoscine Hydrobrom. with Morphia.	Do.	P. Sepsis.	Baby expired due to asphyxia centralis.	Do.
36 hrs.	...	6¼ lbs.	L S C.S. ..	400 c.c.	Do.	Do.	Do.
24 hrs.	5 hrs.	7¼ lbs.	(i) Manual dilatation, (ii) forceps, (iii) cervical tear repaired.	Nil.	Nil.	Nil.	Do.
20 hrs.	4 hrs.	7 lbs.	Duhressen's incision with forceps.	Do.	Do.	Do.	Do.
20 hrs	4 hrs.	3 lbs. (still born).	Hyoscine Hydrobrom. with Morphia. Cervical tear repaired.	Do.	P.P.H. Pneumonia.	Stillborn.	Patient expired.
22 hrs.	...	8 lbs.	L.S.C.S. ..	400 c.c.	Nil.	Nil.	Nil.
30 hrs.	..	6 lbs.	Do. ...	350 c.c.	Do.	Do.	Do.
24 hrs.	3 hrs.	7 lbs.	Manual dilatation forceps, repair of cervical tear.	Nil.	Do.	Do.	Do.
38 hrs	4 hrs.	Stillborn.	Manual dilatation forceps.	Do.	Shock and death.	Stillborn.	Mother died of shock.
32 hrs.	...	7¼ lbs.	Manual dilatation forceps, cervical tear repair.	Do.	Nil.	Nil.	Nil.
40 hrs.	...	8 lbs.	Do.	300 c.c.	Sepsis	Stillborn.	Do.

The serious risk of tear of the cervix extending into the broad ligament should be borne in mind. There is risk of severe hæmorrhage and infection as well.

After the preoperative treatment is given suitable anaesthesia is administered and the patient is put in lithotomy position. With aseptic and antiseptic precaution the whole hand is introduced into the vagina.

(*a*) If possible all fingers bunched and closed together are passed through the partially opened cervix.

(*b*) If all the fingers cannot get in, thumb and index fingers are inserted and the os stretched as far as possible by separating them. Then the remaining fingers are inserted.

When dilating the os manually movement of fingers is pill rolling. the thumb passes over the pulp of each finger. At the same time margins of the cervix are gently and gradually pushed up over the head all round. Later on forceps applied and tears repaired, and, if necessary, the third stage of labour accelerated by Crede's method.

The edges of the tear are caught with sponge-holding forceps and cervix drawn down. Interrupted sutures are placed with chromic catgut No. 3 for 20 days. Repair to be started from the apex of the tear. The row includes the whole thickness of the cervix but the endocervix. Second row may be put in, if necessary, and mattress sutures if the bleeding cannot be checked after the operation is over. The patient should be watched for hæmorrhage and shock. The chances of sepsis inspite of all aseptic and antiseptic precautions are there. The greatest disaster is that of the tear extending into the lower segment, when the case should be treated as that of rupture of uterus.

Duhrssen's operation :—The operation has its own dangers and is resorted to only when the cervix is taken up. The canal is obliterated, external os is left with thin margin and dilated to at least 4 fingers.

Patient is anæsthetised and put in lithotomy position.

Incisions are made with blunt pointed scissors and they should not be more than $\frac{1}{2}$" to $\frac{3}{4}$" in length. (These incisions inspite of all precautions will extend upwards to a certain extent). When making an incision the extent of the bladder should be noted. This is specially so in cases of cystocele.

(*a*) There are only two incisions *i.e.* South-west or South-east is made, so there is less chance of injury to the uterine vessels.

(*b*) The other method is to cut the cervical lip at 2, 6 and 10 o'clock positions.

(*c*) Crucial incisions are made.

These incisions bring about sufficient dilatation and enlargement of the os and labour may proceed normally, or else simple extraction with forceps, if necessary, may be done. There is always difficulty in delivering a big child.

Except in a few selected, the operation should not be undertaken. There is a grave risk of the incision extending into the lower uterine segment. Secondly, the patient has been in the condition of prolonged labour and she might get into a condition of shock.

Technique of operation.—The cervix is grasped with ovum forceps and the entire circumference is observed with the aid of a speculum. One finger is placed inside and the other outside the rim of the cervix and under vision with blunt pointed scissors simple nipping is done. After delivery is over, the cervix and lower uterine segments are palpated for any sign of extension of the cut in the cervix.

This operation was done in 4 cases. We simply nipped the cervix to $\frac{3}{4}$" and it extended to $1\frac{1}{4}$".

Lower segment caesarean section :-It is simple, safe, very expeditious and applicable to practically all the conditions of rigidity of the cervix. It is a safe method of delivery both to the mother and the child. In elderly primiparas, whenever indicated, this is the operation of choice.

Concluding remarks.—(1) An attempt is made in this paper to give an outline of treatment and to point out the difficulties met with. (2) Expectant line of treatment will be successful in many cases with a little instrumental aid such as application of forceps etc. (3) The remaining cases will need operative treatment which is left to the discretion of the obstetrician.

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Menopause

Associated with menopause one usually finds neurocirculatory symptoms *e.g.* flushing, hot flashes, headaches, vertigo. The blood pressure tends to get elevated. Emotional upsets, joint pains and cardiac distress also occur. *The earlier the onset of menses in life, the later the onset usually of the menopause.* Surgical menopause is far more severe than the normal let-down. At the St. John's Hospitals for Women in Brooklyn, New York, the treatment of choice for menopausal complaints is by oral œstrogens. The important point in treatment is to get the dosage high enough at the start to relieve the symptoms, then slowly and gradually reduce to a maintenance dose. A ten day rest period follows each 20 days of treatment. Sudden stoppage of œstrogens causes withdrawal bleeding which may be confused or mistaken for bleeding of fundal carcinoma. Oestrogens should never be used if the patient has or has had a carcinoma anywhere in the body. In such cases menopausal complaints can be controlled by the injection of male sex hormone 10 mg. at a time, not to exceed 400 milligrams per month. —*Off. Gynaec.*, (*Med. Times*, Vol. 78, No. 6, p. 274).

This was a case of cardiac infarct. Under rest and suitable treatment for two months, she made a good recovery.

Discussion and differential diagnosis.—In an acute abdomen, as in the 1st case, diagnosis is difficult and doubtful. Laparotomy alone will show the morbid changes. The probability was "Rupture of Appendix". Rupture of lutein cyst was also likely. But this is a rare condition which occurs in mostly un-married/recently married women. The usual signs of rupture of lutein cyst are very much like those of ruptured tubes except for the missed period and soft cervix of a tubal pregnancy. The pain often simulates acute appendicitis also. Right renal colic is another factor which should be taken into account. This becomes all the more complicating in cases where the pain is felt for the 1st time and where there is no history of lithuria and pain in any previous occasion.

T.B. intestines, in early stages of disease, more specially in the absence of any primary focus in lungs or elsewhere, is difficult to make out. In villages where hygiene is lacking and the milk is almost always polluted, T.B. intestines is not an uncommon disease.

The vagaries of the round worms are too well known for any further comment. It is always a wise procedure to administer an anthelmintic unless contra-indicated. In rural parts, where there is no protected water supply, infection is always a possibility.

In cases of arterial hypertension, associated with coronary thrombosis or cardiac infarct, pain in the abdomen is usually felt and quite often misleading. With the accompanying signs and symptoms of shock, it is easy to be misled. Many an abdomen has been opened for gastric ulcers and many an innocent appendix removed.

It should not be forgotten that diseases of the right sacro-iliac joint, irritation of the posterior nerve roots, due to any pathological change in the bones of the lower lumbar vertebrae, early stages of spondylitis deformans, osteo-arthritis of the spine, rheumatoid arthritis, spinal caries and psoas abscess are also factors that produce pain in the right iliac fossa, not to mention the duodenal ulcers, appendicitis, biliary stones, chronic cysts and tumours of the right ovary.

The Effect of Vitamin E in the Menopause

Studies on the merits of vitamin E therapy were made in 63 patients who complained of the characteristic vasomotor symptoms of the menopause. The daily dose of ephynal acetate ranged from 20 to 100 mg., with an average of 30 mg. in divided doses. Good to excellent results were obtained in 31 women (47.); fair results in 16 (24.2.); and in 19 patients (28.8.) the treatment was ineffectual. Discontinuation of the vitamin E preparation resulted in recurrence of symptoms. Reinstitution of the medication was again attended by prompt relief. Substitution of placebo medication for the vitamin E preparation in 17 patients caused a recurrence of symptoms. Side effects from the vitamin E therapy were negligible and there were no contraindications of its use. It is concluded that vitamin E is a valuable aid in the treatment of menopausal patients in whom estrogens are contraindicated such as women with a familial or personal history of mammary or genital malignancy or patients suffering from precancerous lesions.—(Rita S. Finkler, Newark Beth Israel Hospital, Newark, *N. J. J. Clin. Endocrinol.*, 9:89-94, Jan. 1949) — *Quarterly Review of Obstetrics and Gynecology*

OUTLINE OF CONDUCT OF LABOUR IN MOFUSSIL PRACTICE

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NOW-A-DAYS, medical science is far advanced and the public also realize the importance of private and public maternity hospitals. In towns practically all pregnant women attend the ante-natal clinic and register their names for confinement. In towns and cities many pregnant women can enjoy the modern treatment of so-called painless deliveries. But in the mofussil there is no such arrangement and even though some of the patients are prepared to spend, they cannot enjoy the benefit of this modern treatment. It is not possible for everybody to be in towns and cities. Due to some reason or the other, they are compelled to stay in the mofussil. Many such women are prepared to suffer the hardships and try their best to be in well-equipped maternity hospitals in towns. The difficulty really arises for these pregnant women who cannot enjoy the benefits of these modern equipments and treatment. In India, majority being poor, they have to suffer a great deal. In the mofussil the importance of *Ayahs* and their old methods have not yet disappeared. This is due to the fact that most of the mofussil maternity hospitals are poorly managed and are in the hands of those having no post-graduate experience in this line. Naturally they cannot create an impression in the minds of the public. So in most of the villages most of the cases are conducted by *Ayahs*, naturally resulting in the increase of maternal and fœtal mortality and morbidity.

In the mofussil, there are a few maternity hospitals conducted by Local Bodies or privately, but there is no ante-natal clinic. This clinic is of great importance when expectant mothers have to get proper advice during the pregnancy period and their follow-up afterwards. By such ante-natal and post-natal clinics many gynæcological complaints can be minimised.

In the mofussil, due to the above reasons, practically a majority of cases are delivered at home. The expectant mothers are reluctant to go to such maternity hospitals. Even difficult prolonged labours are conducted at home by doctors not trained in this line.

I had the experience of attending such cases interfered with by *Ayhas* or doctors with increase of maternal and fœtal mortality and morbidity. To minimise this state of affairs an ante-natal clinic was started. Practically all are impressed by this clinic as all of them are profited thereby. The importance of such clinic is more impressive to the public when they see cases dying of tetanus, septicæmia or any such diseases when some of those few home-conducted deliveries meet with such disaster or lose most of their children due to meddlesome midwifery.

In the mofussil, pregnant women are only prepared to go for confinement of their normal labour if they are impressed by such institutions. The essential factors for this are:—

The patient must have full confidence in the doctor attending her in maternity. This removes the fear of the patient. This helps a great deal in normal labour. For normal labour, during the whole first stage of labour the woman should be allowed to be in any position she likes. The doctor-in-charge must try to remove the anxiety of the patient and so his words, actions, and even thoughts must be confident, truthful and impressive to the parturient woman. She must be taught to relax during contractions in this stage. Under no circumstances during the early stage of cervical dilatation the assurances should be over-sympathetic but should be kindly in manner. Besides this, they require firm encouragement, commonsense explanation and companionship. When cervical dilatation reaches its maximum,

there is backache due to tension on cervix. In primiparas this is the really unbearable stage and even though the assurances help a great deal, yet in my opinion it is advisable to help them by minimising these pains by analgesic administration. During the second stage, the patient should be put in dorsal position, holding her legs with her hands in *popliteal fossa*. In a kindly, firm and encouraging manner, she should be properly instructed about how to aid the expulsive contractions and to relax in between contraction periods. Patients should be made to realize that these sensations are more threatening than actually painful. Till the crowning period is over, the patient should be kept under firm control. When the doctor hands over the child wrapped in towel after delivory to the mother her emotional state is of pride and achievement. The best achievement is helped if these women are given lessons about relaxation during ante-natal clinic. Lectures or pamphlets of achievement of normal labour should be given in these ante-natal clinics. Great care should be taken in not using the word "pain". Similarly as the word "labour" creates an impression on these women, care should be taken to use substitute words.

The above system is helpful when there is facility of ante-natal clinic. In such clinic, in addition to the actual examination and care of the expectant mothers, if the above system of lecture or pamphlets is introduced, then such clinic will prove an ideal clinic.

But in the mofussil, where there are no such facilities of ante-natal clinic, and where patients enter maternity hospitals with a complex mind, there is always need of analgesia to help this complex state of mind. In towns and cities, you can impress the importance of rest and relaxation in the last trimester. Practically a majority belong to the intellectual class who can understand the meaning of rest and relaxation. But in the mofussil and in places where there is no ante-natal clinic, this is not possible, and that is the reason why there is no physiological labour in the literate class of people. In villages a majority of cases ends in normal labour as a majority are of the working class, where the physical condition of patients helps them to have the benefit of physiological labour as, due to ignorance, there is no fear in their mind. Pregnancy and labour are taken as the pride of womanhood and not as fear. In these classes of patients fear does not take the upper hand and the whole picture does not become complex due to the robust state of their health. The pathological states set in when meddlesome midwives interfere While in the intellectual class of patients fear takes possession of the patients and makes it complicated owing to non-robust poor state of health. The question now arises about how to deal with such cases in the mofussil. When such cases are admitted to maternity hospitals it is advisable to have the usual procedure, but I have found the following method most useful to have normal labour. Give them Glucose 25 cc. 25 and Cal. Gluconate 10 cc. 10% on admission. Repeat Glucose every 2-3 hourly. Bromides to be repeated in the usual manner. When the examination reveals that the cervix is soft and dilating then either Pethidine or Syntropan is injected *subcutaneously*, to be repeated after 2-3 hours until the disappearance of suprapubic sensitivity due to spasm of the cervix. In my experience generally two or three ampoules suffice and bring on complete dilatation. The idea of Glucose and Calcium Gluconate is to give tone to uterine musculature which brings on strong contraction of the uterus. Glucose is similarly administered orally, and I have seen most of the prolonged labour cases interfered by *Ayahs* or otherwise delivering normally with Glucose and Calcium Gluconate. In the mofussil the general condition of the patient being robust this little help gives them a most beneficial effect. Once the proper uterine contraction starts, the cervix starts dilating. Along with Glucose and Calcium Gluconate, injections of Pethidine or Syntropan, help still more in rapid physiological labour. These injections produce analgesic effects. Patient sleeps in between contraction periods and can take mental rest. By this the state of fear of the mind is minimised a great deal. These injections produce very rarely adverse effect. In primipara the need of Pethidine or Syntropan is more at the time when there is suprapubic sensitivity due to spasm of the cervix, to ensure analgesia and excellent contractions with analgesic effect (by loss of fear) and Glucose. In multipara these analgesic injections should be given as early as possible as the analgesic effect appears only after ½ hour and if labour progresses rapidly, full benefit might not be obtained from this drug.

OESTROGENS

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OESTROGENS are being increasingly used in gynæcology and obstetrics and in general medicine. In this article I am reviewing the various indications for œstrogen therapy. Before dealing with the various conditions in which œstrogens are indicated I shall describe their source in the body and their physiological action so that the rationale of their use in various conditions becomes clear.

Oestrogens is the generic name applied to the synthetic and natural group of substances with œstradiol-like action.

Source in the body.—Oestradiol (formerly known as œstrin) "the ovarian follicular hormone" is constantly secreted since birth in both the sexes by the interstitial cells of ovaries or testes, as the case may be, and probably by the adrenals. After puberty an additional amount of œstradiol is secreted by the ripe graffian follicles of ovaries and active corpora. There is a rhythmic rise and fall in the level of this additional œstradiol according to the phase of the menstrual cycle. During the first half of the menstrual cycle, corresponding with the follicular phase of the ovarian cycle, there is an increase in the available œstradiol, which is necessary to bring about proliferation of the endometrium. During the second half of the menstrual cycle, corresponding with the post-ovular or luteal phase of the ovarian cycle, the œstradiol is inactivated by progestrone which is now secreted by the corpus luteum. During the flow which corresponds with degeneration of the corpus luteum both the secretions are withdrawn. At menopause the share contributed by the graffian follicles is withdrawn but the basic secretion continues, though the basal level probably falls, but the secretion does not stop altogether. During pregnancy large amounts of œstradiol are secreted by the placenta.

Excretion.—Oestradiol gets converted in the body to less active œstrone and œstriol which are excreted in the urine. Oestrone is found in the urine of males and both pregnant and nonpregnant females.

Relationship with pituitary.—The follicle stimulating gonadotropic hormone of pituitary causes maturation of graffian follicles and stimulates secretion of œstradiol, an excess of which depresses the anterior pituitary, which results in decreased secretion of œstradiol, a fall in the level of œstradiol resulting again in increased activity of anterior pituitary. This interaction between the two hormones serves to limit the secretion of both of them to a certain physiological level.

Physiological action.—1. It brings about proliferation of the endometrium and musculature of the uterus, tubes, cervix and the upper part of the vagina during the first half of the menstrual cycle (proliferative phase). This proliferated endometrium gets modified during the second half of the cycle under the influence of progestrone into a secretory or progestational type which is necessary for the nidation of fertilised ovum. If the fertilisation does not take place menstruation is brought about by withdrawal of œstradiol (and progestrone) on degeneration of the corpus luteum.

2. It causes normal rhythmic contractility of the uterus.

3. It is responsible for the appearance of the secondary sex characters in the females, *viz.* pubic and axillary hair, rounded contour of the body and mammary growth.

4. It causes certain characteristic proliferative changes in the duct system of the mammary glands of the female.

5. It limits the secretion of the anterior pituitary as explained above.

6. It maintains a balance with Androgenic hormones in the body which have an antagonistic action. It has no effect on the heart, lungs, blood pressure, kidneys or liver.

Various preparations and their sources.—Natural œstradiol has been isolated in a crystalline form from pregnancy urine and ovaries and is available for medicinal use (Ovocyclin tablets, Ciba). It has been found that by parenteral route its esters (salts of fatty acids) are more active than the pure hormone. The action of esters (œstradiol benzoate and œstradiol propionate) is more intense and sustained and the hormones become slowly but continuously available to the body, while the quality of action remains unchanged. Oestradiol dipropionate (Ovocyclin P, Ciba) is more active and has a more prolonged action than œstradiol benzoate (Progynon B Oleosum, Scherring). Oestradiol is also available in the form of ointment (Ovocyclin ointment, Ciba) for use if a local action is desired.

Recently certain synthetic substances which closely resemble natural Oestrogens in their action and are effective in smaller doses and are cheaper have become available and have greatly replaced the natural Oestrogens. They are Stilbœstrol which is Dihydroxy Diethyl Stilbene and Dienœstrol (Neoclinœstrol, Glaxo) which is dihydroxy phenyl hexadiene. Their drawback is their side effects *viz.* giddiness, nausea and vomiting, especially when given in large doses. If they are not tolerated, natural ones should be substituted. The latest synthetic preparation and the most active so far is Ethinyl Oestradiol which is closely related to the natural hormone and is effective in very small doses and the side effects are minimal (Eticyclin, Ciba). Neoclinœstrol is better tolerated than Clinœstrol (Stilbœstrol) and is effective in comparatively smaller doses.

Therapeutics.—1. *Menopausal symptoms* :—Various symptoms occurring in many women at the time of menopause are supposed to be due to the withdrawal of œstradiol and consequent overactivity of anterior pituitary. These symptoms can be controlled by the administration of natural or synthetic Oestrogens. To start with, the dose should be sufficiently big to control the symptoms and should then be gradully reduced. In a moderately severe case Stilbœstrol 5 mg. or Ethinyl Oestradiol ·05 mg. t.d.s. will control the symptoms in 3–4 days after which the dose can be reduced to 5 mg. of Stilbœstrol daily for one week and then every alternate day and then once weekly and then gradually stopped altogether. In mild cases Ethinyl Oestradiol ·05 mg. once daily will be sufficient and may be gradually reduced. If the synthetic Oestrogens are not tolerated, Ovocyclin P 5 mg. by intramuscular injection once daily may be given to control the symptoms and then gradually reduced to twice a week and then once a week. In mild cases Ovocyclin tablet one t.d.s. may be sufficient.

2. *Kraurosis vulvae, leukoplakic vulvitis, senile vaginitis, and pruritus vulvae*:—These conditions which commonly occur after menopause are also supposed to be due to the deficiency of œstradiol and are greatly relieved by Oestrogens in doses mentioned above for menopausal symptoms. The oral therapy may be supplemented by local applications of œstrogenic ointments (Ovocyclin ointment).

3. *Sterility*:—In those cases of primary and secondary sterility where a pelvic examination reveals no abnormality, Oestrogens have been used successfully in many cases. In several of my cases the results have been dramatic. The patients did not menstruate after taking only one course of Neoclinœstrol tablet 0·3 mg. twice daily in the 1st 14 days of the menstrual cycle. In some of the cases conception had not taken place for 10 years or more. If two such courses failed to achieve success it was rare for the therapy to succeed on repeated courses. I usually give three courses and if no success, follow it with a D and I and repeat three courses after the operation. Success has sometimes followed after this procedure even after initial failure with two courses. How Oestrogens achieve this quick result is not quite clear. It seems they bring about hyperplasia of endometrium which is probably hypoplastic in such women.

4. Oestrogens in obstetrics :—(*a*) Inhibition of Lactation:—Neoclinœstrol 5 mg. once daily for 2-3 days is almost always effective in inhibiting lactation when it is desirable to do so, *i.e.*, in cases of still-births. Smaller dose, ·3 mg. Neoclinœstrol twice a day should be continued for a few days more.

(*b*) Engorgement of breasts in early puerperium may be relieved by smaller doses (Neoclinœstrol 0·3 mg. twice daily) without interfering with lactation.

This inhibition of lactation is probably brought about by depressing the anterior pituitary as the same thing can be achieved by injections of Androgenic hormones [Perandren (Ciba) 25 mg. once daily].

(*c*) Induction of labour :—Neoclinœstrol 5 mg. 3 hourly for 3-6 doses will induce labour at full term or in cases of postmaturity.

(*d*) Missed abortion, carneous mole and intra-uterine fœtal death :—Neoclinœstrol in doses of 5 mg 3 hourly will cause contractions of the uterus and expel the contents.

(*e*) Uterine inertia :—I have used Neoclinœstrol in the same doses successfully in several cases to increase the uterine contractions. The pains become stronger after injection of a 5 mg. tablet of Neoclinœstrol which can be repeated if necessary. Oestrogens given in large doses during labour, however, have a drawback of interfering with future lactation. In one of my such cases there was more or less complete inhibition of lactation. This fact should always be kept in mind when using Oestrogens during labour except when the fœtus is dead.

5. *Oestrogens in menstrual disorders* :—(*a*) Amenorrhœa.—The Oestrogens along with Progesterone have been extensively used for the treatment of amenorrhœa but their indications are rather limited. In the uncommon primary amenorrhœa, if the uterus is absent or rudimentary only, Oestrogens will be of no use. In the rare condition, when normal or an infantile uterus is present but the ovaries are either absent or completely non-functioning as evidenced by the non-appearance of secondary sex-characters, Oestrogens in fairly big doses will help the appearance of secondary sex-characters and may at the most achieve a temporary Oestradiol-withdrawal bleeding. This Oestradiol-withdrawal bleeding which is not true menstruation, since there is no ovulation and no pregnancy can take place, has, however, a beneficial effect on the usually disturbed mental state of the patient. Oestrogens may achieve good results in those cases of amenorrhœa (or oligomenorrhœa) where a normal or hypodeveloped uterus is present with functioning ovaries, but even in such cases the effect may be temporary. However, in several cases of functional amenorrhœa where no cause can be found and probably there is a hormonal imbalance, Oestrogens are successful and are worth trying. The dose is 1 mg. of Neoclinœstrol twice a day for 14 days followed by Progesterone 5 mg. twice weekly for next 14 days and several such courses are repeated.

In cases of secondary amenorrhœa, the cause (anaemia, debility or any other constitutional disease) should be treated and in those cases where no cause can be found, *e.g* in those occurring after delivery, Oestrogens should be tried in the doses recommended above and are usually successful

(*b*) Menorrhagia :—If other measures fail, excessive and urgent uterine bleeding can almost always be temporarily controlled by giving Neo-clinœstrol

1-5 mg. t.d.s. usually within 48 hours. The patients thus can be tided over an emergency. An Oestradiol-withdrawal bleeding will recur on withdrawal of the drug which should be continued for about 3 weeks. As it is not permissible to interrupt the therapy, it should be substituted by Ethinyl Oestradiol if intolerance occurs.

(c) Dysmenorrhœa :—Neoclinœstrol in doses ·3 mg. twice a day for 1st 14 days of the menstrual cycle has been sometimes successful in cases of spasmodic dysmenorrhœa in young girls but whether the effect is only psychic or real is difficult to say.

6. *Development of accessory sexual organs and breasts* :—Neoclinœstrol in varying doses according to the severity of the condition is effective to develop an under-developed uterus and breasts. Ovacyclin ointment has a local action and helps if massaged on the breasts.

7. *Cancer of the breast* :—Stilbœstrol or Dienœstrol in doses of 5 mg. t.d.s. has been successfully used in cases of inoperable cancers of breast with general metastases. Under this treatment the primary and metastatic growths become smaller and the pain and discomfort are markedly relieved. Some of the inoperable cases become operable. The treatment is however successful only in old women of 60 or more. In younger patients Perandren (Androgenic hormone) gives better results. This effect is probably also due to the depressing action of Oestrogens on the pituitary.

8. *Oestrogens in skin diseases* :—Several cases of acne vulgaris which is supposed to be due to the predominance of Androgenic hormones both in boys and girls have been very favourably influenced by Oestrogens. As the drug has got to be given in fairly large doses 1-5 mg. t.d.s. it may lead to some unpleasant side effects in both sexes and should be given cautiously (3 weeks treatment with an interval of 1-2 weeks) and only if other measures have failed. Seborrhœa is also favourably influenced by Oestrogens.

9. *Oestrogens in the male* :—*(a)* Carcinoma of the prostate :—It has been used successfully in cases of cancer of the prostate before and after the operation and in inoperable cases in doses of (Neoclinœstrol) 5 mg. t.d.s. which may have to be continued for long periods 1—2 years. Many patients under this treatment complain of enlargements of breasts and tender nipples.

(b) Mumps.—They have been used as a prophylactic in (Neoclinœstrol 0·3 mg. t.d.s.) cases of mumps to prevent testicular complications and in bigger doses for treatment of orchitis due to mumps.

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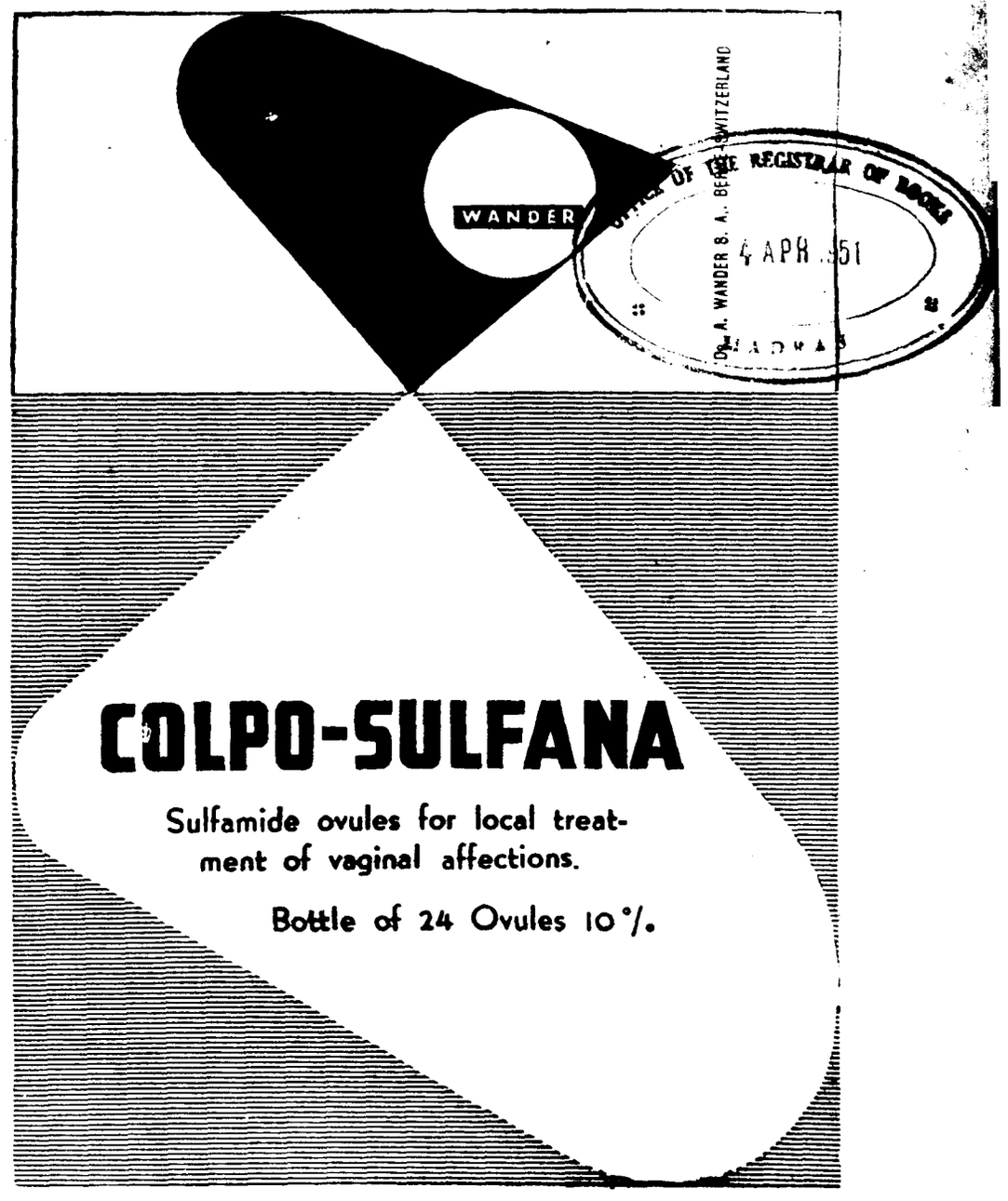

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Original Articles

LIVER ABSCESS*

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Physician, Government Stanley Hospital, Madras.

LIVER abscess is one of the commonest complications of amœbic dysentery. There are two stages in the development of an abscess liver: the hepatitis and the abscess. Hepatitis itself has again two phases: the acute phase and the chronic phase. In the acute stage of the hepatitis, the essential pathology is the liver being invaded by amœba. Roughly this can be compared to paratroop landing in a city. If the defence of the city is alright, the paratroopers are rounded up and nothing more is heard of them. Correspondingly, where the liver cells are healthy, the hepatitis clears without a residual symptom. Whereas in a city, where the defence mechanism is poor, the paratroopers are able to contact each other and establish a colony of their own. This corresponds to a devitalised liver where the defence mechanism is poor, and the amœba is able to bring about colliquative necrosis of the liver cells and form an abscess. Devitalisation of the liver occurs in chronic alcoholics and subjects of protein-deficiency or lowered resistance due to other chronic diseases like a syphilitic infection.

In the acute stage, the condition is curable without operation. In this form the patient has high fever and enlarged tender liver. Usually there is a history of diarrhœa or dysentery sometime ago.

* Address delivered before the Erode Branch of the Indian Medical Association at their Annual Meeting.

The absence of such a history should not be taken too seriously. The temperature chart is that of an irregular remittent type with a relatively fast pulse, and now and then profuse perspiration occurs. Examination shows enlarged tender liver. The enlargement is both upward and downward. X-ray or screening shows well-marked upward enlargement in quite a number of cases as shown by the elevation of the right dome of the diaphragm. While when present, this may be taken as a useful sign, the absence of such a thing does not rule out hepatitis. The left side of the diaphragm is not usually elevated, but may be elevated in case of hepatitis or abscess of the left lobe of the liver. This is relatively very rare. X-ray also shows involvement of the adjacent lung. The bowels may be thickened, particularly the cæcum and the ascending colon. Usually there is always a well-marked leucocytosis at this stage, the count varying widely anywhere between 10,000 and 30,000 per c.mm. Aspiration at this stage only results in blood being aspirated.

In the chronic hepatitis, the diagnosis is not quite so obvious, as in the acute form. Here the liver is not usually tender. There may be diarrhœa and there is also enlarged liver. On quite a number of occasions, I have been successful in finding active amœba in the motion of these cases. There is also moderate leucocytosis. In this phase, emaciation may be prominent; hence, very often, this condition is diagnosed as tuberculous enteritis. Repeated examination of the motion may be necessary to demonstrate the amœba or the cysts. I have noticed that if the motion is collected after administering a saline purgative, positive results are more often met with. In this condition X-ray and screening are of considerable help.

Treatment at this stage is simple and effective. Emetine 1 gr. intramuscularly daily for six days followed by Iodo-quinoxyline compounds is quite satisfactory and prevents the condition going on to liver abscess. With Emetine administration, in the course of three or four days, fever comes down and with that the leucocytosis also comes down. Occasionally it may take as long as six days. Hence before finishing six grains of Emetine, one should not expect the temperature to run normal.

Suppurative hepatitis or liver abscess.—This is a later stage of the hepatitis. The causative agent is entamœba histolytica. The pus is usually sterile unless secondary infection has occurred. In my opinion, the predisposing factor in abscess liver seems to be an alcoholic habit. In a series of over 50 cases, I have come across only four cases of liver abscess in non-alcoholics. Even at the expense of being considered as exaggerating, I should like to say that I consider liver abscess—case proved by aspirating chocolate-coloured pus—is exceedingly rare in a non-alcoholic. Alcoholic habit seems to devitalise the liver resistance to the amœbic invasion. To arrive at the diagnosis in the out-patient, I depend more on the

history of alcohol addiction rather than on a history of dysentery or diarrhœa. I am quoting three cases just to show the importance of alcoholic habit.

In my first case, liver abscess was diagnosed in an old man. We aspirated him once and put him on Emetine. In spite of that he was sinking. Finding that he was not improving, we asked him as to what he wanted. He wanted a pot of toddy to drink and he was given the same as his general condition was too poor. In a day or two, he died and partial autopsy showed a big liver abscess containing a small amount of pus and the rest of the abdominal viscera healthy. In the second case, a man was admitted with abscess liver. He was aspirated 18 years ago and we aspirated again typical chocolate coloured pus. The liver had shrunk and he was afebrile. At this stage he took leave to attend his daughter's marriage, went out, drank heavily at the wedding and in a week's time he was back in the hospital with the recurrence of symptoms and liver again palpable four fingers breadth below the costal margin. We again aspirated about 10 oz. of pus and warned him not to indulge in alcohol. He was reporting himself once in a way for two or three years when he was found to be maintaining his health. Later he joined the Military in 1942 and by 1945 started to take alcohol and in 1947 reported sick with hepatitis. This time we did not strike any pus and the hepatitis responded to Emetine treatment.

I have come across liver abscess only twice in women. In the second case which occurred in December 1946, when I inquired for alcoholic habit, the woman actually said brandy was very welcome. This woman was aspirated twice and she was a heavy alcohol addict. It is well known that liver abscess is comparatively infrequent in women. Even amœbic dysentery is less common in women than in men. This might be due to the more sheltered life that they lead. But the liver abscess, as a complication in women, is almost a curiosity. I presume it is so because they do not indulge in alcohol. For the same reason, liver abscess is very rare in children. The youngest age recorded is by Biggam, A. G., in 1932, of a case of amœbic dysentery in an Egyptian child three months of age who had also amœbic abscess of the liver. The child died of bronchopneumonia and autopsy showed amœbic ulcers in the bowel.

Pathology of liver abscess.—Entamœba histolytica reach the liver from the dysenteric ulcers in the colon through the portal vein in large numbers. It causes a diffuse inflammation or hepatitis. At this stage, if a needle is put into this enlarged liver, only blood is drawn. If the amœba meets with devitalised liver cells and gets a hold, it multiplies and by a process of coagulative necrosis causes destruction of the liver. This occurs in various centres and these spread and by a confluence lose their individuality and constitute a large abscess. Thus the pus inside is actually liquefied liver and not due to suppurative process as in a

coccal infection. Hence culture of this pus is always sterile unless secondary infection has taken place. The abscesses may fail to coalesce and then we get multiple liver abscesses. The pus when secondarily infected is no longer chocolate coloured, but is greenish or yellowish, depending upon the organism. The commonest secondary organism seems to be B. coli.

The abscess may slowly work its way to the surface and may even rupture into the adjacent portion as into the pleural cavity, pericardial cavity into the peritoneum or rarely into the surface by a sinus. In chronic abscesses, the pus may be well walled off by a wall of connective tissue. In these cases, signs and symptoms are apt to be misleading. If, as a result of treatment, the amœbæ are destroyed, calcification of the abscess wall may take place. In these cases encystment occurs and may be an autopsy discovery. The cavity may contain a clear fluid with very few pus cells. Amœbæ themselves are not usually seen in the liver abscess pus. They are only seen in the scrapings from the wall of the abscess cavity. Cysts are never found in the liver abscess pus.

Liver efficiency tests are likely to show greater deficiency of the liver in the hepatitis stage, and in a chronic abscess liver in which the abscess is well walled off, the liver efficiency may be normal, and leucocyte count may also be normal.

Symptomatology.—There are few diseases with such varied symptomatology. Even the best of clinicians have missed abscess liver and diagnosed one when it was not there. In a typical case, patient complains of pain over the side of the chest, over the liver area, or over the shoulder. The pain is fairly severe, with fever coming on in the evenings. At the onset of the fever, there may be rigor, but there may or may not be further rigors, but occasionally there may be daily rigor. On examination, there is a bulge on the right side of the chest over the liver area and also over the right hypochondrium. The liver is enlarged and tender. The enlarged liver is smooth and not nodular. It may be moderately firm or even very hard. Quite a few cases have even been misdiagnosed as cancer liver because of the hardness of the liver that might occur in some cases. In most of the cases, over the right base of the lung, percussion note is impaired and the breath sounds may be feeble or even absent with fine rales. This may be due to either the upward enlargement of the liver in the right upper quadrant, or associated pneumonitis in the right base, or to pleurisy with or without effusion in the right side. This pleural effusion may be clear, straw-coloured fluid showing that the pleura is being irritated or in some cases the liver abscess may burst into the pleural cavity,—if the lung itself is not adherent to the diaphragm—it may behave like pleural effusion due to any other cause. If, on the other hand, the lung is adherent to the diaphragm, then the patient may cough out liver abscess pus and the liver might suddenly shrink. I can now recall a case.

A wandering Sanyasi was admitted with what appeared like an oval tumour filling up the right hypochondrium, right loin and almost reaching the right iliac fossa. No definite diagnosis could be made. The tumour was found to be moving with respiration and looked as though in continuity with liver dullness. The man gave a history of dysentery some years ago and was an alcoholic. He was complaining of pain and was also running a temperature between 102°F and 103°F. Though we were not certain of the diagnosis, we put the patient on Emetine I.M. daily, and, on the second day, the patient said he was feeling giddy and vomited about a pint of chocolate coloured pus and in the course of the next few hours, the tumour disappeared under our very eyes. He was spitting bile-stained saliva for a few more days and this man made an uneventful recovery.

In a typical case, the abscess may actually point in various parts of the chest or even in the back. In one of my cases, our surgeon even thought it might be abscess of abdominal wall. In another case, the abscess had worked its way into the anterior abdominal wall and presented as a small ball-like structure in the anterior abdominal wall. Only on the table it was realised that it was a case of liver abscess which had worked its way into the rectus sheath. In another case, the abscess had worked its way into the small of the back and was diagnosed as perinephric abscess. This case again was properly diagnosed only by operation. In another case, a man came complaining of pain over the area of the right kidney and intermittent type of temperature. Fever used to be coming on with rigor. There were no positive clinical findings except slight tenderness over the small of the back on the right kidney region and very slight fulness. Urine did not show any change and urine culture was sterile. All the same, he was put on alkaline diuretic mixture for a few days with no benefit. One day the patient complained of a severe pain and said that something had given way deep in his chest and in a few minutes he was in a state of shock with profuse perspiration and fast and feeble pulse. Clinical examination showed signs of pleural effusion right base and a chest picture taken in the next few hours confirmed the diagnosis. In view of the fever and the abrupt onset of effusion, liver abscess bursting into the pleural cavity was thought of, and a needle was put into the pleural cavity and chocolate-coloured pus was aspirated. Patient was immediately started on Emetine therapy with considerable improvement. In this case the liver abscess must have been situated posteriorly and pressed upon the kidney, causing a slight amount of fulness over the loin and simulated pyelitis.

Jaundice does definitely occur in the course of liver abscess. Failure to bear this possibility in mind has been the cause of missing at least quite a number of cases by clinicians. In one of my cases,

a man came with jaundice, enlarged spleen and liver and intermittent type of fever. Jaundice was of the obstructive type. He gave a history of alcoholic habit and also of having had dysentery some years ago. We put him on a course of Emetine and aspirated about 8 ounces of pus and the jaundice promptly cleared. A few days later, he was admitted again with jaundice. He was aspirated again and the jaundice cleared within a day or two. In this case, the jaundice showed unmistakable relationship to the abscess liver. In another case which I happened to see, was in an old man past 55 or even more. This man was toxic and deeply jaundiced with a very big liver which was nodular and very hard to the feel. Primary carcinoma liver was the diagnosis made. At the autopsy, it proved to be a case of liver abscess and the nodularity felt in the wards turned out to be due to the abscess wall bulging through the healthy liver. In this case the age of the man, the nodularity of the liver and the hardness of the liver completely misled every body and, but for the autopsy, this would have been completely missed. So it is worth bearing this factor in mind. An enlarged liver with fever and jaundice means the possibility of a liver abscess. Another of my case, again an old man, was admitted with what looked like a case of congestive heart failure. The patient had œdema of the legs and arms with slight puffiness of the face. He was deeply jaundiced and an abscess pointing in the anterior abdominal wall. It looked as though the abscess would burst any minute. I put him on Emetine and showed him to our surgeon. He was operated on immediately and about a pint of pus was drained. Left to me, I would not have advised operation at that stage, but my surgeon was afraid that the abscess might burst and thus might become an emergency. He had to be aspirated two or three more times before he recovered completely. In this case by the third day the œdema of the legs and arms cleared up, and in a week's time the jaundice also cleared up, but he developed broncho-pneumonia for which he was put on Sulphathiazole and was fully recovered at the time of discharge. In this case there were several features which were misleading in arriving at a diagnosis, the patient having congestive failure symptoms and abscess pointing almost like a tent in the anterior abdominal wall and deep jaundice. My then chief called my diagnosis a bold one. This case illustrates the type of cases that come with symptoms of congestive heart failure. I have seen another case with symptoms of heart failure and generalised scabies. In this case, for a time at least, the liver abscess was missed. Text books do not mention this type of cases The problem in this type of case is Emetine therapy. I am of opinion that the heart failure is only secondary to abscess liver and it can only be cured by drainage of the abscess and Emetine therapy. I advocate Strychnine or Coramine or any other cardiac stimulant to be given along with Emetine. I will refer to this point later when I come to the treatment.

In only a very small group of cases we get the abscess liver and dysentery being present at the same time. Motion examination may more advantageously be done for cysts, but it is not easy to spot them. In the analysis of 50 cases, in only two cases were E.H. seen. It is easier to look for such indirect evidence as thickening of the ascending or sigmoid colon. It is very exceptional for the transverse colon to show any evidence of thickening.

Rarely it is the complication that occurs in the course of the abscess that is likely to draw attention to the existence of the liver abscess. The abscess might burst into the neighbouring structures. By far the common sites for rupture of the abscess are into the pleural cavity and peritoneal cavities. When the abscess bursts into the pleural cavity, the prognosis is very grave. I have had four cases and none of them survived. Particularly operation and drainage should be avoided. In these cases, the collapsed lung may need decortication. In the literature mortality is recorded as 70 per cent for these cases. I have seen one case in which the abscess burst on to the pericardium. The case in which it burst into the pericardial cavity was a middle aged man. He was first seen by me in a mild state of shock with thready pulse and cold sweat. He complained of severe pain in the epigastric region. Examination showed liver enlargement two fingers breadth below the costal margin. I admitted this case as hepatitis. In the wards, he got over the state of shock and was quite alright in about three hours time. At this stage, he gave a history of periodic attacks of pain coming on two or three hours after food and being relieved by taking a little food. In view of the history I thought I was dealing with a case of duodenal ulcer. Fractional test meal showed low acid and barium meal series failed to reveal any defect in the duodenal cap. I thought of the ulcer with perigastric adhesions. By this time, again for no reason, while he was at perfect rest, he went into a mild state of shock. This only further favoured my suspicion of perigastric adhesion causing sympathetic disturbance and our consulting surgeon suggested that it might be only liver abscess and took over the case. He put the patient on Emetine ½ gr. I.M. daily. After three injections were given, patient again developed a state of shock, but this time it ended fatally. At autopsy, it was found to be a liver abscess that had burst into the pericardium. In this case, we had two misleading features. One was the periodicity of pain in relation to food simulating duodenal ulcer (subsequently I have elicited such a history in a number of cases). Probably it is the distension of the duodenal cap pressing on the inflamed liver that causes the pain. The second misleading thing was periodic cold sweat and a state of shock from which the patient recovers in the course of a few hours. Very rarely the abscess might burst into the perinephric tissues.

The aids to diagnosis are examination of blood, a skiagram of the chest, and, finally, aspiration of the enlarged liver.

Blood shows leucocytosis in the hepatitis stage and in the acute stages of the liver abscess. In some of the chronic cases, when the abscess is well walled off by fibrous tissues, leucocytosis does not occur. In one of the cases leucocytic count done three times showed only 4,000 per c. mm. The liver was enlarged to such an extent as to almost completely fill the entire abdomen, leaving only a very small area free between the margin of the liver and symphisis pubis. On opening, the abdomen was occupied almost completely by the liver, and on incising the liver 7½ pints of pus was drained and scraping from the wall showed motile amœba. This patient was put on Emetine with complete recovery. A few days later, at the time of discharge, liver was only just palpable.

X-ray of the chest is a very valuable procedure. It may not be of any value when the abscess enlarged downward or is situated in the left lobe. It is of the greatest value when the abscess is situated in the right upper quadrant. In a few cases in which effusion right base is suspected, X-ray chest has shown only raising of the dome of the diaphragm without any displacement of the heart. In two cases where the patients were very markedly emaciated and complained of pain in the abdomen with doughy feel, they were suspected in one as tuberculous peritonitis with a just palpable liver and in the other as tuberculous pleural effusion right side. In both cases X-ray chest showed that we were dealing with liver abscess. Screening shows absence of diaphragmatic moving on the right side, in a large number of cases, but where the abscess does not occur in the upper quadrant, diaphragm might freely move with respiration.

Aspiration of the liver clinches the diagnosis and is also part of the treatment. Once a needle is put in and pus is drawn, aspiration should be done straightaway. I very well remember a physician putting in a needle in the morning and demonstrating to a batch of students the presence of pus. By night the patient developed acute abdomen and laparotomy showed that nearly a pint of pus had collected into the peritoneum. In the liver abscess the pus is under tension and a needle tract affords sufficient passage for the pus to leak.

Differential diagnosis in liver abscess.—As I said at the very beginning, a number of conditions may be mistaken for liver abscess. The common conditions which have to be differentiated are primary carcinoma liver and a liver riddled with secondaries. The liver that is the seat of malignancy has many factors that are likely to present misleading features. It is likely to show a low temperature, hard liver which might also be tender and moderate leucocytosis and skiagram may also show elevation of the right dome of diaphragm. Aspiration might show blood-stained material, and if the needle passed through a portion of the liver bearing malignant deposit or malignant changes, then the aspirated

material shows malignant cells as in one of my bronchogenic carcinoma cases with extensive secondary deposits in the liver. In another case, with primary growth in the gall bladder, with plenty of secondaries in the liver, it failed to show any malignant cells. Therapeutic response to Emetine may also be tried.

The other conditions to be thought of are pneumonia right base; pleural effusion right base, tuberculous peritonitis, peptic ulcer, typhoid and other long continued fevers, gumma of the liver, hydatid of the liver, perihepatitis occurring in cases of kala-azar and malaria cholecystitis both acute and chronic; adenocarinoma of the gall bladder; perinephric abscess and pyelitis and malignant tertian malaria and early cases of cirrhosis liver. I do not say I have completely exhausted all the possibilities. There are many conditions not mentioned by me, but I have mentioned the common ones.

A Hindu, male, aged 16, was admitted for pain in the legs and abdomen and night blindness of two months' duration.

Previous history:—History of dysentery four years ago. History of venereal sore 5 years ago. Habits: Occasionally takes alcohol, non-vegetarian.

History of present illness:—Two months ago patient had fever for ten days. This was followed by pain in the right hypochondrium.

This patient was an emaciated young man with œdema of the feet. Pigmentation of the palate, sclera and icterus. Abdomen: Liver enlarged, more than the left lobe and soft. No tenderness, palpable—three fingers breadth below the right costal margin and 5 fingers breadth in the epigastrium. The other systems were normal.

Blood W.R. was positive strong. Total W.B.C. 6,000 per c.mm. By liver aspiration through the right 8th interspace only blood was drawn. No pathogenic organisms were seen. X-ray chest showed moderate elevation of right dome of the diaphragm.

Patient was admitted as amœbic hepatitis. He was given a course of Emetine 1 gr. I. M. daily with no benefit. Since the left lobe was enlarged and only blood was drawn in the aspirating syringe left lobe, abscess was diagnosed and the case was transferred to surgical side. Under local anæsthesia laparotomy was done. Liver was not adherent to the peritoneum. Liver surface was smooth. Aspiration of left lobe also yielded blood only. Peritoneum stitched to the liver surface and packed with gauze.

In this case, patient had no fever to start with and at the end of 7 injections, started having fever. After the laparotomy on the 8th day, patient started having fever and this responded to Iodide by mouth. Eight months later, patient developed ascites. He was given mercurial diuretics and milk diet and ascites cleared. In view of the history of dysentery and enlargement of the liver and emaciation amœbic hepatitis was diagnosed. This should have been

revised in view of the left lobe being much more enlarged, leucocyte count being only 6,000 per cm. and the absence of response to Emetine. As a matter of fact, the temperature started going up on the 8th day of Emetine injection. With the history of sore on the penis five years ago, blood W. R. should have been done at the very first instance. This type of diffuse involvement of the liver by a syphilitic process is not common and is likely to be mistaken for an abscess liver.

For everyone of the conditions that has to be borne in mind, I can cite illustrative cases and I am sure you would also have seen cases of a similar nature.

The treatment in this condition that I adopt as a routine is to put the patient on Emetine 1 gr. daily I.M. for 9 days. If there is no urgency, then I prefer to aspirate at the end of the course, but where the pain is severe and abscess is bulging and threatening to perforate, I aspirate at the end of 3 grains of Emetine ; but where the symptoms are very urgent and where delay might mean rupture of the abscess any minute, I aspirate immediately after giving 1 grain of Emetine. But I always prefer, if conditions permit, to allow the patient to have at least three injections of Emetine 1 grain each daily, before I aspirate. This much of Emetine is enough to kill the active forms at the surface and aspiration tract is not likely to act as a passage for the amœba to spread.

Most of the symptoms clear up by the third or fourth injection. If a patient is markedly emaciated and general condition too poor, I do not prefer to give a lower dose of Emetine, but I give Emetine 1 gr. and Strychnine or Coramine along with Emetine. If the patient is febrile, he becomes afebrile by this time. I do not find any advantage in putting Emetine locally into the abscess cavity and I do not adopt that procedure. The aspiration with Potain's aspirator is the method of choice when the abscess is on the right side of the liver, to let out the pus. I have aspirated by this procedure in two of my cases as much as 64 ozs. But where the abscess is aspirated in the left lobe, open operation is the ideal method. Even for this, a preliminary premedication with Emetine is of great value in avoiding post-operative complications. Aspiration is done, if necessary, more than once at intervals of 4 or 5 days. Where there is urgency, I aspirate at the end of three grains of Emetine and repeat the aspiration at the end of 9 grains of Emetine.

After a course of Emetine, the patient is put on E.B.I. 2 grains at bed time for 12 nights.

I prefer to have the bowels regular and from the start I put my patient on Oleum Recini emulsion. By the time they have had about 6 grains Emetine, I shift over to Shark-liver-oil emulsion so that these emaciated patients may put on some weight.

Recently an anti-malarial drug was evolved called Chloroquine. It is marketed by Bayer under the trade name of 'Resochin'. This

was synthesised by Andersag, Breitner and Jung. This drug was found to possess an intensive anti-malarial effect. Due to war conditions, this drug was not available in India till very recently. This is designated as Chloroquine or SN 7618 by Americans. This drug is swiftly absorbed from the intestines after oral administration and is stored by the tissues of the body especially in the liver and lung; in liver in concentrations of 400-600 times higher than in the blood plasma. In view of this, the efficiency of this chemotherapeutic was tried in other protozoan diseases that affected the liver. The composition of Chloroquine is 7-chloro-4-(4'-diethylamino-1'-methyl-butylamino) quinoline diphosphate. It is a white crystalline substance which is easily soluble in water. Reports have come from several parts of the world that this drug is very useful in amœbic hepatitis and liver abscess and in pulmonary amœbiasis. I have so far used this drug in four cases to the exclusion of Emetine. In all the cases the result has been comparable to that of Emetine therapy. The temperature subsided within 24-48 hours and with that there was marked lessening of the pain and the patient felt better. This drug is not suitable for the primary amœbiasis of the intestine as the drug is absorbed in the small intestine itself. The great advantage with this drug is that it can be administered orally, is definitely less toxic and so can be administered even in debilitated states without any risk to the myocardium. The dosage recommended and which I have followed is from the 1st to the 4th day of treatment 1 tablet 6 hourly, from the 5th to 12th day twice daily and from the 13th to 21st day of treatment one tablet daily. Each tablet is ·25 gm. in weight. It is recommended that as far as possible the tablets should be administered after light meals. For the supply of Resochin (Bayer) I am indebted to Messrs. Chowgule & Co. (Hind) Ltd., Bombay. A more detailed report on the same will be published at a later date.

Prognosis in these cases is good if the abscess is aspirated or drained well and if the patient has not gone down in general condition too far. It is surprising how even very advanced cases respond to aspiration and Emetine.

In my analysis of 50 cases only 2 deaths occurred. Abscess liver is likely to recur if the patient takes to drinking alcohol again. This is one of the few conditions where under our very eyes, with proper treatment, a patient gets remarkably better in the course of a few days.

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MALARIA MENACE—II

(HOW WE SUFFER)

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THE amount of suffering from malaria is *tremendous; there are numerous ways and means by which malaria is produced among us and the mosquitoes, its carriers, are produced in the Universe.

Malaria, as is particularly known to men of science and to the public in general, is transmitted from man to man through the agency of mosquitoes (female anophelenes) as per—

Clean Mosquito. (A) 10–14 days. (B) Infective Mosquito.

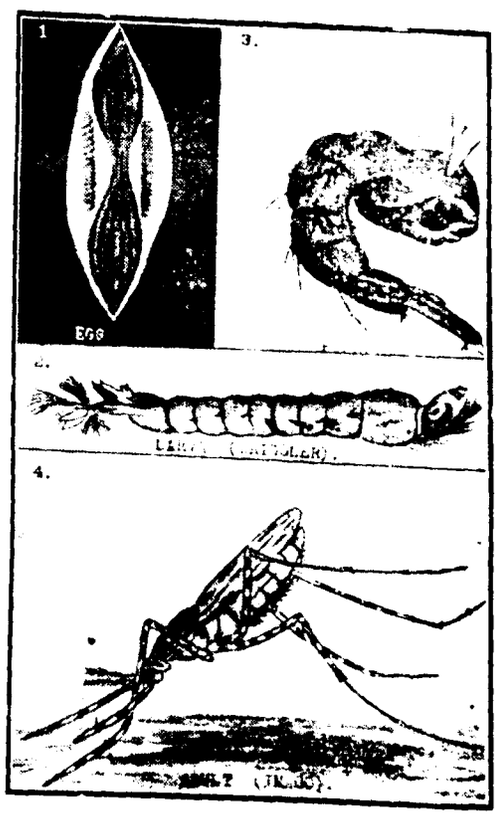
Human Carrier. (E) 7 days. (D) 10–14 days Sick patient. (C) Healthy man. Bites.

Mosquitoes, as commonly met with, are of two types: those that usually breed in dirty water, the watery stages (larval stage) of which have got their heads turned down in water and the adult stages (winged moving about) of which have a haunch back in resting position, are known as *culicines*; and those that breed usually in fresh water, the larvæ of which float and the adults of which sit horizontally on the walls are described as *anophelenes*. Life cycle is as :—

Egg — Larva, Pupa → — Adult.

5 – 7 days.

FIG. 1.



* The first article in this series was published in the July, 1950 issue, pp. 523-534.

Optimum climatic factors are 68°F. temperature and 80% humidity.

Bionomics of adults.—Anophelenes being of many species, about 40 in number, the usually known carriers in India are—

Name of mosquito.	Habits.	Locality.	Type.	Breeding ground.	Usual biting time and range of flight.
A. Stephensi.	Prefer human blood.	N. W. India.	Domestic.	Stagnant water.	20-30–22-30 hrs. ½–1½ miles.
A. culicifacies.	Do.	All over India.	Do.	Stagnant water and slow moving water.	22-30–00-30 hrs. ½–1½ miles.
A. fluviatilis.	Both man and animal.	Foot hills and S. India.	Wild.	Stream.	—
A. minimus.	Prefer human blood.	Foot hills U.P., Bengal and Assam.	Domestic.	Slow running water.	Midnight/06·00hrs. ½ mile.
A. philli-penensis.	Do.	Bengal and Assam.	Do.	Rice-fields, stag. water.	Just after sunset and midnight. ½ mile.
A. sundaicus.	Do.	Bengal.	Wild.	Brackish water.	22-00 hrs. until dawn. 1½ miles.
A. varuna.	Do.	Parts of Bengal, Orissa and Central India.	Do.	Rainwater, pools, tanks etc.	No evidence. ½ mile.

The life of the mosquito varies according to climatic factors and breeding places (Fig. 2, *vide page 186*) and is usually 2–3 months. Once infected, it remains so for 2–3 months. Once fertilised the female continues laying eggs throughout her life. *It is only the female infected anophelenes that can give us malaria.*

Breeding of mosquitoes.—Leaving aside the natural breeding of mosquitoes and our suffering from the same, due to climatic and geographical conditions, the most important of malaria suffering, which is totally avoidable, is the creation of our own hands *i.e.* by activities of human beings and by ignorance and neglect of laws of malarial sanitation.

Increased facilities for breeding mosquitoes have been provided by man by :—absence of drainage, or badly constructed and badly planned drainage, leaking water taps, water storage receptacles, cisterns (Bombay), wells (Bombay), ornamental tanks, fountains (Delhi etc.), soakpits, garden sumps, disused receptacles, tins etc. and through the absence of proper drainage systems, or the presence of badly planned, badly constructed, or badly controlled drainage zones, improper siting of towns, villages or buildings, building operations giving rise to burrowpits, quarries, brickfields, tanks to soak concrete

etc. (Bombay, Delhi), badly kept and leaking irrigation channels (Punjab), over irrigation (Delhi), construction of docks, harbours without proper sanitary precautions, badly controlled or badly planned water supplies, indiscriminate opening up of jungle in certain areas etc.' (Covell). In some localities, *e.g.* the malaria

FIG. 2.

An Ideal Breeding Place.

vectors (carriers) may include species which breed in small wells, blocked up roof gutters, small water holding containers such as tins, vases, pitchers and burrowpits produced during the construction of commercial and industrial buildings in the centre of a city (Henderson). Bottles, discarded automobile tyres, old rubber overshoes breed enough mosquitoes in our houses.

Man-made malaria arising from war, changes in social and agricultural practices, population migrations and from the selection of unsuitable housing sites for permanent or temporary settlement and according to Henderson, the term is commonly applied to that (malaria) arising from the creation of breeding places of malaria carrying mosquitoes.

To have a thorough view of 'how we suffer', the various aspects of the problem are hereunder discussed:

Town and house construction.—Town Planning Commissions, in addition to surveying the site from geographical and strategical

importance, have also a responsibility to bear regarding the health of the inhabitants. As malariologists' advice on the subject is rarely sought, many a town had to be depopulated because of the malariogenic conditions prevailing on the site and its periphery before the construction of the town. Original site selected for New Delhi had to be abandoned on account of malarial conditions at the site, a great but rare achievement. Housing in lowlying areas and depressions has also to be condemned likewise and we have also to be careful about—

(*a*) Construction of water-butts and garden-sumps.

(*b*) Roof gutters, unless properly constructed and maintained in good repair, are dangerous as neglect of such precautions proved to be a fruitful source of malaria in Bombay. Water for soaking concrete on flat roofs usually breed mosquitoes.

(*c*) Storage tanks for mixing of cement and water used for flooding newly laid concrete floors, roofs etc.

(*d*) Mosquito proofing of houses which has already established its worth in America, Africa, Italy, the Federated Malay States and British troops barracks in India.

Water-Supply.—Though great importance, as deserved, is attached to water supply for the public and the individuals, little attention is paid to the overflow. The wells are seldom made mosquito proof, numerous leaks and seepages occur along the piped supply, cisterns are rarely mosquito proofed and the cement platforms, if at all made around stand pipes, do not satisfy requisite specifications. A great opposition to the malaria gang is met by those who are so fond of maintaining ornamental waters or when the gangman goes for the treatment of troughs for watering animals or for washing purposes. Is it not what we can easily avoid ?

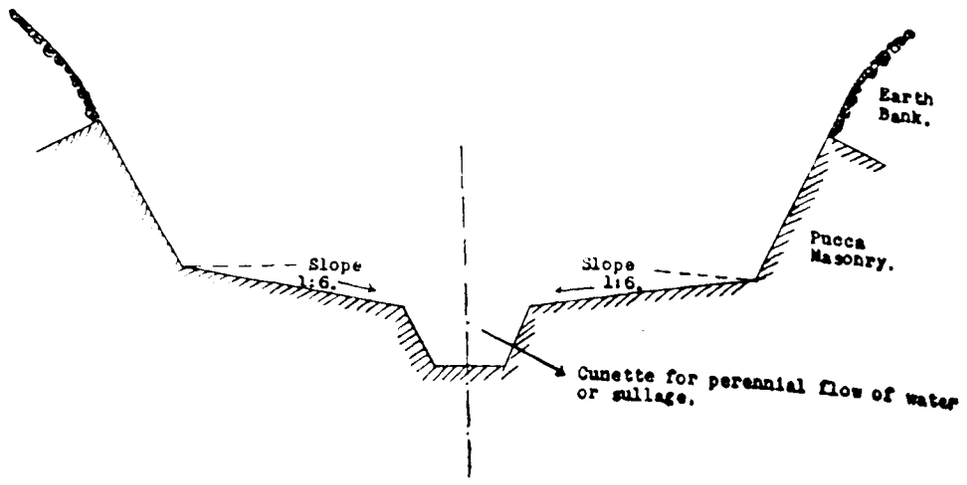
Drainage.—Irrigation without a proper drainage system results not only in increase of malaria, but also in a serious decline in the agricultural prosperity of the area. Just as œdema occurs in human beings due to obstruction in the veins, so water-logging occurs if the excess water is not drained of.

Incorrect planning of domestic drains or their altogether absence is a serious crime of malarial engineering. For example, generally the drains do not have a suitable gradient, outfall is not proper, the drains pass under the house or courtyards.

Storm water drains usually get silt-laden during the rainy season by the earth being washed into the drain. Engineering which plays a great part in Malariology, sometimes omits essential requirements required by a malariologist *e.g.* provision of a Cunette (Fig. III, *vide page 188*) branch drains to join the main drain at an acute angle (not right angle). Provision of open culverts in place of syphons, avoidance of abrupt falls, and again provision of manholes which are rarely mosquito proof or mosquitoes are capable of

entering into underground drains at the entrance of small drains, or storm water drains at their outlet into a river or canal become 'headed up' when the river or canal is in flood, because the discharge point has been placed at an unusually low level. Provision of automatic tide gates is a necessity in drains having tidal influence.

Figure No: 3.



SECTION OF STORMWATER DRAIN WITH CUNETTE. (Mulligan - Afridi).

There are many other minor points which are of importance for malariology and that is why joint planning of drainage by an Engineer and a Malariologist is recommended, as has already been experienced in Delhi where it has been proved 'that the Central P.W.D. is capable of not only executing anti-malarial schemes in the most expeditious and efficient manner but also of taking a keen and active interest in the furtherance of anti-malarial work.'

'Many of the precautionary measures advocated are neither difficult of execution nor associated with appreciable additional expenditure. Neglect of these at the time of construction will, on the other hand, eventually necessitate remedial measures which will often be difficult, costly and sometimes not entirely satisfactory.' 'The chief obstacle to overcome is the barrier of tradition.' To alter established malpractices requires great planning, perseverance and all-out cooperation.

Irrigation.—'A majority of the breeding places created by man are related to irrigation systems, burrowpits along railroads and highways, and obstructions to natural drainage. It is estimated that about 25,000,000 cases of malaria are caused annually by such situations and result in socio-economic losses totalling many crores of rupees.' (Henderson).

Whereas the peasants and rise in subsoil water levels are responsible for undesirable by-products of an irrigation system, engineers are equally to be blamed. For example, imperfect drainage causing water logging, leaky sluice gates, seeping canal banks, burrowpits, defective distribution chambers, immoderate water supply and improper delivery of water, poorly maintained canal banks and beds and lack of sufficient number of bridge crossings, are some of the engineering faults narrated by Dr. Russell.

'Unfortunately it is true, as a rule, that the cost of corrective measures is disproportionately greater than would have been the extra initial outlay required to obviate mistakes.' So why not be vigilant and co-operate from the very beginning ?

1. *Inundation irrigation* :—Due to time, and labour spent and on account of the quick flow of water from wells, well irrigation is the anti-malarial method of choice. Inundation irrigation practised in many ways *e.g.* flooding of tracts of country by the overflow of silt-laden water from rivers, does not cause much malaria, but irrigation done by conducting flood water from rivers and streams by way of inundation canals which are filled only when the river level rises to a certain height, *i.e.*, when the river is in flood, is sometimes associated with high incidence of malaria as it happened in Sind. Another method where the inundation canals arise above a bund or barrage behind which the water is dammed up, and is consequently raised to a sufficiently high level to allow of its entry into inundation canals is not much malarious, except where the dams or barrages employed are responsible for raising the subsoil water level in the territory above them, in which case a high degree of malaria prevalence may result.

2. *Perennial irrigation* :–In this type of irrigation, water is carried in canals which are constructed at high levels, and is fed to the fields by gravity. In our country this type of irrigation has almost invariably been associated with a high incidence of malaria and as has usually happened, this does not become apparent until after the scheme has been in operation for a number of years. According to Rao, 'Malaria has followed the development of each irrigation project in the Mysore State, in the Cauvery and the Hemavati basins, in the Vanivilas Sagar Project in Hiriyur, the Boran Kanave Project in Tumkur District, the Marconhalli Project and the Kanva and Byramangala Projects in the Mandya, Tumkur and Bangalore districts.

Although the malarial danger arising out of Irwin Canal Project was foreshadowed and put forward by Malariologists, yet as it usually happens, their advice was ignored and the essential provisions of drainage and dry belts around villages were left out, and this resulted in a serious problem involving 2 lakhs of population within about a year of starting irrigation. 'The loss of life became so appalling and the situation became so alarming within 3 years that

serious attention had to be paid to this area' (Rao), and it is only now that the situation is improving.

At the Sarda Canal head works in the notoriously malarious Terai of Uttar Pradesh, Clyde (1931) says that 'In the first year of the work, before anti-malarial measures were started, work had to be closed down in April because 96 men out of every 100 imported were down with fever at one time. Contractors refused to carry on the work and cleared out one after another, and it was realised that unless active measures were taken the headworks would never be completed.'

Most regrettable, but usual accompaniment of all canals is the creation of innumerable number of burrowpits, occurrence of seepages in the surrounding territory, provision of insufficient number of bridge crossings, breaches in canals, distributaries or watercourses and the worst is giving rise to the condition of 'water logging' due to loss of a high percentage of water by percolation from main and branch canals. This condition is associated with an increase in local relative humidity which facilitates the spread of malaria. Water logging, as happened in Lloyd Barrage (Sind), had disastrous effects on the health of people and the productivity of the soil. These conditions if premeditated, can certainly be avoided. Suffering from water logging in the Punjab has already been discussed in the first article of this series.

Perennial irrigation is also associated with a liability to over irrigation, a customary practice with agriculturists as actually happened in Java where excessive irrigation continued throughout the year. In the absence of a drainage system, this produced such a high incidence of malaria and such a poor yield of rice, that the irrigated area began to be depopulated.

'Unfortunately many of the issues referred to above do not ordinarily receive attention, with the result that perennial irrigation in India has almost invariably been associated with a high incidence of malaria.'

Leaking hydrants and sluice valves are dangerous if irrigation is done by piped supply of unfiltered water. But this is the method of choice for urban areas if proper care is taken and a meter installed. Herms and Gray simplify to say 'It is a strange comment on human intelligence that most irrigation districts have been organized, financed and constructed without any consideration of the problem of removing the inevitable seepage and surplus irrigation water.'

3. *Rice cultivation* :—It is not the fact of rice growing, according to Covell, which is important but the type of country in which it is growing and the method of cultivation. Out of the vectors found in India, all rice fields are dangerous in places where A. annularis is the carrier (Foot hill areas), seeping rice fields and fallow are very dangerous so long as the fields are wet. According to Senior White, if

transmission period is the S. W. monsoon, A. culicifacies is dangerous until the rice plants are more than 12" high and Sen states that 'the anophelenes prefer to breed within a range of 2 to 12 inches of water in the cultivated rice fields. They avoid deeper water.'

4. *General considerations (irrigation)* :—Wet crop cultivation (rice, sugar-cane, sweet-potato etc.) within half a mile of local habitation, obstruction of old canal beds by roads, railways or new canals, presence of herds of cattle, especially water buffaloes in canal, nullah and anti-malarial drain beds, are all factors by virtue of which we suffer and these are all our own creations. I wish we could be wise enough to avoid such causes of our suffering and increase national health.

Malaria and engineering.—*Introduction* :—There is much truth in Sir Malcolm Watson's dictum that 'work which without excuse leaves a trail of malaria behind it, is bad engineering.' In their report, the Bhore Committee states that 'an unfortunate feature of the present malaria situation in the country is that, in many parts of the populated areas of India, man has been directly responsible for its incidence through creating conditions favouring the multiplication of the transmitting species of mosquito. For instance, embankments constructed in connection with roads and railways have, in many cases, interfered with natural drainage and have promoted water-logging. Burrowpits are an accepted accompaniment of ordinary house-building operations and other engineering works. In more recent years projects designed to better the economic condition of large sections of the population have resulted in unnecessary addition to their misery. Irrigation projects, which bring water to previously dry areas, will produce malaria unless measures are taken simultaneously for adequate drainage to prevent the development of marshy conditions. The Sukkur Barrage and the Mettur Irrigation Project stand as object lessons of the result of failure to make such provision. In both cases malaria developed on a large scale in regions which were previously free from it.'

As Covell has described, 'A considerable amount of unnecessary sickness and loss of life would be prevented if all engineers working in the tropics were required to attend a short course of instruction in the principles of tropical sanitation before taking up their duties.'

It is not the engineers only that are to be held responsible for engineering-made malaria, but equal responsibility is shared by budgetry control also, as 'no one will deny the tendency of Government departments to look upon problems from the point of view of how they affect the budgets of their own department and not that of the administration as a whole. Co-operation between different departments is essential in the interests of the finances of the Government as a whole and not that of any one particular department, and 'while the outlay for such remedial measures may not fall upon the budget

of the engineering department responsible, the cost has however to be paid for by the same province or industry either in money, in economic loss, in sickness, or in lives.

Malaria, as is evident, can be caused at each and every step of engineering and any single fault can produce disastrous effects. Engineering being a very vast subject, the most important malarial aspects of it will be dealt with under a few separate headings :

Roads and railway constructions.—Severe epidemics of malaria occurred during the construction of Colaba Causeway (1838-1841), Back Bay Reclamation Scheme (1861-1866) and also during water works construction near Bombay, railway construction in Rajshahi, road in Burdwan etc.

A committee for the co-ordination of policy regarding the prevention of malarial conditions produced during the construction of roads and railways, convened in 1947 by the Government of India summarises 'the principal features of railway and road construction which favour the spread of malaria :

(1) Interference with natural drainage by the provision of an insufficient number of culverts or of culverts incorrectly placed.

(2) The creation of burrowpits without provision for their drainage, either to obtain earth for embankments or in the process of quarrying for stone or gravel.

Anti-malaria drainage differs in many respects from other engineering activities, the chief being that meticulous attention to details and continuous maintenance are all important. If these are neglected the scheme from the anti-malaria view point may be a total failure. In the disposal of storm water for instance, drainage measures may fail because whilst great attention is devoted to its rapid disposal, too little is given to the removal of all water after the storm has passed. Again, whilst a system of flat bottom drains may be perfectly effective in rendering an area fit for agricultural purposes, malaria may actually be increased unless a cunnette is provided, or the bottom shaped and maintained as a shallow V' (Covell).

Culverts.—'Where there are no other considerations involved, there is a tendency to provide only that number of culverts which will ensure that the road or railway will not be washed away or damaged by floods. This is insufficient for anti-malaria purposes. Any interference with natural drainage will result in an increase of mosquito production and hence of malaria. Furthermore, it must be ensured that natural drainage will be unobstructed, not only under normal conditions, but also in years of abnormal rainfall and flooding.'

Correct placing of culverts and their design are of great importance. Clarke condemns the box culverts as a public menace on account of 'the unpardonable dereliction in the design of a bottom which, being an integral part of the structure, may not be tampered with.' He criticizes the 'equalizer culvert' as an admission of failure, having no outlet but simply permitting water to stand at the same level on both sides of the road. The anti-malarial choice of a culvert is, according to him, a bottomless culvert which will allow the deepening of the stream bed.

Embankments, burrowpits, excavations etc.—Road and rail embankments not only obstruct natural drainage but also raise the level of the subsoil water, producing numerous water collections for mosquitoes especially at points where road and railway embankments intersect *e.g.* Western Bengal area, near Nizamuddin (Delhi), Ambala.

'Burrowpits which follow the line of our roads and railways help to provide additional breeding grounds (Fig. IV). Bengal is

FIG. 4.

Row of enormous burrowpits along the Agra-Delhi Chord Railway embankmen t, New Delhi. These were filled in 1957. (Mulligan-Afridi).

generally cited as an outstanding example of man's thoughtless interference with natural drainage resulting in the steady rise in the incidence of malaria over the greater part of that province.'–(Health Survey and Development Committee).

According to the Engineer Mr. Cochrane, the earth required for embankments is obtained from :—

(*a*) By transfer from adjacent 'cuttings' along the road.

(*b*) By the excavation of drains at the roadland boundaries.

(*c*) From burrowpits dug outside roadland boundaries.

It is the third category which is dangerous because :—

(*a*) They increase malarial incidence, especially because of their location near towns and cities.

(*b*) Reduce the fertility of the land.

(*c*) Produce unsightly appearance.

Against all the initial creation of burrowpits and their devastating effects, there is a continuous drainage on the health of the country in having to combat malaria produced from mosquitoes of burrowpits continuously being dug by road maintenance parties, who produce thousands of new undrained pits each year and spoil gradation of roadside drains (through which water had found its own course and thus graded it) by removing earth from here and there and thus creating pits inside drains.

The practice of rice cultivation or leasing them out for fishing add to their being the most dangerous man-made malarious problem.

Quarrypits and cuttings are likely to expose seepages and these produce ideal breeding places for malaria carrying mosquitoes. Initial provision of drainage is a very easy control measure, but is still mostly neglected.

Yet another engineering fault for a malariologist is lack of proper care in avoiding leaks, seepages or overflows from the main body of water in dams and barrages. The results in high incidence of malaria and sometimes introduces malaria in otherwise dry areas *e.g.* Sind Barrage.

Cleaning of jungles :—'It is frequently necessary for the conduct of certain engineering projects to clear jungle and remove undergrowth. The effect of such operations on the incidence of malaria may be beneficial or disastrous for the clearance of jungle may transform comparatively safe waters into extremely dangerous breeding places or *vice versa*' (Mulligan and Afridi). As wholesale jungle clearance in connection with large construction works is liable to produce such highly malarious conditions that a project may have to be abandoned owing to sickness among workers, why not avoid it from the very beginning by requisitioning the services of a malariologist on the board.

Tropical aggregation of labour :—For canal, railway, irrigation and road projects, employment of enormous labour force is necessary, which, if it remains uncared for, not only itself suffers from malaria but spreads the infection in all nearby villages. The construction of the Panama Canal is a well known fact. 'In 1883 France had undertaken to build a Canal connecting the Atlantic and Pacific Oceans, but after 20,000 deaths and thousands of desertions among the French workmen the job was given up as too difficult. In 1904 when the United States assumed responsibility for completing the Canal, General William Crawford Gorgas, a native of Alabama, was sent to Panama to take charge of the health and sanitation work. General Gorgas and his corps of sanitary inspectors, knowing that Anopheles mosquitoes were the cause for the spread of malaria, took steps to destroy the mosquitoes and the places in which they were breeding,'

(Alabama State Board of Health) and then only the Panama Canal could be completed.

So it is very necessary in the interest of work to be undertaken that malaria amongst the labour force should be reduced to a minimum and adequate steps taken regarding camp site selection, spraying of quarters and tents, antilarval measures, personal protection and suppressive treatment. Details of these measures will be furnished in subsequent issues of the journal.

Contracts and leases :—Having at length discussed the various causes of our suffering due to malaria, it is realised that many of the conditions which favour the increased incidence of malaria in connection with construction works are the direct responsibility of the contractors and not of the engineers concerned. The engineers and administrative officers will do a nation wide service only if they are careful about malarial conditions at the time of giving contracts and include such clauses in contracts and leases that will not give rise to malarial conditions.

Conclusion.—We realise therefore—

1. 'That there are a countless man-made breeding places unintentionally created every day and overlooked except by a mother mosquito with an urge to lay eggs' (Virginia State Board of Health).

2. 'That there is a natural tendency to curtail expenditure on preventive measures in the very beginning and especially as the incidence of malaria begins to fall, and that the engineer while caring for his own department's budget, creates directly or indirectly greatest malarial conditions in the country, most of which is avoidable.

3. 'That ruinous economy which, by sparing a little renders all, that is spent, useless, infected the British Council (Southey, 1813).

W.H.O. Expert Committee on Malaria recommends therefore 'that even more important than educating the general public is the vital need to acquaint administrative officers and engineers of all branches with the basic principles of malariology.'

Malaria suffering is every man's cause, administrators', Governments', doctors', engineers', philanthropists', educationists', agriculturists' and all have a national duty towards its control, as Thiruvalluvar's Kural says :

'Man is born a social being, he alone lives who works for the world's welfare. All others may be counted as dead, though they may consider themselves to be alive.'

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THE SIGNIFICANCE OF THE BILATERAL TENDERNESS OF THE MEDIAN NERVES *

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THE *median nerves*, and not infrequently the *radial nerves*, have been found to be bilaterally tender in some diseases; the former at a point medial to the medial wall of the cubital fossa and the latter lateral to the lateral wall of the same fossa; the former just before it begins to branch and the latter just before it finally bifurcates. At the point of tenderness the median nerve lies between the two heads of the Pronator Teres and on the medial aspect of the brachialis, while the radial nerve lies between the brachialis and the brachioradialis and in front of the lateral epicondyle of the ulnar bone.

Course of the median and radial nerves

The median nerve arising from the lateral and the medial cords of the brachial plexus descends at first through the arm lateral to the brachial artery and then crosses behind it and lies to its medial side at the bend of the elbow. No branch is given off in the arm.

The radial nerve is the continuation of the posterior cord of the brachial plexus. It winds round from the medial to the lateral side at first between the medial and long heads of the triceps; it then lies in the spiral groove between the bone and the lateral head of the triceps; then on the lateral side of the limb it pierces the lateral intermuscular septum, passes between the brachialis on the medial side and the extensor carpi radialis and the brachioradialis on the lateral side, to the front of the lateral epicondyle where it finally bifurcates into the deep and superficial radials. Before it reaches the elbow, it gives off branches to the three heads of the triceps. to the anconeaus, the brachioradialis and the brachialis, and the posterior brachial and antibrachial cutaneous branches.

The bilateral tenderness of the median and radial nerves

This was at first frequently detected in the active progressive types of leprosy such as those with multiple hypopigmented lesions, other active neuro-macular lesions and early lepromatous macules. In the more established lepromatous cases and neuro-anæsthetic cases, the sign was usually found to be absent. In the types of leprosy where the median nerves were bilaterally tender, the ulnar nerves were not usually tender or thickened. In most cases there were no lesions over the areas of distribution of the nerves.

Presuming that this was a form of neuritis, I examined patients suffering from diseases simulating leprosy sent to me for opinion from the Stanley Hospital wards and other departments. In a few of these cases also this sign was elicited :—

(1) An advanced case of peripheral neuritis.

* Specially contributed to THE ANTISEPTIC.

(2) Three cases of secondary syphilis, and one case of congenital syphilis with leucomelanodermia.

(3) A case of radial paralysis of one hand only–cause unknown.

(4) Three cases of dermal leishmaniasis.

In the General and Royapettah Government Hospitals, I examined some cases of fever, and found this tenderness in the following :—

(1) Fifty one cases of typhoid mostly in the end of the second week of the disease. The ulnar nerves were not found to be tender. This tenderness disappeared when the temperature was normal.

(2) A few cases of lobar pneumonia in the later stages of the disease. One had tenderness the day after the crisis.

(3) Six cases of Kala-azar.

Over 100 Corporation school children with lesions of early leprosy were examined; a few of them had bilateral tender nerves. In a Montessori school with 80 children between ages 5 and 8, not one had bilateral tender nerves which proves that this sign cannot be elicited in normal persons. It was also observed that in a few active neuro-macular cases with lesions all over the body and with bilateral tenderness of the median nerves, this tenderness disappeared when the cases were rendered symptom-free. The peculiarity is, as has been mentioned before, that when the median nerves are tender in the active early types of leprosy, the ulnar nerve is generally neither thickened nor tender. But when the ulnar nerve becomes thickened, this bilateral tenderness is not usually elicited, unless the ulnar nerves are also tender.

It is therefore evident that this sign is not pathognomonic of leprosy, nor can it be considered to be due to traumatic pressure as the median nerve does not lie directly over the bone and as physicians have tested patients for this tenderness and have elicited it. Moreover, however hard the ulnar is pressed against the bone as it lies in the olecranon groove, tenderness cannot ordinarily be elicited. Therefore, this tenderness has some significance.

This sign can be elicited by extending the forearm and exerting slight pressure at first which is gradually increased but not to the extent of traumatic or deep pressure. The pressure has to be made an inch lateral to the medial epicondyle to test the median nerve and an inch medial to the lateral epicondyle to test the radial nerve. Occasionally the radial nerve will be found to be more tender than the median, but generally the median nerve is more tender.

Nerve affections in leprosy

The following nerve affections are commonly met with in leprosy :—

1. *Thickened but not tender* cutaneous nerves with lesions over their areas of distribution, especially when the lesions are of the

tuberculoid types:—supra-orbital, great auricular and its branches, cervical cutaneous, medial antibrachial and its branches, middle supra-clavicular, superficial radial, dorsal branch of ulnar, superficial peroneal, sural, etc. The leprosy workers in Calcutta are of opinion that these nerves are usually tender, but in my experience I have not found these nerves usually tender when thickened, especially when they are thickened in relation to tuberculoid lesions. There may be complete or partial anæsthesia over their areas of distribution, usually the latter.

2. *Thickened and tender* nerves, generally not the cutaneous ones, with lesions over their areas of distribution, with symptoms such as anæsthesia, neuritis, neuralgia, etc.:—the ulnar in the olecranon groove and the common peroneal behind the head of the fibula. Generally there is complete anæsthesia over the areas of these thickened nerves.

3. *Tender but not thickened* nerves, generally the cutaneous, with neuromacular, especially simple macular, lesions over their areas of distribution, such as the infratrochlear near the inner canthus of the eye, the supratrochlear at the junction of the inner one-third and outer two-thirds of the eyebrow, the infra-orbital at its exit from the infra-orbital foramen.

4. *Tender but not thickened* nerves with no lesions over their areas of distribution, but with lesions on any part of the body, such as the median and the radial—the subject under discussion. Sometimes the tibial nerve has been found to be tender at a point where it bifurcates into the plantars.

Thickening of nerves without tenderness does not seem to be of much significance in leprosy. Tenderness with or without thickening is suggestive of activity of the disease. The subject under discussion is tenderness without thickening of nerves and without lesions over the areas of distribution of the nerves concerned. The bilateral tenderness of the median nerves which are not thickened and with no lesions over their areas of distribution, points to some systemic factor. As this tenderness is present not only in leprosy but also in certain other diseases, this factor is evidently not related to any particular disease and may possibly be due to some cause which activates the disease.

Discussion.—This tenderness is a sign which is elicited and is not associated with neuritic symptoms; it is a sign and not a symptom; it is not pain ordinarily felt by the patient but pain elicited by the doctor; it is localised and not referred; there is no lesion over it or in its vicinity or over the area of distribution of the affected nerves.

This tenderness is bilateral:—In the case of the median nerve it selects a point where it begins to branch and in the case of the radial a point where it finally bifurcates. Naturally the questions one would ask are: Why is this tenderness bilateral? Why are

only these two nerves tender? Why are the points near the elbow selected? Has this tenderness any significance?

1. *Is this tenderness due to traumatic pressure*?—A few doctors have told me that in any individual this tenderness can be elicited. It is only by constant examination, particularly of typhoid patients, that one can differentiate between this tenderness and traumatic pain. The median nerve rests on the brachialis and the radial nerve lies in front of the lateral epicondyle. In the case of the former normally great pressure has to be applied to press it against the bone, but such pressure need not be exerted to elicit this tenderness. Even when much pressure is used to press the ulnar nerve against the bone as it lies in the olecranon groove, this tenderness cannot be elicited except when there is an active lesion over its area of distribution or when the disease is in the metastatic stage. Moreover, the examination of several healthy persons will reveal that this tenderness is absent in them.

2. *Is it due to lymphatic spread of toxins from a lesion?*:—I have already stated that there is no lesion over the point of tenderness or in its vicinity or over the area of distribution of the nerves. The lesions must be symmetrical for this tenderness to be bilateral, but such lesions are seen only in the more advanced neural and lepromatous types where this tenderness is not usually elicited. The same is the case with typhoid where the lesions are far from the point of bilateral tenderness of these nerves. Therefore this tenderness is not due to lymphatic spread of toxins from a lesion.

3. *Is it related to tissue immunity*?:—Several tests with Lepromin on cases of leprosy with and without bilateral tenderness of nerves, were performed in the Stanley and General Hospitals. The Lepromin for this purpose was kindly supplied to me by Drs. Muir and Dharmendra. Tests were made with a view to establish a relationship between Lepromin reaction and bilateral tenderness of nerves. As Lepromin reaction is generally negative in lepromatous cases, these cases were not selected for the test. Among the neuromacular cases, at least 40% are negative to this test and so neuromacular cases with and without bilateral tenderness were tested. Among those with bilateral tenderness, there were positive and negative reactions; so also among the cases without bilateral tenderness. So a relationship between Lepromin reaction and bilateral tenderness was not established. In other words, this bilateral tenderness is not related to tissue immunity.

4. *Is this tenderness due to toxicity*?:—I have already stated that in the more advanced lepromatous cases with innumerable bacilli, with tendency to leprous reaction and with lesions even over the distribution of the median nerves, this bilateral tenderness is usually absent, and that in many neuromacular cases where the smears are negative for M. lepræ by the recognised present-day standard methods, this sign is present. So in leprosy this tenderness

is not related to toxicity. In febrile conditions like typhoid and pneumonia, there may be a relationship between this bilateral tenderness and toxicity as this sign is elicited when the patient is in a toxic condition, whereas in diseases not accompanied by fever, such as pellagra and dermal leishmaniasis, such a relationship cannot be established. It is not unlikely that in leprosy, a chronic disease, this bilateral tenderness was present in the earlier stages before the case became lepromatous, and that the response to a factor which caused this tenderness, has now become weakened, just as the response to stimulus weakens in a fatigued horse; whereas in the febrile acute diseases, the period of activation of that factor is not long enough to cause 'exhaustion' of it to cause it to fail to respond. We have therefore now to search for that factor.

It therefore seems that this tenderness which is bilateral shows activity of the disease rather than toxicity, like the filling of a tank and not of a tank which is full, and that the cause of this activity is an activating factor, probably a systemic one, failing to act when it has reached its maximum capacity of action or when its action is arrested. What is that factor ? Where is it likely to be found ? How does it act ?

6. *Is this tenderness due to intestinal sepsis of toxaemia*?:—There is no doubt that in certain septic conditions, such as septic teeth, septic tonsils, etc., there is bilateral neuritis, and even bilateral tenderness of nerves. Whether such septic conditions cause bilateral tenderness of the median nerves only, one cannot say. Tenderness of the muscles and neuritic pains, not infrequently shooting down the ulnar side of the arm, are not uncommon manifestations of septic conditions. But here we are concerned with a localised tenderness and not with neuritic pains, a tenderness elicited over a particular point in the course of particular nerves.

That gastro-intestinal infection or irritation or any interference with the absorption of food or with the intestinal secretions, reacts on the human system, is admitted by all. In typhoid, though the lesions are concentrated in the lymphoid tissue of the gut, the toxins will affect the rest of the intestinal tract. I may go so far as to state that in all active diseases the normal functions of the intestinal tract suffer. Even in leprosy in the metastatic stage, with or without febrile symptoms, there is a certain amount of intestinal sepsis, for, in dealing with reactions, both leprous and tuberculoid, I have obtained good results by the administration of intestinal antiseptics in addition to diaphoretics and diuretics. So it is not unlikely that any interference with the normal functions of the intestinal tract will interfere with the production or synthesis of those substances necessary for the various tissues in the body. Probably an inhibition of the substances required for nerve tissue and for the maintenance of the reticulo-endothelial system at the level of efficiency, is found in the intestines.

7. *Is this bilateral tenderness due to deficiency of vitamins* ? :— This bilateral tenderness is not a neuritis in the strictest sense as it is not accompanied by symptoms of nerve irritation, or of pressure by inflammatory products. It is a localised pain over a nerve which is not thickened. Other nerves are unaffected and so this shows that there is a systemic factor which has a predilection for these median nerves only, just as in metallic poisoning certain metals have a greater affinity towards certain nerves than towards others. So this tenderness has some relation to some substance connected with the nerve tissues.

In the intestines two important vitamins are synthetised—Aneurine Hydrochloride and Nicotinic Acid; the former is concerned with the nutrition of nerve tissue as well as tissue oxygenation, while the latter is concerned with protein and carbohydrate metabolism, and oxidation and reduction processes in the tissues. If it is conceded that the hyperæmic effect of Nicotinic Acid will result in increased phagocytosis, this drug can be said to raise the efficiency level of the reticulo-endothelial system. The synthesis of these two vitamins can be inhibited in the gut by:

(1) Interference with the absorption of food (diarrhœa and dysentery), or increase of basal metabolism due to pyrexia or by the foods being absorbed by the parasites in the gut.

(2) Lesions of the intestinal tract—by absorption of the intrinsic factor or by destruction of that part of the bowel producing the intrinsic factor.

(3) By restricted food intake or unbalanced diet.

(4) By the bacteriostatic action of the Sulpha and Sulphone drugs.

The inhibition and consequent deficiency in these vitamins probably results in the bilateral tenderness of the median nerves which seem to be particularly selected to denote this deficiency. The response of the median nerves to the deficient vitamins will pass off when the deficiency is made up, or when the disease ceases to be inactive as in the case of typhoid, or when the intestinal tract is restored to its normal condition to carry on its normal functions, or when the power of responding to the stimulus weakens.

Summing up, it would seem:

(1) That the bilateral tenderness of the median nerves is due to a disturbance of a systemic factor which has some relationship to the functions of nerve tisue.

(2) That this disturbance is caused by Vitamin B_1 and Nicotinic Acid deficiency; the former because it is concerned with the nutrition of nerve tissue and the latter because it is concerned with the reduction and oxidation processes in the tissue and probably with the resistance of the body to bacterial invasion.

(3) That this vitamin deficiency is caused by the inhibition of the synthesis of Aneurine Hydrochloride and Nicotinic Acid in the gut for various reasons, such as gastro-intestinal irritation, intestinal sepsis.

(4) That this disturbance in the synthesis of these vitamins serves as an activating agent deciding the course of the diseases giving it as it were a 'momentum.'

If the theory advanced for the bilateral tenderness of the median nerves is rational, the administration of intestinal antiseptics and Vitamin B_1 and Nicotinic Acid in diseases where this bilateral tenderness is present, may help in controlling the activity of these diseases.

Sensitization Caused by Streptomycin in Nurses

Dr. Justin-Besancon and his colleagues report 40 cases of sensitization caused by streptomycin in nurses employed in various hospitals and sanatoria. Neither age nor sex seemed to act as predisposing factors. No history of previous allergy could be traced in 36 nurses. 5 per cent eosinophilia on an average, was noticed in the 40 nurses. In 24 of these, sensitization disorders occurred one to six months after they had first come in contact with streptomycin. This interval did not exceed 10 months in any case.

Handling the laundry of patients treated with streptomycin or presence in a ward where streptomycin was regularly handled sufficed to produce or re-produce the sensitization disorders in some nurses. More than 20 of them had headaches and 12 complained of vertigo. Pruritus was often limited to the hands and eyelids but was generalized in 8 nurses. 28 nurses had blepharoconjunctivitis and more than half of them had eczematoid dermatitis particularly in the peripalpebral region and 8 had it on the hands and arms. Urticaria or icterus was *not* observed.

Treatment consists exclusively in the cessation of the handling of the product or in a change in service. From the legal point of view the cutaneous manifestations caused by handling streptomycin should be classified as 'occupational disease'.—*Sem. Des. Hopit.*, Paris., 25, 2389-2391, 1949 : *Eng. Abst.*)

Unrecognized Pernicious Anæmia Mistaken for Arthritis

Dr. W. J. Ford reports the cases of 2 female patients aged 63 and 74 in whom subacute combined degeneration of the spinal cord progressed because they were erroneously treated for chronic arthritis, with deleterious results. Intensive liver therapy, though instituted late led to partial recovery. Ford is inclined to the view that the gravity of the neurological lesions in pernicious anæmia and the partial recovery on liver therapy make early diagnosis very important. In the absence of a really accurate clinical appraisal, subacute combined cord degeneration might be easily (and wrongly) diagnosed and treated as chronic arthritis to the detriment of the patient.—*Illinois Med. Jour.*, 96, 318-321, 1950.

SHORT WAVE THERAPY,
BASED UPON SOUND THEORETICAL FOUNDATIONS AND PRACTICAL EXPERIENCE*

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I. General remarks.—The development of high frequency therapy has been closely associated with that of high frequency and radio engineering technique, and advances in the latter have been followed almost immediately by progress in medical applications.

In diathermy the spark-gap invented by Max Wein for radio telegraphic technique was applied to the generation of high frequency currents.

The most important development has resulted from the application of Thermionic Valve to high frequency current generation, effecting a complete revolution in radio-communication technique, and eliminating the spark-gap previously employed. Modern radio telephony and broadcasting have, in fact, developed as the result of this invention.

The special physical effects of these large ultra-high frequency currents and the distant effects of the corresponding ultra-short waves produced by them suggested the advisability of investigating the possibility of their application in the field of therapy.

Schliephake made the first experiments on human bodies in the electric condenser field and so laid the foundation of short wave therapy. Previous experiments with animals had shown the possibility of biological reactions.

It is not correct to consider short wave therapy to be an improved form of diathermy. The biological and therapeutic effects of short wave therapy are of a completely different character and hence it must be inferred that a second characteristic specific action must be occurring in addition to the thermal action.

It embraces in particular diseases which are contra-indicated in the case of diathermy treatment proper especially in ailments of this kind (acute inflammatory, purulent or septic processes) and the most favourable results have been obtained with short wave therapy. As a consequence, short wave therapy, today, ranks first among electro-physical healing methods, a fact confirmed by the daily increase in the short wave apparatus put into use, and the large out-put of detailed literature concerned with this field of science.

II. Physical principles.—The therapeutic properties of electricity are due to its power to bring about certain chemical and physical changes in the tissues so as to modify the action of the cells that the defensive forces may be strengthened against the carriers of disease which assail them.

* Specially contributed to THE ANTISEPTIC.

The currents used in medicine are :—

(1) Direct currents.
(2) Unidirectional interrupted currents.
(3) Alternating currents.
(4) Unidirectional remittent currents.

High frequency current used in short wave therapy come under alternating currents.

A high frequency current is one that periodically reverses the direction of its flow at an exceedingly high rate. A current may be made to reverse its direction any number of times per second, but when the frequency of reversal is sufficiently high the physical properties of the current and its action on living tissues are profoundly altered. The current is no longer able to produce chemical changes in solution of salts, nor is it able to evoke a response from excitable tissues. The frequency of reversal may be called high when the current is unable to produce these chemical changes or to stimulate muscle and nerve to give their customary responses. Consequently its strength and density can be increased to a value high enough to generate heat that can be perceived by the subject and measured by a thermometer. Therefore a high frequency current may be defined as one which alternates at a rate which is high enough to deprive it of its power to stimulate nerve and cause contraction of muscle. It is frequently called an oscillatory current.

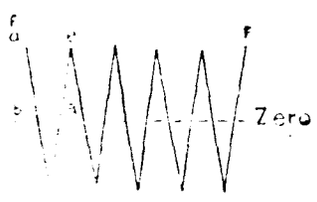


FIG. 1.

One complete period (complete oscillation) is indicated by a, b, c, d, e. Five complete oscillations are indicated.

Suppose a straight line from t' to t' represents 1/100,000th of a second. The duration of each period, therefore, is 1/500,000th of a second and the current is one of a frequency or periodicity of 500,000 per second.

At A and B the oscillation is undamped, whereas at A it is sustained, at B it is unsustained.

Three groups of damped oscillations are represented at C. There is no interval between the end of one group and the beginning of the next. The oscillation, therefore, is sustained although it is damped.

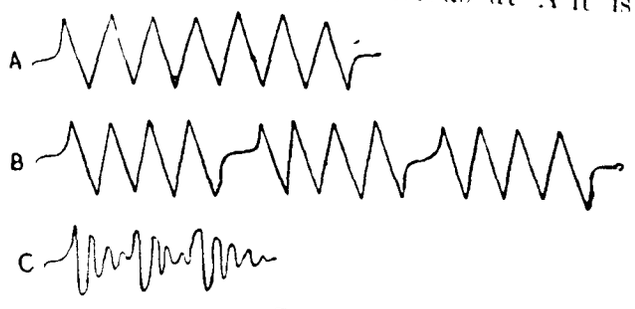


FIG. 2.

The thermionic valve generates undamped oscillations of a strictly determined wave length. As opposed to the thermionic valve the spark-gap supplies damped oscillations on non-hemogeneous (heterogeneous) wave length.

For ages, heat has been one of the most important medical healing factors. Heating of the sick body is the aim and purpose of many methods which are all based on the fact that heat is produced outside the body and introduced into it, in the wellknown way, by hot water, hot air and steam baths, hot compresses, hot air douches etc.

All these applications—considered purely physically—only produce a superficial heating. An appreciable introduction of heat into the inside of the body does not occur.

The heating of the deeply situated organs can only be made with the assistance of diathermy or short wave therapy by means of which heat, as opposed to old processes, is produced inside the body and in the desired depth on the place to be treated. The necessary energy for this is introduced into the body, in the form of electric current.

The high frequency currents used in short wave therapy are applied to the body, not by means of bare contact electrodes as in the case of long wave diathermy, but with the aid of short wave condenser field. The rigid or pliable condenser plates forming the electrodes are insulated and arranged far from the patient's body, so that there is a certain distance between them. The insulating layers and these distances prevent the direct passage of current between the plates, but permit the 'field' to pass, producing a remote action between the two plates. In this way the electric field penetrates the body of the patient, acting on the ions and electrons in the body materials, bringing them into synchronous oscillation, that is to say, producing currents of the same frequency within the body.

Owing to the high frequency of these oscillations the currents produced give rise to no electrolytic nor Faradic effects, but merely produce Joulean heat. The heat generated in the skin is decreased while on the other hand, the depth effect increases.

The specific biological effects produced by short waves in addition to the purely thermal effects are probably due partly to temperature differences arising between certain very small particles of tissue (hence also a secondary thermal effect) and partly to action of a purely electric character. Generally speaking these thermal and specific effects increase both in their intensity and heating effects, in proportion to a reduction in the wave length.

1. *The condenser field* : —The total effect of the electric forces existing between the plates or "the space they pass through is termed "the electric field" or "the condenser field".

Provided the electric energy between the plates or within the patient be not transferred to heat, this condenser field becomes the

starting point (wave centre) of a Hertzian wave radiation, penetrating into space in which it is spread in all directions like water and acoustical waves.

The more short waved the field, the greater is the number of current impulses flowing through the condenser per second, and the greater is the intensity of the current; therefore, the production of powerful physical or biological reactions, is highly facilitated by the generation of the short wave condenser field.

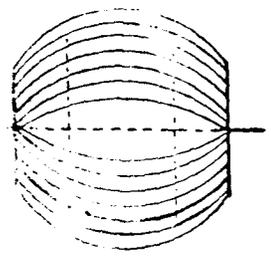


FIG. 3.

The field lines shown in the Fig. 3 are projected in an approximately rectilinear direction only within the axial midpart of the picture.

Further a divergence of the energy lines, a so-called 'energy spreading' is observed, which is particularly exaggerated on the limiting zones of the figure. The amount of spreading depends upon the relation the plate distance bears to the plate surface or diameter respectively.

The depth effect in the condenser field :—Two important practical consequences should be borne in mind for obtaining good depth results.

(*a*) The dimensions of the electrodes must always be as large as possible under the conditions prevailing.

(*b*) The electrodes should not be placed on the body to be treated but arranged far from it at distances of such an extent that only the central homogeneous field zone, as it is limited in Fig. 3 by the dotted lines, can pass through the body. In other words, the field zones near the electrodes, which are characterised by their increased field density, must be outside the body to be treated in order to avoid inadmissible surface heating.

2. *The dielectric* :—In general, layers of insulating material placed between the condenser plates are qualified as "dielectric". Vacuum and glass of a certain quality are loss free dielectrics. All solid and liquid substances of the human body are loss producing dielectrics. Clothes have very differentiated dielectric reaction. Moist stuffs (perspiration) produce great losses and are heated up to a high degree. Therefore it is indicated always to unclothe the body parts to be treated when specially strong depth effects are aimed at.

Schliephake has proved by experiments that selective heating also occurs in very small particles of the human body. The red blood corpuscles are warmed up to a higher degree than the blood serum and certain kinds of cellules are able to reach a higher temperature than others. Certain specific short wave reactions as, for instance, the influence these waves have upon bacteria, at least when *in vitro* are probably due to this selective heating effect or point heating.

This is shown by an experiment in a water receptacle containing living fishes in the short wave field. The fishes, owing to overheating, died a few minutes after having been exposed to the field, whereas the water did not indicate a remarkable rise of temperature. Although we cannot expect in every case an immediate lethal effect on the micro-organisms, their vitality is greatly attenuated. Thus the defence forces of the body become more active.

5. *Wave length and depth effect* :—When a glass trough filled with minced meat is penetrated in the condenser field, thermometers being immersed at both ends and in the centre, so that it is possible to ascertain the temperature rises which take place in the interior and on the surface of the field, determining in such a manner the relation of the temperatures or the relative depth effect, no remarkable differences are indicated when modifying the wave length. But this proportion is fundamentally changed when the thermometer in the midst of the trough is arranged in a glass bottle which is likewise filled with minced meat. If long wave diathermy current is led to the minced meat by means of bare electrodes, no remarkable depth effect is obtained owing to the fact that the diathermy current cannot pass through the non-conductive glass of the bottle. It therefore only surrounds the bottle and no heating effect is exerted upon the minced meat enclosed in the bottle, neglecting the temperature rise originated by the heat conduction through the glass wall, which is of smaller importance. This temperature rise of the minced meat within the glass bottle will increase constantly when currents of continuously decreasing wave length are utilised and advance to the temperature rise obtained in the test carried out without the glass bottle when very short waves are used.

The trough and the bottle are filled with minced meat. The temperature rise of the thermometer placed in the bottle depends on the wave length. This experiment illustrates the observation that human organs surrounded by masses of bad electric conductivity (fat and bones) can be penetrated the more intensively the more the wave length applied is shortened. Hence, in therapeutical practice, all human organs surrounded by masses of bad ohmic conductivity *i.e.*, fat, bones, fascia etc. can be penetrated the more intensively the shorter the

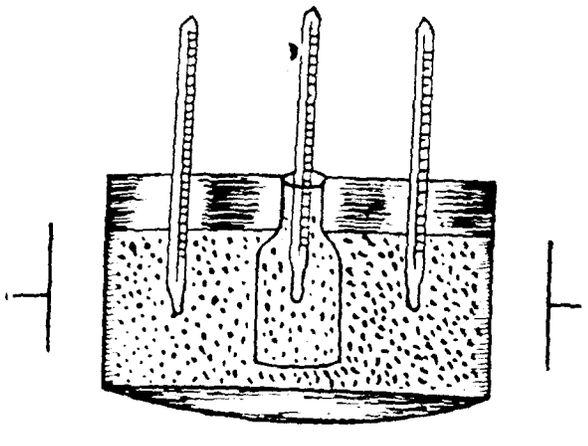


FIG. 4.

wave length employed, and, generally speaking, owing to the special composition of the human body, which consists of several layers of well and poorly conducting substances, the strongest depth effects will be obtained with the shortest waves. The depth effect, therefore, depends on two factors *i.e.*, the electrode distance and the wave length (frequency).

The ordinary diathermy is a current of about 500 to 300 metres and a frequency of oscillation of 1 to 2 million cycles per second.

In short wave therapy wave lengths of 30 to 3 metres and a frequency of 10 to 100 million cycles per second are used.

The effects produced in the body by short wave therapy differ fundamentally from those produced by a diathermy current since the latter follows the lines of least resistance, heating superficial structures such as skin and subcutaneous fat, which offer considerable resistance, while in short wave therapy, on the other hand, skin and fat offer little resistance, and the influence of the field, in the production of heat and other effects, is exercised on deeper structures.

At first it was thought that all the internal effects of short wave therapy were due to heat alone, but Schliephake and other workers have proved conclusively that heat is not the only factor, and heat explains by no means all the consequential benefits.

An experiment conducted by Schliephake upon himself in 1929 marks the moment when short wave therapy entered for the first time into real medical practice. Having tested out his theories by innumerable experiments on animals, in this year Schliephake found himself suffering from a painful nasal furuncle and tried short wave therapy upon his own body. The pain and tension disappeared almost immediately and the furuncle vanished in two days. This was not only a remarkable result in itself, as those who have experience of this painful and intractable complaint well know, but memorable for the fact that it put the coping stone on Schliephake's great work and opened the door to the treatment of human beings by this new therapy.

Liebesny, himself a great worker in this field, says: "In the treatment of acute dangerous bacterial diseases lies the greatest importance of short waves, and Schliephake must be looked on unquestionably as the founder of this therapy".

4. *Biological and therapeutic effects of short waves*: The hyperæmia produced by the short wave is of a really longer duration than the corresponding effect in the long wave diathermy and other treatment methods. Another distinct effect of short wave therapy, usually found in the first treatment, is the alleviation of pain, far more effective than in long wave diathermy or in any other method of physical therapy. A fundamental difference between short wave therapy and long wave diathermy is the favourable influence the former has upon acute inflammatory and septic processes in which

long wave diathermy is strictly contra-indicated, because it is apt to activate and spread the inflammatory process.

Schliephake also suggests that there is a certain auto-vaccination due to the dead bacteria, while curing furuncles he found that several untreated ones healed simultaneously. Furthermore, there is also probably a direct influence on pyogenic bacteria (staphylococci and streptococci) due to heat effect of more or less subjective character (point heating).

Schliephake has proved that in the short wave field, pus and inflamed tissues are heated up to a higher degree than healing tissues.

He and his co-workers have proved the possibility of killing bacteria in the short wave field by relatively low dosage. This is proved by heating to the same temperature bacteria of the same culture partly in the short wave field and partly in a water bath. The period necessary for the lethal effect on the bacteria in the short wave field only amounted to a fraction of that applied to the water bath. Generally thermal effect predominates with longer waves, while with shorter wave lengths, the so called specific component is largely shown when depth and localising effects have increased simultaneously.

III. Experiences gained in short wave therapy in various diseases.—*Ultra short wave therapy* is based on the fact that electrical waves of under 20 metres length have a fundamentally different action on the tissues of the body from any other kind of oscillations of the electro-magnetic spectrum.

The considerable shortening in the time required to heal many diseases and the numerous cures of many stubborn ailments of long standing show beyond any doubt that we possess in short wave therapy a very valuable addition to our therapeutic armamentarium.

As previously stated, in many conditions ordinary diathermy is definitely contra-indicated because of the presence of infection and pus.

In about 300 cases of furunculosis the average treatment period was 4 to 5 days. Large carbuncles healed in 10 to 20 days after 8 to 15 treatments. In every case a surgical operation was avoided. In most cases pain and tension were relieved after the first treatment.

Extensive internal suppurations can be cured with operation.

Dental conditions treated by short waves:—Gum boils and other purulent processes are very good indications for short waves, also lymphadenitis, lymphangitis and periodontitis. Pain ceases after the first treatment in many cases. Short wave therapy also prevents pain after extractions.

Purulent conditions of antra and sinuses:—These conditions are very well suited for short wave treatment and it often does away with the necessity for operation. Acute and septic cases react

almost immediately, but chronic cases require more treatment. 10 to 20 sessions.

In this connection the experience of Schliephake is quoted:

"In antral empyema of more than 20 years' duration I succeeded in rendering the patient completely comfortable. The disagreeable odour disappeared generally in from 6 to 10 days, and the incessant use of a handkerchief ceased almost altogether because the secretion of pus was abated. In from 4 to 6 weeks these patients were nearly symptom free. At any rate, the patient can be saved an operation, but it cannot be expected that mucous membrane which has undergone such severe pathological changes as are entailed by years of suppuration should be completely restored to its functional capacity."

In my clinic (St. Raphael's), I had treated few cases of sinusitis and empyema of antrum with success; one was that of a missionary lady who had empyema of antrum on both sides. An ear and throat specialist operated on one side and she was asked to go again after three months for another operation, but she suffered so much pain and discomfort during and after the operation that she decided not to go through another ordeal; she consulted me and I treated her with short wave with complete satisfaction.

Diseases of the upper air passages:—Acute colds can often be completely cured in a day. Symptoms seem to disappear after the first treatment. The same results are obtained in cases of acute laryngitis; septic and chronic laryngitis with chronic catarrh, where every kind of cure at Spas have been tried in vain, have been treated with very good results.

The ear:—Good results have been obtained in the treatment of otosclerosis, ear furuncles, catarrh of Eustachian tubes even in chronic cases of atresia.

Diseases of bones and joints:—Periostitis responds well to short waves. Effusions into the joint that have lasted for years are gradually absorbed. Septic and chronic arthritis is often alleviated very rapidly as regards function of the joint and the general improvement of the patient. Inflammation of the knee joint has often responded so well to one treatment, that actual recovery has taken place. Even in cases of chronic knee joint inflammation with deformity and bony outgrowth, pain can be alleviated and even stopped, and function can be restored. Very good results have been obtained in the treatment of gonococcal arthritis. In the treatment of traumatic joint diseases, due to injuries from sport etc., with bloody and serous effusion into the joint total resorption of effusion, retrogression of the inflammatory process and complete mobility of the joint have been obtained.

A case of chronic arthritis of both knees with great deal of thickening of the fibrous tissues was treated so satisfactorily that

the knees assumed their natural shapes and the measurement round the most prominent part of the knees was reduced by 2½ to 3 inches.

This patient was not able to walk a furlong without much discomfort, whereas after treatment she walked about 12 miles cross country on the hills.

Rheumatic condition:—Treatment of rheumatism shows favourable results, even refractory cases treated sometime for years by other thermal methods with little or no success have been cured by short wave therapy after comparatively few treatments.

Lumbago:—One treatment of 10 to 20 minutes will certainly relieve and in some cases remove all pain and even in severe cases a complete cure can usually be effected.

Sub-acute muscular rheumatism:—Pain and disability very soon disappear. This shows the superiority of short wave treatment to diathermy in the treatment of these tedious rheumatic affections. For a complete cure, however, it is absolutely necessary to consider and remove all sources of focal infection.

Inflammatory conditions of the peripheral nerves:—As a rule acute sciatica reacts best. In chronic cases good results are often achieved by a combination of short wave therapy with medical or possibly other electrical treatment or with ultra-violet radiation. Short wave therapy is, however, much more effectual than diathermy as many cases, that have failed to react to the latter, have cleared up on short wave treatment.

Treatment of neuritis and neuralgia:—This again is more successful if given in the acute stage. Complete relief has been given in the case of neuritis in the arm and leg after about 8 treatments. The same result has been obtained in intercostal pain with involvement of nerve roots.

Diseases of the central nervous system:—General paralysis of the insane: Good results have been obtained by general treatment of the whole body (electro-pyrexia), also by treatment of the skull. This same treatment has succeeded in banishing the lancinating pains of Tabes dorsalis. Schliephake has had success in the treatment of abscesses of the brain and has cured several. One woman was cured of daily epileptic fits from compression of the left ventricle from inflammatory change. The fits completely ceased after 4 weeks' treatment.

Genital organs in the male:—Acute epididymitis is generally curable after a few treatments, alleviation and even complete freedom from pain being rapidly achieved. Acute prostatitis reacts well to short wave therapy.

Abdominal conditions:—According to Schliephake, gastric diseases react well and good results are obtained by the treatment of chronic catarrh of stomach and the colon. Pain of many years'

duration from chronic peritonitis is alleviated and several varieties of liver trouble uninfluenced by any other method of treatment, respond well to treatment in the short wave field. Rapid improvement and recovery may be obtained in cholecystitis.

Chronic dyspepsia of long standing had been treated very successfully with short wave.

On the assumption that most cases of dyspepsia are of the acid type which cause certain amount of erosion of the lining membrane of the stomach, even tiny ulcers, and which maintains its chronic condition, I decided to try short wave. This again led me to the treatment of a case of duodenal ulcer.

In both cases, as a preliminary, counter irritation was applied by ultra-violet radiation on the epigastric region. At times counter irritation to an area of skin clears up mysteries of what lies in the remote depths of the body. This has been constantly observed, but the therapeutic action is still unexplained.

Skin erythema appears about four hours after U. V. irradiation, a maximum reaction results about 48 hrs. later and this erythema may persist for three or even twelve days, with intensive dosage. With still intensity of radiation œdema and blistering are produced; usually from 6-10 skin erythema doses are applied for counter irritation therapy.

The erythema and blistering reaction of the irradiated skin is painful and unfortable, so that the patient has to go to bed. Directly after irradiation adhesive elasto-plast straping is applied to the irradiated skin and the surrounding area. The straping is kept on and left undisturbed for 14 days; it is removed and the irradiated skin is exposed, revealing a reddish brown moist area.

It is necessary to explain emphatically to the patient that the straping must not be disturbed for 14 days.

If this skin area is painful, infra red rays can be applied, two or three times a week to this region, the straping being left undisturbed.

Technique of counter-irritation by U.V.R.:—The area of skin for ultra-violet irradiation is mapped out carefully with a dermatograph pencil. The surrounding skin area is protected from the rays of the lamp by crepe paper or towels.

Usually a skin area measuring roughly 12x10 inches is exposed. At a distance of 12 inches between the quartz burner and the skin area, an exposure for 20 minutes equivalent to 10 normal erythema skin doses is applied. This irradiated skin area and the surrounding skin margin extending 1-2 inches is immediately covered by overlapping strips of elasto-plast 2–2½ inches in width.

One of my most spectacular cases was that of a patient with duodenal ulcer treated by counter irritation over the epigastric

region followed by short wave and two courses of general U.V. irradiation.

Rev. Fr. Veremundo, 6-9-'45.
2 hours after barium meal. Prone.

The first radiograph was taken by the radiologist attached to the Government Hospital, Ernakulam, and the second after treatment by the radiologist of the Government Hospital, Ootacamund. They show the change effected after treatment. (*vide X-ray pictures*).

After treatment and a test meal the patient was free from all symptoms and I was able to follow up the case for 3 years.

Diseases of the cardio-vascular system:—In many inflammatory and degenerative diseases of the myocardium there has been marked improvement or recovery as shown by electro-cardiograms. Schliephake reports alleviation in angina pectoris with much decreased frequency of attacks.

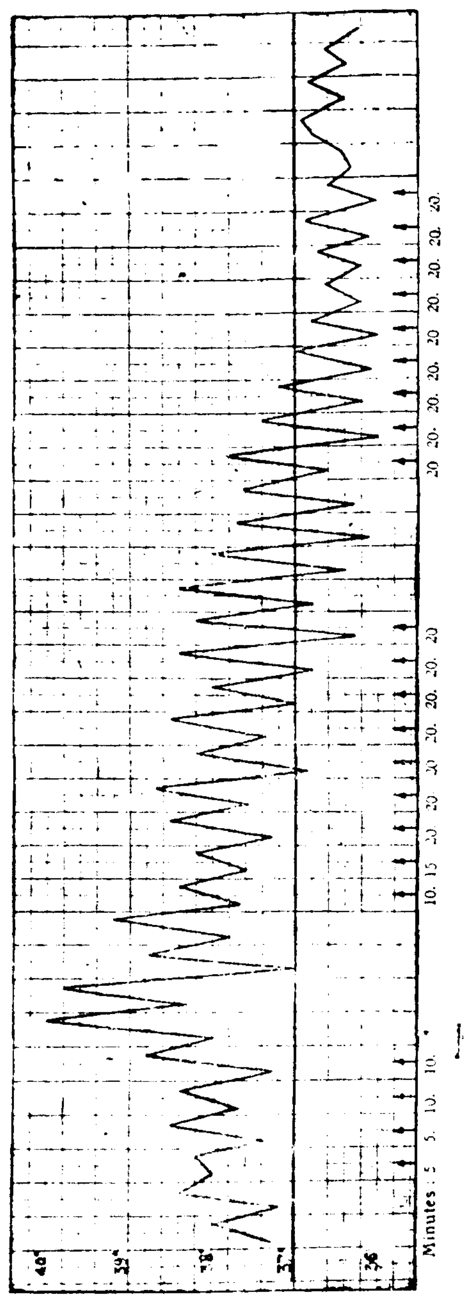
Diathermy is the quickest and most potent means of influencing the action of the heart, and, unlike drugs, the action is immediate, is entirely under control, and definitely local.

Nagleschmidt considers that every person over the age of 50 years should undergo two or three courses of diathermy to the heart each year as a means of keeping free from heart troubles associated with arterio-sclerotic changes.

Rev. Fr. Veremundo, 3-6-'46.
Immediately after barium meal. Erect.

A radiograph of my chest was taken at the Bernard Institute, Madras, in 1936 and enlargement of the left ventricle was seen. It was the opinion of the Superintendent of the Institute that the hills would kill me in a few years, but it was due to the occasional application of short waves that I was free from all pain and distressing symptoms.

CASE OF GANGRENOUS ABSCESS OF THE LUNG. NOV.-DEC., 1934



—Vide page 215.

Allergic and endocrine diseases:—Migraine can be treated successfully. Headaches due to angiospasm will disappear after one treatment of 10 minutes.

Some important cases of bronchial asthma are reported.

According to Dousey, diseases of the endocrine system can be cured by general treatment, applying low dosage.

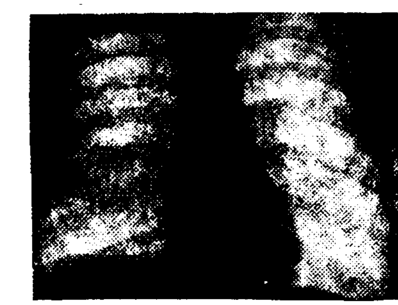
It has been my curious experience, being questioned by some of my patients while undergoing treatment by short wave, especially of rather long duration, whether I was giving them something as a general tonic as they experienced a sense of well-being not felt previously.

Lung diseases:—Schliephake has obtained excellent results in the treatment of purulent diseases of the thorax. He has completely cured a number of patients suffering from severe diseases of pleural empyema which were unaffected by any other form of treatment so that the cases were regarded as hopeless. All his patients suffering from severe empyema after pneumonia were

afebrile and free from symptoms in 3 to 5 days. Dullness cleared up after 2 to 3 weeks and complete cure resulted after an average

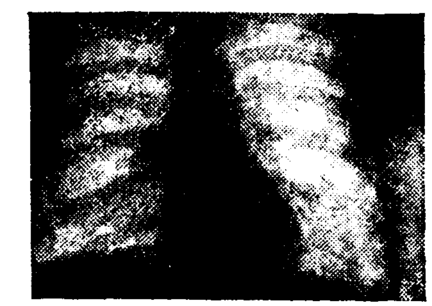
TYPICAL CASE OF GANGRENOUS PULMONARY ABSCESS

(1)



(2)

Radiographs taken before, during and after treatment with Short Waves.



(3)

of 3 to 6 weeks of treatment. Complete cures have also resulted in all the cases treated by him of acute and chronic abscesses of the lung of varied ætiology and various usual mixed infections, some complicated with gangrene. In most cases operative interferences can be avoided.

I have treated a few cases of pneumonia in conjunction with Sulfa drugs.

The first subjective and objective symptoms observed were relief of pain and distress and the dropping of temperature to normal in 2 to 3 days.

The above is a case report of pulmonary abscess that appeared in the *British Journal of Physical Medicine*, June 1937, treated in an hospital of the University of Turin, Italy. Radiographs taken before, during and after treatment (*vide X-ray pictures*) and Temperature Chart (*vide page 214*) are given.

"The initial applications (S.W.), were carried out for 5 minutes the succeeding sittings being prolonged to 10, 15 and finally for the rest of treatment, to 20–30 minutes. The period of treatment was divided in cycles of 6–9 days with a daily application; between the cycles there was a period of rest for some days."

The author had experience of many such cases:

The whole duration of treatment was very variable and depended directly on the condition of the patient and the nature of the lesion.

Among the patients I have treated, one was cured after seven applications, generally 30–50 sittings were necessary. After the first application there was almost constantly noticed an increase of objective and subjective symptoms, which frequently ended in severe vomiting. It is advisable to suspend the treatment temporarily for some days if such exacerbations are serious. Vomiting generally signified the commencement of improvement. The first symptom to disappear was pain; continuous fever remained for some time, then remitted slightly and then markedly so, later became intermittent and finally disappeared.

Expectoration is a more persistent symptom; it first loses its fetid character, then its purulent and lastly becomes sero mucoid and much less in quantity and may last for a long time.

Noteworthy improvement occurs in the general condition from the beginning of the treatment, the weight increases, the appetite is stimulated and in many cases a sense of well-being is easily seen.

Figs. 1, 2, and 3 show the radiograms taken before, during and after the treatment in a case of gangrenous pulmonary abscess, showing the most frequent radiological appearance.

"In a patient, 62 years of age, also affected with diabetes mellitus, who had a gangrenous abscess of the lower lobe of the right lung, cure was complete after 26 applications of the short waves. During the whole treatment the metabolic disturbance was constantly corrected by adequate treatment with insulin and diet.

"In some cases treatment with short waves was associated with intravenous injections of Neosalvarsan, the obvious benefit derived suggests that the combination of Salvarsan and short waves can produce a resolution of the lesion with greater rapidity."

Cases have been reported of syphilis being treated in America, with electro-pyrexia immediately followed by Neosalvarsan and sterilising the patient in a few days, Kahn and Wassermann showing negative results.

A writer in the *British Journal of Physical Medicine* of Nov. 1937 writes:

"One great advantage of the use of inductothermy in the treatment of pneumonia is that there is no disturbance of the patient, no removal of clothing, no pressure of electrodes and, summarised, it may be said that:

(1) Inductothermy has benefited all forms of pneumonia in all stages.

(2) The maximum benefit occurs during the first 48 hours of treatment regardless of the type or stage of the disease or severity of the symptoms.

(3) The relief from dyspnœa, cynosis and from pain takes place during and after the first treatment and is usually confirmed after the second treatment. The fact that patients are without distress in any position in the prone posture is the best evidence of such relief.

(4) It is significant that all cases treated reach a persistent normal temperature in less than 80 hours after the beginning of treatment.

(5) There is no disturbance in the pulse rate as the result of the treatment and improvement occurs coincident with decrease in temperature.

(6) Lastly, the pathological processes clear up coincidently with the crisis, with the early incidence of persistent normal temperature."

Treatment of renal diseases.—Rapid cures have taken place in the treatment of acute and chronic pyelitis. In cases of chronic pyelitis with fever and tendency to relapse the temperature went down rapidly and the purulence became much less, also decrease of leucocytes and bacteria was marked.

I have treated a few cases of cystitis in conjunction with Sulfa drugs with marked success.

While the whole field of indication for ultra short wave length therapy is by no means established there is no doubt about its efficacy in suppurating infections. This is due to the following factors: attenuation of the germs, thermal effect and hyperæmia, favoured, apparently, by a lowered tonus of the sympathetic system, and, lastly increased phagocytosis.

We may agree with the Editor of the *Journal of Physical Medicine* when he writes: "Thus it can be seen that Physical Medicine has achieved a further triumph and a new vista of healing has been opened up."

Certainly, great efforts must still be made, before this conception will enter into the general mind of physicians, and even high placed clinicians consider sometimes physical medicine as a "pis aller," a last trial in lost cases, instead of accepting it as the first treatment when the natural capacity of reaction is still fully present.

"The day will come when all physicians worthy of the name will know their physical methods as they know their drugs."

The Editor of *Archives of Physical Therapy, X-ray, Radium*, August 1934 says:

"High frequency current, according to Bergonie came too soon to a profession too unprepared to appreciate its possibilities. As compared with the laugh that was said to have gone round the world when X-ray presented its reasons for recognition high frequency current was greeted with deathly silence by a world too

ignorant to be anything but hostile to the thesis of its deep thermal properties. Since then it suffered more from over-zealous enthusiasms, than it profited from impartial, intelligent research. It passed through the baptismal experience of a number of appellations until the term diathermy crystallized the action of high frequency current."

Another American writer says: "All medical discoveries undergo a period of trial and criticism until accumulating and overwhelming proof of value captures the citadel of Medical Conservatism."

Toxæmias of Pregnancy ; Diabetes in Pregnancy The Early Diagnosis of Uterine Cancer

At the First International Congress of Obstetrics and Gynæcology held in the United States, physicians from all countries of the world were present.

1. A symposium on the *Toxaemias of Pregnancy* was presented. Prof. S. Mitra of India, was of the opinion that environment was a definite ætiological factor and said that in the hot and dry seasons of Calcutta there was an increased incidence of toxæmia which was due at least in part to the concomitant nutritional deficiency during that time of the year. Dr. Kennedy of Scotland said that the main abnormalities found in toxæmia were the increased cardiac output and increased peripheral circulation.

2. Diabetes in pregnancy was discussed by Dr. White of Boston who advocated Stilbœstrol and Proluton for management in addition to a well regulated diabetic diet, insulin, and careful watch over the toxæmia when it develops. From her series of 485 cases, she considered early termination of pregnancy at the thirty-fifth week by cæsarian section desirable. Dr. Given of N.Y. maintained that spontaneous vaginal delivery was permissible if labour was normal and uncomplicated.

3. Prof. T. Antoine of Austria read a most scintillating paper on the surface microscopy of the living. He inserts a modified microscope which magnifies 120 times and contains built-in lighting and a special tubing for the instillation of the dye. He thus is able to differentiate histologically benign from malignant cervical conditions with clear cellular detail *in situ*. He exhibited photographs of cervical cancer lesions which were extremely impressive.

4. In the treatment of cervical cancer, Prof. Navatril of Austria, and Dr. Adler of N.Y., expressed the opinion that in essence, the radical vaginal panhysterectomy was better tolerated, equally extensive, and had a lower incidence of fistula formation than the abdominal approach. In addition Prof. Navaril stressed the extra-peritoneal pelvic lymphadenectomy, while Adler advocated immediate post-operative irradiation. The consensus of opinion was that radiation does not appear to be able to sterilize the lymph nodes in the treatment of corpus cancer.—(A. P. Reporter of *American Practitioner*, Vol. I, No. 7, July 1950).

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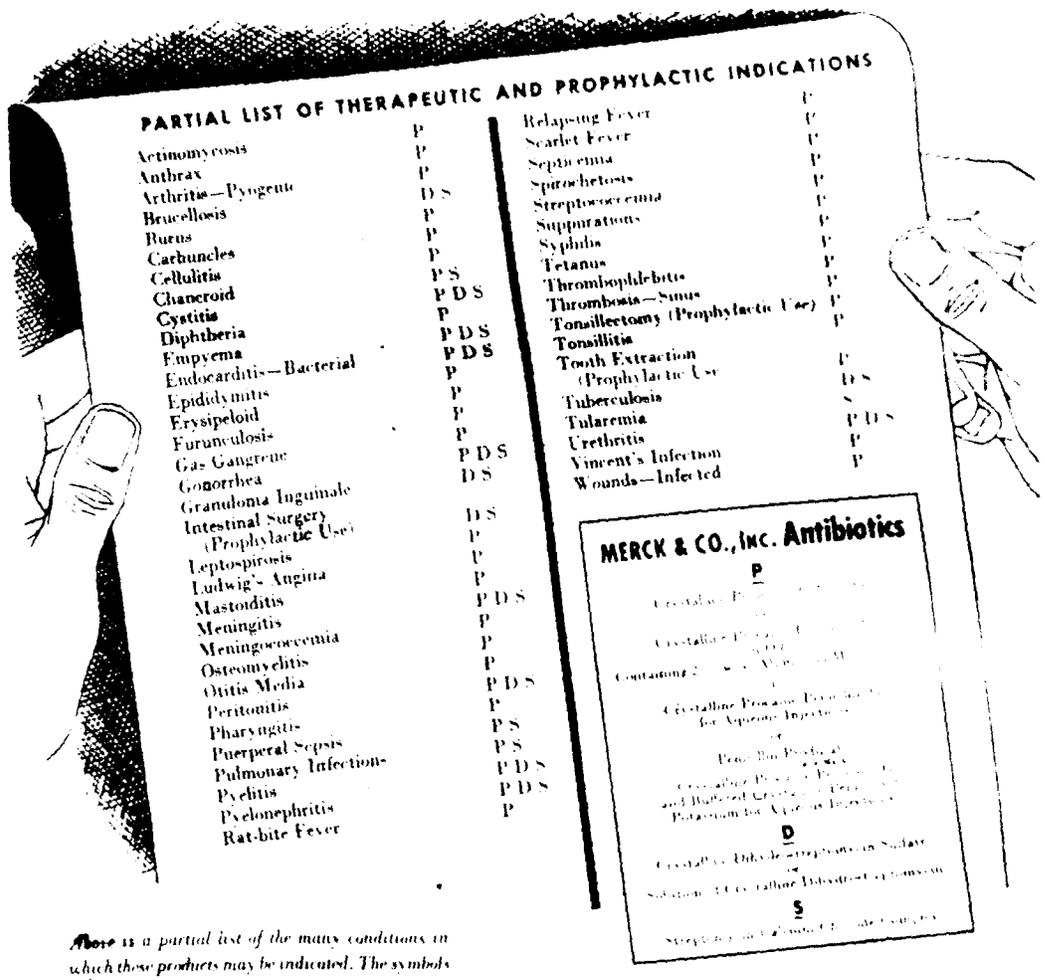

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FERTILITY AND CONTRACEPTION*

RATILAL C. PATEL, L.C.P.S., L.T.M.,
Sinor (Baroda State).

UNDERSTANDING of evolutionary biology of fertilisation and sex function in brief is essential. Basic instinct of self-propagation of species is manifested in reproduction.

(1) Asexual reproduction {fission / budding : fission means division of organism into two or more parts, and each developing into near independent organism, *e.g.*, Ameba, budding means growing from parent-cells *i.e.* yeast.

(2) Sexual reproduction—by union of two organisms or their parts forming zygote {spore-stage / vegetation-stage *e.g.* Algae asexual stage alternating with stage of sexual conjugation—Alternation of generation.

(3) Bisexual or hermaphrodite stage with inbreeding of gametes in same organism *e.g.* hydra.

(4) Unisexual differentiation of organism with ext. fertilisation of gametes in environment *e.g.*, pollination by insects, wind, water in plants and animals.

(5) Internal fertilisation in urogenital sinus and their development of embryo occurs outside, *e.g.* frogs.

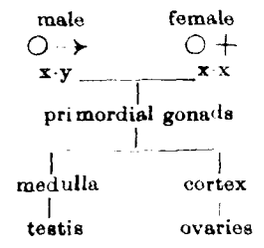
(6) Intramaternal development of embryo and placenta formation—so alternation of genital functions, sex act alternating with reproduction—pregnancy and parturition.

(7) Estrous cycle and mating season of sex-activity intermittently *e.g.*, birds.

(8) Rhythmic cyclic periodicity in female with menstruation and continuous sex-impulse from gametes sex invades other parts of body, realm of mind, body chemistry. In cyclic periodicity of ovaries and uterus in relation to ovulation and menses, her whole body and psyche share the rhythm-endometrium, vaginal keratinisation, breast engorgement diurnal temperature variations, cardiac function and B.P., skin glands, metabolism and urinary excretions. As life is in a constant state of flux so as to adapt to changing environment and to prevent degeneration of germ-plasm, sexual reproduction was evolved to allow fresh outside combinations and mutations, functions of sperms on dynamic activation of passive egg-cell or ovum to segmentation and development; and transmission of heredity from father to child. Human cell contains 48 chromosomes of heredity. Gametes-sperm or ovum has 24 in each. So in fertilisation zygote contains normal No. 48 for human species. In mammals sex is determined by chromosomes of sperm; while in birds and

* Specially contributed to THE ANTISEPTIC.

butterflies, it is ovum that decides the sex of the offspring. Mammal-sperms are of two types "x" and "y" while mammalian ova are only one type, "x" only. In fertilisation { X-Sperm + X-Egg = XX-Child-Female / Y-Sperm + X-Egg = XY-Child-Male. Thus sitting on a hermaphrodite the embryo is prepared to move in any direction. In birds male development is basic and non-hormonic, while in mammals female development is basic negative and non-hormonic. Gonads are bisexual and relative strength of cortex or medulla decides sex of gonads. In mammals activities of sex genes are centralised in gonads, while in insects federal system is evolved, so intermediate stage of gonadal hormonic control is absent. In mammals machinery of sex control is a double-switched mechanism. Chromosomes with genes form the first switch which decides gonads, while the 2nd switch acts by gonadal hormones. It is tempering of second switch *i.e.*, by tumour, T.B. degenerations and other diseases of gonads and gonadotrophic glands, etc. which causes sex reversal, so oft-quoted curiosities in newspapers. In every woman lurks a man and in every man lurks a woman. Thus modern science hasn't so far advanced to control sex determination.



Now coming to the subject proper, the husband and wife might be fertile with different persons but not with each other. There is a certain threshold of fertility below which conception cannot occur. Both parties should be examined by gynæcologist, urologist, endocrinologist and internist. Whenever a man and a woman has lived together for three years indulging in regular coitus without contraception and pregnancy does not occur then it is called sterility.

(1) Primary—absolute-sterility; (2) one child sterility; and (3) Dyskyesis—habitual abortion and child-deaths.

Primary sterility is about 20% due to diseases of pituitary, testis, uterine tubes and anovular cycles. One-child-sterility is due to puerperal pelvic inflammation and venereal diseases. Dyskyesis is due to endocrinopathy or local diseases. 75% sterile marriages are due to totality of multiple infertility factors. In the fertile couple, one or two sterility factors are found, but in the sterile couple the number varies from 2–8 factors. Such are in themselves not important. So remove as many as possible so that fertility level is raised above the threshold value. In 21% husband is at fault. Of these 1/3 male sterility is due to aspermia. In 16% couples no apt cause is found. In 47% fault lies with woman. 15% is one child sterility.

Sterility in male.—(1) Defects of gametogenesis; (2) bad influences on vitality of sperms; (3) obstruction to passage of sperms in male; (4) obstruction to passage of sperms in female genitals; and (5) inimical conditions to sperm vitality in female genitals.

1. Are genital tracts and secretions of accessory sex glands healthy?

2. Is coitus satisfactory and with reasonable frequency in the fertile phase?

3. Does semen contain enough number of healthy action sperms? Like animals some families are fertile and prolific while others tend to die out and single. In future just like blood-grouping there will be semen grouping for compatibility to combat sterility. Fertility varies with age, food and health.

Semen-analysis.—Quantitative and qualitative analysis of condom specimen should be made. When we have to search for sperms the specimen is abnormal. When we see large number of spermatic crystals, it means sperms are dead or absent. Pus cells and leucocytes are abnormal means of inflammation. Blood cells mean hæmorrhage. Large number of abnormal forms mean poor quality of semen. 60 million sperms per c.c. and more than 20% abnormal forms mean male sterility. Amylospermia means concentration of convertible carbohydrate is higher than normal fertile sample—crystalo-spermia-spermin crystals—means pathological necrosis and death of sperms. Teratozoospermia means frequency of abnormal heads. Necrospermia means non-motile sperms. Defective semen is fraught with abortions. Vitamin E defect causes incurable degeneration of seminiferous tubules. Treatment of male sterility lags far behind diagnosis and fertility assay. Apart from semen analysis, examination of fluid by testicular puncture aspiration for sperms are made. Aspermia in testicular aspiration means anti-pituitary defects.

Sterility in female.—1. In 44% there are some defects of sex organs. In 20% sex organs appear normal. In defects of sex organs, anatomical defects of developmental errors and infantilism are commonest due to dietetic errors of avitaminosis and endocrine failures in fetal life to puberty. Other causes are hostile acid viscous cervical secretion, tubal blockage, anovular pseudomenses, cystic ovaries salpingitis, post-partum and venereal infections lead to sterility.

2. Sex organs appear normal:—(*a*) defects in husband, endocervical secretion serologically antagonistic to sperms of husband; (*b*) In female low B.M.R. chronic toxæmias and diabetes, chronic cholecystitis; (*c*) more than twice coituses per week and abuse of contraception. Fertile cycles are followed by sterile cycles in the same woman. Almost all women are comparatively irregular. Every woman is a rule to herself. Many women cast more than one ovum in a single monthly cycle, sometimes two or three at 6–10 days interval, so multiovular type. In young girls sometime after the advent of menses, women after delivery for 12–18 months and women approaching menopause generally don't cast ova, so anovular type of menses

cycles. This variation of fertility is more marked in female. She needs general examination of the body, gynæcological examination and functional examination—post coital examination of semen, endometrial biopsy and Rubin's patency of tubal insufflation with kymograph and lipiodal examination by X-ray.

1. Does ovulation occur ?
2. Can ovum pass into uterus ?
3. Does uterine mucosa undergo normal development ?
4. Are endocrine conditions of fertility present ?
5. Does insemination occur aptly in time and manner ?
6. Do sperms pass into cervix ?
7. Are conditions for development of ovum maintained at proper level ?

Don't do D & C, as a general routine. Don't take it for granted that the husband is normal for he has children with previous or present wife, for she might have extramarital relations without the husband's knowledge. If azoospermia in condom specimen perform testicular puncture examination and if sperms are present, it means blockage in male passages, and if no sperms in this test it means defective gametogenesis. Azoospermia in Huhner's test—post-coital finding of sperms from cervix or uterus—means hyperacid or inimical cervical secretion. If living sperms in Huhner's test, it means female passages upto uterus and their conditions favourable.

Contraception and sterilisation.—Contraception or birth-control is a method of preventing pregnancy by interfering with union of male and female gametes, excluding abortions. Pioneers of this movement of birth control and eugenics are Malthus and Sir Francis Galton respectively. By his "Essay on Principles of Population", Malthus gave impetus to the study of many problems. As a keen diagnostician he saw evils of uncontrolled birth-rate, but as a therapeutist he was a clergyman. For serious disease he proposed impossible remedy. In his days not so much was known of sexual pathology and little about effects of sexual repression. He tried to solve the sphinx riddle of reproduction by advising celibacy and later marriages. His ideal was platonic relations. By removing the possibility of unwanted pregnancies, contraception enables woman to plan her family and space her children. It gives greater freedom to women and allows them to follow manly occupations. Average couple shouldn't have more than 3-4 children. Couples should produce children in proportion to their health, wealth and conjugal happiness. In order to preserve the well-being of family, birth control is essential. Too rapid succession of child-bearing destroys health of the mother and leads to premature old age, Sir Francis Galton in his "Hereditary Genius" advised compulsory sterilisation of defectives, lunatics, criminals and sufferers of hereditary diseases. Hanging dread of unwanted pregnancy mars spontaneous freedom,

naturalness, and joy of sex relations of the couple and leads to various nervous breakdowns, aches, and harmful practices during coitus, perversions, and psychic impotence.

Means of contraceptions.—1. *Check pessaries* :—Condom in male, diaphragm, caps, sponge in female. 50% successful. Sex pleasure is reduced in both, but, safety against venereal infections. It is harmless.

2. *Mechanical irritants to endometrium* :—Graefenburg's ring, stud or pin pessary of gold or rubber.

3. *Chemicals—spermicidal* :—Lozenges, tablets, powders, jellies of Chinosol, Quinine, Boric or Citric Acids. These chemicals are injurious in the long run, leading to chronic inflammation and permanent sterility in female.

4. *Coitus in safe period of menstrual cycle* :—As many women are irregular in ovulation, safe and sterile period are determined by daily Vitamin C test for one month. In marriage complete celibacy is incompatible but relative continence mutually desired by the couple is good.

5. *Sterilisation by vasectomy* in male and salpingectomy in female. Irradiation by X-rays or radium. All these cause permanent sterility.

6. *Biological methods of sterilisation by hormones* are still experimental—sex hormones are ambivalent and bisexual. Inj. Testosterone in female stops ovulation and menses temporarily. Similarly injection of Estrin in male causes temporaray sterility and impotency.

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'Para' and 'Gravida'—Difference Between

Gravida refers to a pregnant woman ; the word is used to denote a pregnancy regardless of its duration. Multigravida refers to the number of times a woman has been pregnant not to the number of fœtuses. *Para* refers to the delivery of pregnancies that have continued to the period of viability. A patient is *primipara* when she delivers a fœtus which has been viable regardless of whether the child is dead or alive at birth. If a woman has delivered five children even if two are twins, she is a quintipara. "Delivered by Cæsarean "section" is a commonly accepted term ; a mother of 4 children, even if one was delivered by Cæserean section, is still a quadripara.—(*J.A.M.A.*, 142, 7, 523, 1950).

Cases and Comments

INTRAVENOUS PROCAINE IN SURGERY

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PROCAINE is not a new drug, but it is only recently that it has been widely used for analgesia by intravenous administration. The enthusiasm that has accompanied this use has its basis in clinical observation. To date, there is no agreement as to how its analgesic action is accomplished. The site of action is not determined experimentally. It is obvious that the more spectacular results have been with the control of pain associated with trauma. Patients with burns, fractures, sprains, and those with pain at the site of surgical manipulations are uniformly benefited from intravenous Procaine. This observation suggested that analgesia follows the extravasation of Procaine through damaged capillaries where it reaches nerve endings in the perivascular areas at the site of injury. The rapid hydrolysis of Procaine is contrary to this concept. It has been suggested, also, that the central effect produced by Procaine was responsible for the analgesia. It has been determined by the Hardy-Wolff-Goodell technique that the pain threshold is elevated in patients, who had received large subcutaneous doses of Procaine, an elevation more prolonged than the duration of local tissue analgesia. Using a similar technique, it was determined in our laboratory that one gram of Procaine given intravenously, as used clinically to control pain, failed to raise the pain threshold as much as a therapeutic dose of Aspirin (Acetyl-Salicylic Acid). This is not in keeping with the analgesic action observed and throws doubt on the importance of the pain threshold as a modality for evaluating analgesic drugs, or points to another mechanism to explain the results with Procaine.

Brodie and his associates devised chemical methods for identification of the products of hydrolysis, Diethyl-amino-ethnol, and Para-amino-benzoic Acid. With these procedures it was demonstrated that, in man, Procaine was rapidly hydrolysed to the alcohol and acid after intravenous injection. They learned further that urinary excretion of injected Procaine is negligible, but that 75 to 95 per cent of the predicted PABA (Para-amino-benzoic Acid) injected in Procaine is excreted unaltered in urine. This is in contrast to the 20 to 35 per cent of the predicted amount of Diethyl-amino-ethnol which could be isolated from urine.

It was obvious then, that the Diethyl-amino-ethnol product of hydrolysis of Procaine is further metabolised *in vivo* in a manner not yet determined. This, and the fact that Procaine persists in plasma for a much shorter time than Diethyl-amino-ethnol, suggests

that the latter drug may be the pharmacologically active agent rather than the parent drug.

It was logical, then, to prepare Diethyl-amino-ethnol for oral, intramuscular, and intravenous use, and study its toxicological and pharmacological action. Emphasis was given to experiments leading to an evaluation of its possible analgesic effects. Such a study is now in progress in New York University College of Medicine and Bellevue Hospital. Initially it is being used to control post-operative pain.

Diethyl-amino-ethnol produces no obvious toxic effects in man even when large doses are given. This is in sharp contrast to Procaine, where the most serious criticism of its use intravenously is the frequency of toxic reactions. Also there are some definite indications that Diethyl-amino-ethnol is effective as an analgesic when given orally or intramuscularly. The experiments with this drug so far completed are still in the experimental stage and further research in this field is sure to be fruitful.

No toxic symptoms have been noted following the administration of 4 grams of Diethyl-amino-ethnol by intravenous infusions during operations. The analgesic effects appear to surpass those observed with Procaine. The results obtained with Diethyl-amino-ethnol, especially because of its relative absence of toxicity, make it mandatory to complete further studies.

UNUSUAL SYMPTOMS DUE TO STREPTOMYCIN

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AND
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VARIOUS toxic symptoms due to Streptomycin have, from time to time, been reported. Many a pen has added to the huge pile of information. This, one more, may be pardoned.

The symptoms exhibited by the patient reported hereunder are of such unique type that they are worthy of record.

Case report.—Mr. K. A. S., a tanner, aged about 35, was suffering from vague abdominal pains for about 4 years. The pains were of such a diverse nature that it was difficult for one to arrive at a definite conclusion. Chronic gastritis, cholecystitis, gastro-duodenal ulcer and appendicitis were considered as "Probables", not to mention neurasthenia and hypochondriasis. He was drugged with various preparations of barbiturates and hypnotics. With all the excellent care and treatment, the patient went down-hill, lost his appetite, weight and sleep.

Laboratories failed to furnish any clue and account for his ailment. His stools, blood, sputum, urine and gastric contents were examined on several occasions and found normal; X-ray photographs of his lungs and heart, Barium-meal examinations of the stomach and intestines revealed nothing abnormal.

His past history was medically unblemished and noncontributory. He did not suffer from piles, dysentery, gall-stones and syphilis, at any one time. Neither he had typhoid and tuberculosis in his family.

Finally, an exploratory laparotomy was performed about 9 months ago and an innocent appendix removed. The pain in the abdomen continued as before and became worse later on.

On 1-12-1950 he developed diarrhœa which persisted for about a week in spite of the best medical treatment. His motions, 6 to 15 per day, were loose, watery and copious; pale yellow in colour and without any foul odour, mucus and blood. On 11-12-'50 he developed hiccough which was persistent and not amenable to treatment. It was at this stage of his disease he came for treatment.

Tuberculosis of the intestines? It appeared to be more than a probability. The chronic nature of the disease, the vague pains in the abdomen, loss of weight and appetite, unaccountable diarrhœa, negative reports from both the laboratory and X-ray units, were definite "pointers" to tuberculosis. Without obtaining any further auxiliary assistance from a laboratory, Dihydro-Streptomycin Sulphate was administered; 1 gramme per day divided into 2 doses and given at 12 hours interval.

After 14 grammes of Streptomycin were given the patient complained of giddiness and weakness, to which we did not pay much attention and put it down to his general weakness and poor diet which he had been having for some days. The injections were continued for 3 more days. On the 4th day we found him really bad. He could not stand and walk steadily. Streptomycin was suspended.

The next morning, I (M.A.) was hastily summoned to see the patient. He was looking pale, worried and anxious; complained of palpitation of the heart and pain in the chest. His temperature was 97·2°F.; pulse 130 and of low volume; respiration 20 per minute. Blood pressure, most unfortunately, was not taken.

He had violent tremors of both the upper and lower extremities, —more marked in the legs, which increased and became more apparent when the limbs were moved. The knee jerks, ankle clonus, and knee clonus were absent but the tactile sensations were present. He had no cephalalgia, nystagmus, tinnitus and his eye-sight and hearing were normal.

Under complete rest and heavy doses of Nicotinic Acid he improved wonderfully and by the next morning he was about normal, excepting his weakness which lasted for some more days.

Discussion.—The giddiness and tremors were definitely due to the Streptomycin. They stopped with the cessation of the drug. They could not have been due to his weakness, hysteria or neurasthenia. The medical dictionary, most unfortunately, is still replete with certain words and terminology conveniently coined by us in order to cover up our profound ignorance. Neurasthenia is one of them.

Tuberculosis of the intestines, in the early stages of the disease, could be overlooked and mixed up with a number of diseases and conditions of the intestines, such as enteritis, colitis—due to any cause, sprue and amœbiasis. The signs and symptoms are so vague that they easily baffle the ingenuity and keen observation of one.

It is more than likely that continuation of Streptomycin beyond the stage of vertigo, severely affects the nervous system.

Manifestation of such severe toxic phenomenon with 17 grammes of Dihydro-Streptomycin Sulphate is so far unknown.

Summary.—1. A case of Tuberculosis is reported.

2. Unusual symptoms affecting the nervous system are recorded.

A CASE OF NEGLECTED SHOULDER PRESENTATION WITH PROLAPSE OF THE CORD

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SHOULDER presentation is one of the rarer of all abnormal presentations. The outlook of prognosis is graver than in any other presentation. The earlier the condition is recognised, the speedier the lie remedied, the better is the prognosis.

I was called by the midwife on duty to examine a case of prolapse of the cord, which had been brought to the hospital for delivery at 2-30 p.m. on 18th December 1950. The female had been in labour for more than 12 hours, and the child was dead. The age of the patient was 26 years and the present one was her 4th delivery. Labour had been normal in her previous deliveries. The labour pains were very feeble. The patient was taken on the table and I directly started my examination. Then she began to shiver and there was a rise in her temperature. This was perhaps brought about by malarial attack. On examination I not only found out the prolapse of the cord, but also a round mass of the size of cricket ball bulging out of the vagina. I thought it to be the head of the fœtus, but by observation and palpation I concluded that it was not the head. Introducing my hand to locate other parts I could feel the chest. I pulled out the hand of the fœtus to see whether the round mass was shoulder or not, the child having been dead and

as a result my diagnosis was confirmed. Under anæsthesia, after clearing up the rectum and the bladder, I tried internal podalic version but failed. It is difficult to perform version in such cases, and should injudicious efforts be made there is a danger of rupturing the uterus. The head and shoulder of the fœtus are generally firmly wedged under pelvic brim, but in this particular case the shoulder was so much swollen that it was difficult to introduce it. Many books have laid undue stress on this point of rupture and have given exaggerated impressions of the danger of version, in any case in which the patient had been in labour for more than 12 hours with membranes ruptured, but actually it is not so. Nearly 3 years ago I came across a case of prolapse hand where the female had been in labour for a pretty long time and the child was dead almost 6 hours back. I did internal version successfully and brought down the leg and delivered the fœtus. The mother made uneventful recovery under ordinary treatment.

The only solution when version has failed under such circumstances, was to perform decapitation. The instruments were ready at hand. But this method is dangerous because, if not handled carefully, the uterus may be injured. Moreover, in this particular case the shoulder was so much swollen that there was not sufficient space left to pass the hand and the decapitation saw, after fixing the head. I therefore decided to deliver the fœtus by spontaneous evolution, and should this method fail, to perform evisceration or spondylotomy. The position of the lie was dorso-anterior. 1 c.c. of Pictocin was injected I.M., two fingers of each hand were introduced into the vagina and the chest of the fœtus was pressed to do acute lateral flexion and of cervical and upper dorsal spine, the ribs distended the perineum and the breech forced in the hollow of the sacrum. The part of the thorax and shoulder already having escaped, the breech and legs then followed. The other hand which was impacted under symphysis pubis was dislodged by giving the rotation to fœtus. I introduced my hand into the vagina and the extended hand of fœtus was brought out. The after-coming head was removed by jaw flexion and shoulder traction method without any difficulty. The placenta was also removed by hand. After delivery she had a temperature of 103°F. which in my opinion, was purely due to malaria as corroborated by the symptom of shivering in my presence at the time of inspection. Still I injected 2½ lac units Penicillin straightaway and gave ½ lac units Penicillin every six hours for the next 48 hours. The temperature touched normal on the third day. She was placed on Ergot Quinine mixture. On the fourth day everything being normal, her husband removed her to his house. She is very well and fit now.

Points of interest.—1. I have never seen a big round swollen shoulder, which may perfectly resemble head. I think the presenting part was congested due to pressure of the uterine contraction for a long time. It became swollen and foul smelling due to the death of the child.

(2) Spontaneous evolution method is worth trial in the cases where pelvis is roomy, before doing decapitation, which is dangerous and requires very great care and skill born of long professional practice. Formerly I used to entertain the belief that this method is possible of employment only in cases where the fœtus is abnormally small but in this case the fœtus was quite normal.

A CASE OF CHRONIC ULCER

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ONE man, aged 30 years, came to me for medical advice. His history was as follows:—

Complaint:—Ulcer on the left leg.....18 months.

In the beginning he got one very small wound on the left leg, on its medial aspect, the cause of the wound being unknown to him. Later on, the wound increased, thereby irritating him. He tried his own remedies and finding no improvement he started consulting local *vaidyas*. Finding no satisfactory improvement, he later on started Allopathic treatment, during which blood and urine examinations were also done. Sugar being present in urine "Insulin" treatment was advised and local treatment of the wound was carried on with no benefit. So he left the treatment and allowed the wound for Nature to cure.

Past history:—N.P., denied V.D.

Family history:—Wife and children—all well.

Examination:—(1) General:—N.P. except few brownish scars on the body. (2) *Chest*:—N.P. (3) *Abdomen*:—N. P. Spleen—nil. Liver—nil. (4) The wound proper:—The bandage was opened and the wound was cleaned. Length and breadth—1½" · 1". Covered with stuff. Surrounding area brownish. The exact type of the ulcer could not be judged as it was handled by various hands. (5) *Special examination*:—Was done during his past treatment. (*a*) Blood—N.P.; W.R.—not done. (*b*) Urine—as usual. Sugar+2%.

TREATMENT:—Taking into consideration the brownish scars on his body and the look of the wound, I thought of anti-syphilitic treatment. As the treatment was different from the one that he had so far received, he readily agreed to be under my treatment:—

℞	Pot. Iodide	...	gr. xv
	Liq Hydrargyri Perchlor	...	♏ vii
	Syr. Simplex	...	ʒp
	Aqua ad	...	ʒi
	Mft. mist.	...	ʒiii ʒi T.D.S.

℞ Penicillin G (Glaxo) I.M. 1 lac in morning and one lac in the evening—daily.

℞ Thiosarmine (Brahmachari Lab). 1st I.M. Inj.—·3 g.m. 2nd I.M. Inj.—·45 gm. on the third day, followed by ·6 gm. on every third day.

℞ Spiroids (C.D.C.) Tab.: II tabs. t.d.s. after meal with cold water.

Local treatment:—Wound was cleaned with spirit and dressed with Cibazol (Ciba) powder only. (No Insulin was advised and that idea was postponed).

After 15 days I found the ulcer improving and so the treatment was carried on.

Penicillin after 30 lacs was discontinued. After one month the ulcer healed up completely. Later on my attention was drawn towards the old urine reports,

and so I advised him to get his urine examined again for sugar and percentage. When I got the new report I was surprised to note that no sugar was reported. My anti-syphilitic treatment probably cured the diabetes also!

May I know the reason through this Journal?

Conclusion:—I think particularly in this case probably syphilis might have influenced the pancreas (the islets) and thereby given rise to the diabetes. As the syphilis got cured the islets might have recovered and hence the diabetes disappeared.

Near Cinema House, Barnagar,
(Madhya Bharat).

ANTI-HISTAMINE DRUGS IN CONVULSIONS OF CHILDREN

RATANLAL N. GANDHI, L.C.P. & S.,
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A FEMALE child, aged 3 months, had attacks of convulsions. She was treated by a *vaidya* without any improvement. When I was called to see the patient the following conditions were noticed:

Complaints:—Convulsions for the last 8 days.

Family history:—One brother and one sister died in childhood by similar convulsions. Three brothers and two sisters are all healthy. Parents are healthy.

Previous illness:—There were no birth injuries, no congenital defects of head. Child was healthy before this illness.

Present illness:—The child gets attacks of convulsions. At the end of each convulsion, she becomes drowsy, and, before she gets consciousness, she gets another attack of convulsion. The duration of each convulsion is 10 to 30 minutes or more.

Physical examination:—Temperature 97·5 F (armpit); Pulse—120 p.m.; Respirations not counted due to convulsion but they were not rapid. She is well built and healthy. Abdomen is not protruded and tympanic. Spleen is just palpable; liver not palpable. She has passed two normal stools. Respiratory system is normal. No adventitious sounds are heard. Breathing is normal vesicular. Heart sounds are normal. Pupillary reflexes are normal. Plantar reflex is flexer. Knee and ankle jerks were difficult to elicit. There are no signs of paralysis. Laboratory examinations were not done due to lack of facilities.

Diagnosis and differential diagnosis:—As the history and examination suggested nothing it was difficult to arrive at a diagnosis. A provisional diagnosis of intestinal helminthiasis and malaria were first thought of, as they are common in villages.

As there was no temperature or other signs, encephalitis, meningitis, broncho-pneumonia, tonsillitis, pyelitis, influenza, acute infectious fevers, were out of question.

There was no history of difficult labour. So birth injuries, cerebral hæmorrhage were not thought of.

Tetany, tetanus, mumps, uræmia, hypoglycæmia were the rare conditions to be met with, but there were no signs and symptoms present to suggest them.

TREATMENT:—(1) Benadryl (P & D) 1/4 cap t.d.s.

(2)	Euquinine	
	Calcium Lactate	... gr. i
		... gr. ii
(3)	Soda Citras	
	Soda Bicarb	... gr. iii
	Chloral Hydras	... gr. iii
	Pot. Bromide	... gr. i
	Tr. Hyosciamus	... gr. i
	Syp. Auranti	... ♏ v
	Aqua Chlor	... ♏ x
		... 3i

(4) Santonin with Hydrargyri Cum Creta gr. i each were given at night for 2 days.

(5) Penicillin 50,000 units injections were given on the fourth day.

With this treatment there was no improvement and the condition of the patient beame serious.

She was given Antistine tab. 1 4 and Phenobarbitone Sodium gr. 1/3 Mft., t.d.s

Convulsions were controlled on the fifth day but she remained listless and drowsy.

On the sixth day, the above powder was given twice a day, the condition of the patient became somewhat better.

The powders were given for 8 days more, there was no convulsion and the patient improved thereafter.

Discussion.—Dr. L. K. Rama Rao has mentioned allergy as an acting agent in convulsion of children in some cases in the ANTISEPTIC of October 1950. In this case, though Antistine (with Phenobarbitone) has acted and controlled the convulsions, but Benadryl, the anti-histamine drug, has failed to prevent the convulsion. So the cause for convulsions in children requires further investigation. Had it been allergy. in this case both the anti-histamine drugs—Benadryl and Antistine—would have controlled the convulsions, but Benadryl failed to check the convulsions.

A CASE OF PERSISTENT NEURALGIA

K. NARAIN RAO, L.M.P.,
Asst. Medical Officer, Mysore Medical Service, P.O. Kengeri, Bangalore District.

PATIENT, N., male, aged about 12 years, coming from an average middle class family, rather sparingly built, slightly anæmic and run-down.

Previous history.—About 3 years ago, the boy started complaining of severe head-ache involving the whole head in general, but the actual *pain* was referred on to the frontal region in particular; the boy was in very good health then, and there were no other concomitant signs or symptoms associated with the headache; as is usual, the local doctor was consulted, who did all that he could for about 3 months continuously, but, most unfortunately for the boy, and to the utter disappointment of the poor parents and the doctor as well, there was no improvement at all: then, the anxious parents naturally thought of consulting "specialists," (for, I do not know if there are any for neuralgias in our country) and they did consult, and they advised the parents to get the boy's eyes tested; even that was done, and glasses were prescribed for correcting a "short sight", but the neuralgia continued; back they came to the specialist in a General Hospital, who admitted the boy to the hospital for observation, examination and treatment. The usual routine examinations were done with negative results including a radiogram of the skull to find out any pressing tumours; during the period of his stay in the hospital, the boy was treated empirically with Vitamin B, Liver Extract Cibalgin, Luminol, Aspirin etc. but the poor anxious parents were disappointed to find that the boy did not progress at all towards improvement, much to the dismay and disappointment of the specialist; consequently, the boy was discharged after about a month with instructions to consult the mental specialist as the boy had by then become rather cranky, irritable and desperately violent at times, though rarely. At this stage, one can easily imagine the psychology of the poor parents as well; most unfortunately, they did not think of consulting the mental specialists merely on grounds of sentimental objections. Then came the turn of grannys who advised Ayurvedic treatment and "*mantrams*" which were also tried for about 2 months but with no relief whatever; the parents naturally became desperate, and at this stage a wandering "Yogi" (?) was sighted by mere chance

who advised by looking into the stars, a pilgrimage to Rameswaram. At this critical juncture, the father of the boy was transferred to my place, and out of sheer curiosity he came to me one day and said "Sir, I have got a son who is suffering from neuralgia for the last 3 years, and I have tried all doctors including specialists, *vaidyas*, and *mantrams* etc., but found no relief: now, since I have been transferred to this place, before going on a pilgrimage, I want to "TRY YOU" and be done with it; can you kindly take up the case and do your best? On hearing all the story of specialists etc., I felt rather very reluctant to handle the case, thinking that I would be nowhere between the specialists on the one hand, and *vaidyas* and *mantrams* on the other. But, my curiosity to try the case overpowered my professional ability and I did say "YES" to the father, definitely telling him to allow me to have my own way in the treatment without any restrictions as to the time that I would take etc. I took up the case.

Physical examination.—A thorough detailed physical examination of all the systems was done to the best of my ability with the result "N.A.D" (Nothing abnormal detected), but, clinically he was found to be slightly anaemic and a bit "run-down": mentally, he was a little over-productive and at times hyperactive which at times lead on to a little violence also.

TREATMENT.—After all my examination and with N.A.D. uppermost in my mind, I found myself between the devil and the deep sea as regards treatment. I could not proceed nor could I decide upon any scientific line of treatment as every available stuff had already been tried and given up. Anyway, I thought that an empirical line combined with a psychological approach was the best one under the circumstances; so, I straightaway pitched upon "Intensive Calcium" and "Vitamin B (Complex)" therapy, and started pricking him alternatively at intervals of 3 days: the stuffs that I used were Colloidal Calcium with Ostelin Vitamin D (Glaxo) 2 cc. and "B. Complex" T.C.F. 2 cc.: My psychological approach was to sit with the patient everyday for about half an hour and talk to him on various subjects that would interest him: in all, I gave him 48 injections of each, at the end of which, to my intense surprise, the patient told me one fine morning that he had no headache. I could not believe him, but it was true: he never complained of the headache even though I used to persistently question him; further on, I gave him 12 more injections of each and stopped. Thereafter, I started giving him orally "Kepler's Malt Ext. with Cod-Liver-Oil" (B.W's). During the treatment, he was asked to take ordinary home food with more of milk and some fruits as and when they were available in this small place. After 3 months, the boy did not complain of any headache and this improvement continued on even after 6 months which was indeed marvellous from my standpoint: at the end of 9 months still there was no headache, and, thank God, the boy appeared for Middle School Examination and passed in first class. Even after 12 months, I hear that the boy is getting on alright.

Now, so far as this case is concerned, I want to ascertain certain points from my learned professional brethren, who, I am sure, will enlighten me. In this connection, I humbly beg to submit to the profession in general and to specialists in particular, that I being at the lowest step of the ladder in the profession, do not profess to know much, nor do I mean to decry the value of specialists and their treatment, but a casual mention was made just to complete the story. That is all. If they think that I have in any way gone beyond my jurisdiction, I beg of them their kind pardon.

Points for consideration.—1. What was the cause of the "headache" in this particular case? I mean the pathology.

2. Is it the intensive Calcium or Vitamin B or both that brought on the relief? or

3. Is it the psychology behind it? or

4. Is it mere faith?

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THE STOCK-TAKING

THE anniversary of our Republic affords one the most valuable opportunity to take stock of the achievements of the past and to plan for the future. The Hon'ble the Health Minister has availed herself of this golden opportunity to catalogue the achievements so far and to explain how much more yet remains to be done, if the nation is to attain parity with the other advanced countries in the world. Starting on the premise that "the health of the nation is in fact its greatest wealth" and that "there can be no happiness or contentment for any individual or a group or a country if they are always ailing or in danger of falling easy victims to disease," she explained how many opportunities that came in the way of the country in the past had been missed: "It is a real tragedy that very little attention has been paid to the nation's health in the past. When there was ample money to train personnel and expand health services, build hospitals and sanatoria, concentrate on housing and environmental hygiene, health education and all that pertain both to the curative and preventive side of the disease, a very meagre portion of the revenues was devoted to health. The rural population which constituted the real India was wholly neglected and even in the cities the facilities afforded to the poor were not such as to inspire confidence in the patient or cater adequately to the general need." The charge is, of course, very well-founded and we have ourselves had repeatedly to draw pointed attention to the gross neglect of this elementary function by the State. We can give proof to sustain this charge from the history of our own Province. In the early twenties, the Provincial exchequer was full to the brim and overflowing too, and if only the then Government had

spent at least a part of this over-flowing money for the improvement of public health and sanitation as they should have done and as they were requested to do, we would certainly have a very different picture at present. But, unfortunately, for reasons of their own, the then administrators allowed all these moneys to be overflowing from their coffers that the Government of India, through the Meston Award, snatched away a very large slice of it, *i.e.*, 348 lakhs every year by way of Provincial Contribution. The same was the case with many other Provinces also which had shown a similar miserly attitude towards the needs of the people. And all these moneys were frittered away by the Central Government in increasing the emoluments of the highly pampered superior services, extension of so-called strategetic railway lines in the N.W.F. Province, and so on and so forth. But it is no use crying over spilt milk. We have to take things as they were handed over to us and see how far we have progressed and how much yet remains to be done.

The tabular statement furnished by the Hon'ble the Health Minister in order to convey an idea of the expenditure per capita on health development programmes since India achieved independence, for the financial years 1946–'47 and 1948–'49, is revealing :

	1946–'47 Rs. A. P.	1948–'49 Rs. A. P.
Coorg ..	1 6 0	3 0 0
Madras ..	0 9 5	0 11 2
Bombay ..	0 14 11	1 6 9
West Bengal ..	0 11 2	0 12 2
Uttar Pradesh ..	0 4 10	0 7 1
East Punjab ..	0 7 0	0 8 5
Bihar ..	0 5 0	0 6 3
C.P. and Berar ..	0 3 10	0 5 11
Assam ..	0 6 5	0 9 1
Orissa ..	0 6 5	0 12 3
Average ..	0 8 3	0 10·11

While it is a matter for some satisfaction that at least within three years the per capita expenditure on health development has increased to a certain extent, we have to consider how it compares with the amount spent in other countries on this head. Let us leave aside such highly advanced and financially strong countries like the U.S.A. and the United Kingdom and compare the per capita expenditure with that of our neighbouring country, Ceylon. That country is spending Rs. 8 to Rs. 9 per head on health alone. While there may be no comparison between India and Ceylon from the point of view of either size or of population, it cannot be said that what had been possible in Ceylon should be impossible in India, provided the will was there. The figures given by the Health Minister herself show how much leeway India has to make if she is to attain parity at least with her neighbouring country.

We are quite prepared to grant that because of the realisation on the part of those in charge of the Government that the health of the people cannot be allowed to deteriorate, something has been done which, if fairly viewed, might probably show a more steady advance in the course of three years than over a preceding period of many more years and that too in the face of great troubles and turmoil. But what little improvement has been made falls considerably short of the immediate and urgent needs of the situation. The Health Minister says that when they have practical proposals which they would like to undertake, "they are handicapped by a financial stringency which not only forbids any development but which makes it hard for the Health Ministries both at the Centre and in the States even to continue to serve the cause of health even on their present meagre footing !" *et tu Brute* ! The wealth, well-being and prosperity of a nation depend very largely on the health of the people. It is only when the people are healthy, happy and contented, they can improve the wealth of the nation by increasing production all round and make the country not only self-sufficient in the matter of its own absolute minimum requirements but also export something abroad to meet the cost of its imports. If the health of the people is to be allowed to remain static or deteriorate owing to financial stringency, the wealth and productive capacity of the people would naturally go down, further affecting the financial position of the country. If the country is to advance, if the wealth and prosperity of the nation are to be increased, this vicious circle should be broken and a great, very great, step forward in the improvement of public health has to be taken. We trust this aspect of the matter would receive the earnest attention of the Governments and steps taken on a large scale to improve public health.

While, under the Constitution now in force, the States are autonomous in respect of Medical Relief and Public Health, a close liaison has to be maintained between the Centre and the States so that a co-ordinated policy can be followed throughout the country. For this purpose the Central Ministry of Health can and should maintain a degree of influence in the matter of improvement of health administration throughout the country to the extent that it can initiate enquiry, discussion and experiment and to the extent to which it comes to be looked upon by the State administrations, the professional and the lay public, as an organisation which is competent to advise and assist in the practical solution of health problems. In this sense the functions of the Central Ministry of Health which have been summarised by the Hon'ble Minister in her review are fairly comprehensive to cover all matters of common interest. But the success of any effort on the part of the Central Health Ministry is dependent on the wholehearted support and co-operation extended to it by the States. The States by themselves cannot do much individually and we hope that the co-operation so far forthcoming would be made available to

the Centre in an ever-increasing measure in the years to come so that a uniform policy of development can be adopted throughout the country.

We are glad that the need for increased medical personnel has been recognised by the Governments of the States and increasing attention is paid to this matter. In addition to the up-grading of certain Medical Colleges in the country with a view to provide post-graduate training, some of the States *viz.*, Bombay, Madras and Bihar have increased the number of yearly admissions to their Medical Colleges. The Governments of West Bengal and Uttar Pradesh have introduced the double shift system to enable more students to qualify themselves. While all these are no doubt improvements in the past position, the present lack of personnel can be got over only by the establishment of more and more Medical Colleges all over the country. We are glad that the question of the revision of the syllabus of the medical course is to come up for consideration early before the appropriate authority, and we trust the matter will be gone into in all its aspects and a proper decision arrived at.

It is true, as the Health Minister has pointed out, that the promotion of public health is a long lane that has no turning. But even that long lane has to be traversed if India is to attain the status which is legitimately her due. India's collaboration with WHO and UNICEF has greatly benefited her. Let this collaboration be sought and obtained in other aspects also not only in the interests of India but also in the interests of the world as well.

THE TUBERCULOSIS PROBLEM

DR. K. S. RAY's unfortunate and premature passing away deprived the tuberculosis workers who assembled in Conference at Hyderabad on February 5, 1951, of the valuable suggestions he might have put forward to help prevent the spread of the scourge, but his place was worthily filled by Dr. K. VASUDEVA RAO, formerly Superintendent of the Tuberculosis Sanatorium, Madras, and at present Deputy Surgeon-General, with the Government of Madras. He has brought to bear in his address an analytical mind, his long and wide experience in the field, and the large volume of information available from periodical reports and other publications on the subject and given the greatest importance to both the preventive and curative aspects to be attended to if any tangible reduction in the mortality from this disease is to be brought about.

As he pointed, out, the problem of tuberculosis is a vast one. The radiography surveys carried out in the United States of America, where living and environmental conditions are fairly satisfactory and the standard of living is high, have demonstrated that

there are approximately ten active cases for each death occurring from this disease. In India, where housing and environmental conditions are, to say the least, deplorable, and the standard of living very, very low, this proportion must naturally be much higher. But even assuming, in the absence of reliable statistical data, that the proportion in India is the same as in the United States, for about a million known deaths from tuberculosis, there must be at least ten million people suffering from active disease, out of which at least about 50% or more must be in an infectious state. And it has also to be remembered that the incidence and mortality are heaviest between the ages of 18 and 35, when they are about to enter life after education, or are in the prime of life, responsible for maintaining their families.

But what are the facilities available in the country for the treatment of these people? All told there were only 7,295 beds all over the country at the end of 1949; 520 beds have since been added; and we are left with only 7,815 beds in all. The cost of maintaining a bed being Rs. 8,000 a year, it is next to impossible for the State to find this colossal sum of 800 crores for this one disease alone. Even in well advanced countries, the expenditure on tuberculosis is not borne entirely by the State. In Switzerland the Government contributes 15%; in Greece 20·25%; and in the U.S.A., according to the President, at least 50 times more per head is spent than what it is in India. Even if we are to follow the Switzerland proportion, the Governments in this country would have to contribute 120 crores a year. This is next to impossible, and we have therefore to attach the greatest importance to the preventive aspect, at least to avoid the contacts catching the infection.

Dr. RAO recommends nationwide vaccination with B.C.G. While the progress of this course has been satisfactory in other parts of India, people in the South have not taken kindly to it, due probably to the strong opposition voiced by an influential group of persons. When in course of time the evils and complications supposed to result from B.C.G. are proved to be unfounded, public response would be greater than it is at present. Dr. RAO estimates that one team of vaccinators can vaccinate about 100,000 persons a year and at this rate at least 200 teams would be required to cover the whole country. The expenditure would come to about 30 lakhs a year at the rate of Rs. 15,000 for a team in a year. It should not be difficult for the Governments in this country to provide this money. But the plan will fail in its purpose unless, side by side with it, steps are also taken to improve envoronmental conditions and nutrition. If with B.C.G. vaccination, the standard of living and public health are improved, the President believes that in the course of 15 or 20 years mortality from tuberculosis can be reduced to 4 5 the present rate. But it is a big "if", and it is for the

Governments to take effective steps to bring about that laudable consummation.

On the curative side, while the advent of Streptomycin and other antibiotics has brought about a revolution in the treatment of tuberculosis, the President has turned to the other side of the shield and pointed out its drawbacks and the complications it creates when used injudiciously. He says: "In certain types, the organism appears to have a tendency to grow more luxuriantly in the presence of Streptomycin and so the patient gets worse. In certain other forms, the tubercle bacilli become resistant to Streptomycin and so Streptomycin has absolutely no effect on that particular individual. This second complication is a very great danger from the public health point of view because the contacts who are infected with the disease by Streptomycin-resistant patients also become Streptomycin-resistant. Thus the number of resistant cases would increase and would become a positive danger to society and nullify the good effects of this drug". It therefore becomes necessary for the Governments and organisations engaged in tuberculosis relief work to see that those who are entrusted with the treatment of cases are well equipped with the knowledge needed to treat them.

When accommodation for institutional treatment is very meagre and some sort of home treatment has to be given to a large number of patients, it becomes necessary to equip the general practitioners also with the required knowledge. For this purpose the President suggests that Refresher Courses in tuberculosis must be held in different parts of the country more frequently than it is done at present. This would not involve any extra expenditure and it should not therefore be difficult to arrange for it at regular intervals.

Finally, the President suggests that a comprehensive scheme should be drawn up for each State, laying down definitely the lines on which it should be worked out on a three-year period, the ultimate goal being aimed at in the course of five to ten such periods. We commend this suggestion to the earnest consideration of the Governments, Central and States, for immediate attention.

Radium Treatment of Cancer of the Rectum

In post-operative superficial recurrences of rectal cancer complete regression with healing was obtained by employing a uniformly distributed, appropriate dose of radium at least equal to that used in cancer of the skin. Only mucus secreting tumours were found to be resistant to radium. The tolerance exhibited by the rectal mucosa had a definite relation to the type of the filter used; *e.g.*, it was greater when a 2 m. m. platinum filter was used than when 1 m. m. thickness was employed.

In 11 cases early carcinoma situated low in the rectum 1 to 2 inches in diameter was treated. In six of them satisfactory results were obtained which have lasted for 3 to 7 years. The five which did not respond were mucus-secreting adenocarcinomata: The author concludes that the use of 2 m.m. platinum filters presents possibilities in the treatment of inoperable cases.—*Polsk. Tyg. Lek., Eng. Abst.*, 4, 513-515, Jan. 1950.

Gleanings From Medical Press

SURGERY

The prevention of secondary hæmorrhage following tonsillectomy.—Secondary hæmorrhage following tonsillectomy is a very real problem—much more so than realized by the average operator. After careful surgery has been performed Jones [*Southern Medical Journal*, 42: 124, February, 1949] prescribes the following regimen for his tonsillectomy cases:

1. Aspirin should *not* be prescribed in amounts sufficiently great to cause hypoprothrombinæmia; furthermore, it "should not be prescribed, in any form, for local administration following tonsillectomy". (The author specifically prohibits the use of chewing gum containing aspirin).

2. A combination of 5 mg. Synkayvite and 100 mg. ascorbic acid is given 3 times daily to all patients, occasionally for several days before operation and always post-operatively.

3. Sulphanilamide or sulfathiazole powder is sprayed into the tonsillar fossæ twice daily after operation to prevent infection. Sulfathiazole nose drops are used following adenoidectomy.

Jones treated 75 cases this way with not a single case of secondary hæmorrhage. In conclusion he advocates the routine use of Synkayvite and ascorbic acid for all patients undergoing tonsillectomy.—*Medical Times.*

Experiences with cardiac arrest.—F. H. Lahey and E. R. Ruzicka (*Surgery, Gynæcology and Obstetrics*, 90:108, Jan. 1950) report that 13 cases of cardiac arrest occurred in the operating room at the Lahey Clinic in seven years. Of these 13 patients, 5 recovered, and in the other 8 the cardiac arrest was overcome, but 7 patients died later due to cerebral damage, and one of acute cardiac failure. On the basis of the results in these cases, the authors conclude that in cases of true cardiac arrest, cardiac action must be restored within three and a half minutes if the patient is to recover without cerebral damage. In order to treat cardiac arrest successfully the anesthetist and the surgeon must be on the alert. In most cases the anesthetist will be the first to be aware of cardiac arrest and must notify the surgeon. Cardiac arrest may occur in any type of operation and with any type of anesthesia. In the cases reported, cardiac arrest occurred during a chest operation in 3 cases; an abdominal operation in 4 cases; thyroid operation in 2 cases; sympathectomy, brain operation laryngoscopy in one case each; and during induction of anesthesia in 1 case. A planned programme of treatment of cardiac arrest is necessary, and the required instruments and drugs should be immediately available. The plan of treatment advocated by the authors consists of: Artificial respiration with 100 per cent oxygen: immediate cardiac massage; drug therapy with procaine and epinephrine; general methods, including intravenous administration of fluid and the Trendelenburg position. The cardiac massage is "the all important step," and should be instituted at once by the surgeon; however, if procaine and epinephrine are immediately available, a cardiac puncture is done for aspiration of blood and injection of the solution; this procedure is not indicated unless the syringes and solutions are ready for immediate use. For artificial respiration with oxygen an unobstructed airway is necessary, and an endotrachial tube must be inserted by the anesthetist, while other procedures are being carried out, if such a tube is not already in use. Artificial respiration may be needed in some cases for hours after cardiac activity is restored; and in other cases for only a few minutes. The epinephrine-procaine solution for intravenous injection contains 0·5 cc. of epinephrine 1:1000 and 9·5 cc. of procaine, 1 per cent; so that both drugs maybe given simultaneously, preferably into the antecubital vein; or it may be injected into the heart as noted

above. If cardiac activity is slow in returning, epinephrine may be omitted for a time until some degree of automatic cardiac activity returns; but procaine should either be repeated or be given by continuous intravenous drip until the cardiac action is regular.—*Medical Times*, Aug. 1950.

Amniotic grafts in chronic skin ulceration (Preliminary report of the successful results).—(*Lancet*, 6-5 50, pp. 859-60).

Dr. E. Troensegaard-Hansen, F.R.C.S. of the Charing Cross Hospital, London, obtained good results between 1939 and 1942, in 7 bedridden patients aged 60 to 80 years who had ulcers for 4 to 15 years, and were in hospital for 3 years, by applying amnion grafts. He applied these to six and had the seventh dressed with soft paraffin gauze only as a control. In 10 weeks the six ulcers treated with the amnion healed up completely and the control had not. This was subsequently treated with amnion and healed up in 5 weeks. He, therefore, firmly believed that amniotic membrane possessed some specific healing power. Chao *et al* (*Bri. Med. Jour.*, 1940: 1, 517) used amnion to close dural defects. In 1949, he started a new series of cases in Charing Cross Hospital, and so far there had been a single failure.

Technique :—The "caul" (fœtal membrane) is obtained from the obstetric wards within 24 hours of a delivery. It is cleaned and the amnion is carefully freed from chorion and clots. To be suitable for use the amnion must be thin, clear, tensile and strong with no yellow tinge from meconium staining. The amnion, thus collected and cleaned, is boiled for 7 minutes in normal saline (0·85 per cent) and preferably used immediately. It can, however, be safely kept dry in a sterile pot for 24 hours, but if not used within this time should be discarded. An average confinement provides a piece of amnion about 8 inches square which on boiling contracts to 4 inches square.

The patient, on admission, has his ulcer scraped with a Valkmann's spoon under general anæsthesia. A dressing of phenoxetol cream is applied covered with gauze and left *in situ* for 5 days after which the dressing is removed, the ulcer gently cleaned and the prepared sheet of amnion is carefully spread over it. Hansen has found it best to apply the smooth side which secretes the amniotic fluid *in utero*, to the ulcer. The area is next covered with soft paraffin gauze and wool held in place by pressure bandage. Patient is sent home to rest in bed and dressing is removed after 6 to 10 weeks according to the size of the ulcer. No other treatment is given.•

Pulmonary resection in pulmonary tuberculosis.—(*Dis. of Chest.*, 17, April 1950, pp. 464-479).

In an elaborate and well-illustrated article, Drs. Perez, Caeiro, Langer, and Wolaj of Cordoba in Argentina (S. America) review the entire available literature on this subject, and report on the results of their experience of pulmonary resection in three complicated cases of pulmonary tuberculosis. The subject of the above article formed the basis of a demonstration at a meeting of chest physicians from different parts of America and an interesting discussion followed. Some of the facts brought out during this discussion are very illuminating. Below is given the outstanding experience of *Dr. J. D. Murphy of North Carolina* :—Pulmonary resection is reported to have been done in 616 cases up to May 1948, with an overall mortality of 26%, and an immediate operative mortality of 15%. His own experience prior to the advent of Streptomycin was limited to eleven resections, for residual post-thoracoplasty cavities. The results were discouraging. Since January 1947, he had done 74 resections *using Streptomycin as a prophylactic* agent in spreads, empyemata and fistulæ. Indications for which the operations were performed are:—(1) Residual cavity after thoracoplasty 38 cases, 13 of whom had endobronchial disease. (2) Failure of collapse therapy 13 cases, endobronchial disease was present in 5 of these and hilar or basal cavity in 5. (3) Tuberculer bronchiectasis 13 cases and destroyed

lung 10 cases. (As an elective procedure 7 cases, severe endobronchial disease 3 cases, tuberculoma one case).

In view of the established safety of pulmonary resection, using modern surgical technique, with Streptomycin and adequate blood replacement, there can be little quarrel with any of the above indications, except that of elective procedure. The low mortality and favourable early results in his series is shown *by comparing the operations done in the pre-streptomycin era with those following the use of Streptomycin.* Early deaths have been reduced from 18% to 8·1%; late deaths from 18% to zero; empyemata from 55% to 5%; fistulæ from 55% to five per cent; spreads have been reduced from 27% to four per cent; sputum conversion has been increased from 55% to 92% of the living patients.

OBSTETRICS AND GYNÆCOLOGY

The present status of penicillin in the treatment of syphilis in pregnancy and infantile congenital syphilis.—(*Am. Jour. Med. Sciences*, Apr. 1950).

Crystallizing the information on penicillin therapy in the prevention and treatment of congenital syphilis, Ingraham and Beerman of Philadelphia have furnished a statement to the Expert Committee on Venereal Infections of the W.H.O. This brings up-to-date all published material, and clarifies the clinical observations originally made. The authors present a fully explanatory statement of principles with respect to the use of penicillin in the prevention of congenital syphilis:—

A. *Pregnancy and syphilis*:—The following facts are fairly well established in the treatment of the syphilitic pregnant woman with penicillin.

(1) Penicillin readily permeates the human placenta. This occurs in the later months of pregnancy and indeed as early as the tenth week of gestation.

(2) Very small amounts of penicillin, even total dosage in the magnitude of 300,000 to 600,000 Oxford units, given to women with active recently acquired syphilis in the latter months of pregnancy, are often adequate to prevent infection of the fœtus in utero and to result in the birth of a healthy infant. Even though a mother is not cured of her syphilis, she may yet give birth to a normal healthy baby through penicillin treatment during pregnancy.

(3) Pregnant women treated with larger amounts of penicillin will give birth to almost 100 per cent non-syphilitic infants regardless of the stage of syphilis treated. The infrequent failures following penicillin treatment may be due to 2 causes: (*a*) the fœtus may have been diseased beyond recovery before starting treatment; (*b*) a single course of penicillin treatment given to the mother with active infectious syphilis usually early in pregnancy may be insufficient to result in the cure of the mother.

(4) Penicillin need not be supplemented by arsenic or bismuth as the penicillin alone will protect the fœtus satisfactorily. These results are not likely to be improved by arsenic or the heavy metals. The toxicity of arsenic makes its use contra-indicated in this circumstance when penicillin is more effective.

(5) Treatment reactions to penicillin have not proved to be serious or to need any modification of the course. The fear that penicillin may induce uterine contractions, placental separation or premature labour has proved groundless, except in the case of grossly diseased fœtus.

Points still open to some controversy or doubt in the penicillin treatment of pregnant women:

(1) *The optimum treatment course*:—Since larger amounts of penicillin (a total of 2·4 million Oxford units administered every 2 to 3 hours at the rate of 40 to 50,000 units) will *not* apparently harm the fœtus, it seems best to gauge the dose for the mother on the requirements of the maternal syphilis rather than base it on the optimum dosage to

protect the fœtus. The optimum duration of treatment with penicillin for the syphilitic pregnant woman has not been finally determined. Till now 7 to 12 days' treatment has been used with success. Shorter courses have not been appraised. Syphilitic babies born of mothers with active syphilis who have been treated with penicillin during pregnancy averaged 1·8% to 2·0%.

(2) *The addition of absorption delaying vehicles to penicillin for ambulatory treatment* is still a matter awaiting final decision. Provided the preparation used can be relied upon to give sustained blood and tissue levels of penicillin in both mother and fœtus, there is no reason to feel penicillin in absorption delaying vehicles is not satisfactory for the treatment of the syphilitic pregnant woman.

(3) *Re-treatment of women in subsequent pregnancies*:—If a woman is "*cured*" of her syphilis by penicillin treatment as revealed by necessary tests, she may safely go through subsequent pregnancies untreated without risk of infection of the fœtus. The crux of the problem, however, is the criteria of *cure*. Because of the difficulty of correctly assessing complete cure in every case, it is not certain that withholding treatment in subsequent pregnancies can, as yet, be recommended as a standard routine procedure.

B. *Infantile syphilis*:—The time to treat infantile syphilis is *prenatally*. The offspring of syphilitic parentage should be uniformly studied for syphilis regardless of clinical appearance of good health, by blood tests, by X-rays of the long bones, and other tests. Therapeutic shock will occur in 50% of infants with congenital syphilis and may be severe (high temperatures 104° F 105° F., circulatory collapse etc.) It is desirable not to modify the penicillin dosage. The superiority of penicillin over other types of therapy in the infant is that it will treat intercurrent pyogenic infections as well as syphilis.

The number of motile spermatozoa as an index of fertility in man.—(*Jour. Urology*, 61, 1099-1104: *Amer. Pract.*, March 1950).

Dr. Edmond J. Farris analysed 406 semen specimens supplied by 239 men. 70 specimens were supplied by 49 men who were fathers. Every one of these 49 possessed at least 83 million or more active sperm in his total ejaculate. Men whose wives conceived readily had higher active sperm counts than those whose wives conceived with difficulty. 23 men supplied 46 specimens for analysis. Each man supplied 2 specimens on succeeding days. Men with counts of 185 millions or more active sperm on the first day had fertile counts of 83 million or more moving sperm on the next day. Men with counts of less than 185 millions on the first day had subfertile counts of less than 83 millions on the second day. Men whose sperm counts averaged more than 83 million moving cells in the total ejaculate had proved themselves fertile. Men with characteristically better semen pictures had *more* children. The male with more than 185 million active sperm remained in the fertile zone at the second emission on the following day and possessed at least 83 millions moving **active sperm.**

3 groups were classified according to fertility:-Males with more than 185 *million* active sperm in the total ejaculate were classified as *highly fertile*. Those with a range of 83 *to* 185 *millions* as *relatively* fertile. Men exhibiting *less than* 83 *millions* active sperm in the total ejaculate as *subfertile*. Sperm counts of certain individuals vary from time to time and this fact would account for an occasional conception that may occur among those men classed as subfertile.

[The author considers this classification as the *best means for evaluating the fertility of the individual* short of his ability to produce offspring. *No man* with a total active sperm count of *less than* 83 *millions had been able to have children.*]

Value of vaginal smear.—(*Amer. J. Obst. Gynæcol.*, 58, 843-850, 1950).

Drs. Graham and Meigs carried out the examination of the vaginal smears during a period of six years from 1943-1948, as an aid in the diagnosis of uterine cancer. A total of 8130 slides

was examined and 432 cases of carcinoma of uterus were detected. The false positives in this large series were negligible being only 0·04 per cent. A positive smear thus meant the presence of cancer. False negative smears were about 10 per cent. This figure was due to the absence or paucity of cells in advanced cases and a lack of exfoliation in others. Smear and biopsy diagnosis are really complementary and not independent rival methods.

RADIOLOGY

Differential diagnosis between benign and malignant ulceration of the stomach.—(*Br. Jour. Radiol.*, 22, 280-283, 1949).

Dr. Elekeles examined lateral radiographs of the abdomen of 184 patients over the age of 50 for the presence of calcification of the aorta. This was with a view to correlating the incidence of gastric ulcer and gastric carcinoma with the presence of general arteriosclerosis. 32 of the 184 patients suffered from gastric carcinoma, 36 from gastric ulcer and 55 from duodenal ulcer. In 61 cases there was no evidence of disease in the gastrointestinal tract.

The percentage of cases in each group in which evidence of aortic calcification was found was:—gastric ulcer 69·4: duodenal ulcer 14·5: gastric carcinoma (only one case) 3·1 and the controls 22·9. The relatively high value for the gastric ulcer group is significant. The available literature also supports the theory that vascular occlusion resulting from arteriosclerosis is frequently the cause of gastric ulcer in middle-age and old-age. *The strikingly low incidence of calcification of the aorta in cases of gastric carcinoma would appear to lend support to the view that this might be used as an index (or at all events an additional confirmatory evidence) in the differential diagnosis between benign and malignant ulcer of the stomach.*

Irradiation of the pituitary gland in treating hypertensive vascular disease.—*Am. Jour. Sciences*, 219, **3,** March 1950, pp. 276-281).

Best *et al* of the Institute for Medical Research, Louisville, Ky. studied 43 hypertensive patients (aged 27 to 65). 25 were treated by irradiating with 2000μ units (measured in air) the region of the pituitary gland, as recommended by Burn and others, without significantly lowering of blood pressure. 17 (68%) had symptomatic improvement. 3 (12%) showed a fall in blood pressure of 30 mm. Hg. systolic or 20 mm. Hg. diastolic, but no other objective evidence of improvement was noted. The 18 control patients were managed in an identical manner with the treated group except for the roentgen therapy (which was not actually given). 14 (78%) improved symptomatically. 3 showed a fall in B.P. of the same order as the treated series (above). The only complication noted as a result of the roentgen treatment (3 to 5 months duration) was a loss of hair in the temporal region of some patients.

MEDICINE AND THERAPEUTICS

Streptomycin resistance of tubercle bacilli.—(*Br. Med. Jour.*, 27-5-'50.)

In a leading article the *British Medical Journal* reviews the recent report to the "Streptomycin in Tuberculosis Committee" of the Medical Research Council by a band of distinguished research workers (from the Brompton Hospital and the Post-graduate Medical School of London). This team of eminent chest surgeons and specialists carried out an investigation to attempt to alter the development of streptomycin resistance by the use of four different schemes of dosage. In the first, a group of 9 patients was treated with 0·5 g of streptomycin six-hourly for alternate weeks; in the second, 13 patients were given 0·5 g six hourly for alternate months; the third group of 12 cases had 0·25 g of streptomycin six hourly without intermission: and the fourth group of 11

patients had 1·g (one gramme) in one single dose daily without intermission. The cases were all of acute progressive bilateral pulmonary tuberculosis, of recent origin, unsuitable for collapse therapy, the patients being between 15 and 30 years of age. Treatment was continued for six months and the time, in the course when streptomycin resistant organisms were isolated from the sputum was noted for each case, and the results in the different groups compared. The emergence of streptomycin resitant bacilli in all the four groups occurred at the same time and in the same proportion of cases in each group. The degree of resistance was also of the same order in each group. So the attempt to delay the emergence of streptomycin resistance was a failure. The groups were also reviewed from the point of view of radiographic and clinical change during the period of treatment. No significant difference was seen between them. The single injection of 1 gramme daily was as satisfactory as the more elaborate methods. Since this trial ended it has become clear that the most promising work or the possibility of delaying the emergence of streptomycin resistance is concerned with the use of other drugs with streptomycin.

The report of Karlson *et al* (*Amer. Rev. Tuberc.*, 59 : 438.) and the preliminary statement by the British Medical Research Council (*Lancet*, 2, 1237 : 1949) suggest the use of *P.A.S. concurrently with streptomycin*, to reduce the incidence of streptomycin resistant tubercle bacilli. The idea of combined drug therapy is not new and has been used in other infective processes. It has not been developed in tuberculosis. Yegian and Vanderlinde (*Amer. Rev. Tuberc.*, 1950, 61 ; 483) have reported favourably on combined drug therapy, such as the use of drugs *from the very beginning* of drug treatment or the use of one drug for a period and then the addition of the other. "If the second drug is withheld too long the bacterial population may increase and consist chiefly of cells resistant to the drug given initially and resistance to the second drug may occur as rapidly as if it had been used alone ; thus the effectiveness of combined therapy in reducing the incidence of resistant strains will be lost."

Carstensen and Linde Andersen (*Lancet*. 1950, 1 : 878) *use P.A.S as a routine* in the treatment of tuberculosis and *supplement it by short courses of streptomycin* when serious complications occur or before surgical procedures. They have found that the combination of the two drugs in this way does *not prevent the emergence of* resistance to streptomycin. So far there have been no reports of the development of strains resistant to both drugs given in combination to patients who have never previously had either.

Oral and pharyngeal complication of chloromycetin therapy.—(Williams, B., *Amer. Practitioner*, Sep. 1950, pp. 897-900).

Williams directs attention in this paper once again to the oral and pharyngeal complications that arise during the treatment of infections, by the administration of chloromycetin. Of 200 patients receiving the drug, he observed 12 (or 6 per cent) who developed glossitis and black tongue, stomatitis, pharyngitis, and infection of the mouth and throat by the yeast like fingers, *Monilia albicans*, while they were on chloromycetin therapy. In 6 of them, the symptoms were so severe that treatment with the drug had to be discontinued. Apart from the symptoms and signs of inflammation, there was a change in the bacterial flora of the mouth and throat so that monilia albicans could be easily isolated and signs of moniliasis were seen in five of them. The pathogenicity of Monilia albicans for man is usually limited to nursing infants (particularly the malnourished or unclean infants) and to adults in the terminal stages of wasting diseases.

Sommer and Favour (*Amer. J. Med.* 7, 511, 1949) reported 4 patients who were being treated with penicillin in whom the bacterial flora changed from gram positive to a predominating gram negative type. These were either old people or those weakened by disease.

Chloramphenicol has been proved to be effective against a large number of bacteria of both the gram positive and gram negative group. In some this antibiotic apparently therefore suppresses both groups to an extent that allows overgrowth and invasion by the yeast-like fungus. The possibility that this same type of invasion may occur in the lungs or elsewhere in the body with more serious complications should be kept in mind. It is possible that some of the reactions observed in patients receiving chloromycetin may be due to the local effects of the drug. Salivary excretion is evidenced by a bitter taste noted by many patients receiving 2 gm. a day. The 12 cases who developed the toxic symptoms noted above, were patients who were treated for acute pyelonephritis, regional enteritis, bronchiectasis, urinary tract infections, subacute bacterial endocarditis, severe ulcerative colitis, pneumonia and amœbic dysentery.

Terramycin.—(*Lancet*, 10-6-1950, p. 1080, Annotation). Is a crystalline compound which forms salts with both acids and bases ; these are stable at room temperature and may be kept without loss of potency for at least a year. This new antibiotic is effective against gram positive and gram negative organisms and some rickettsiæ and viruses. In many respects terramycin is comparable in its range of activity to aureomycin, and like aureomycin and chloromycetin is effective by mouth. In doses of 500 to 750 mg. six hourly (*i.e.* 2–3*g* daily) it can be detected in active concentrations in the blood C. S. F., pleural cavity, bile, urine and fæces. It also passes the placental barrier and so can be given in pregnancy for the treatment of mother and fœtus. Terramycin is relatively non-toxic, and according to Herrell *et al* of the Mayo Clinic the diarrhœa, nausea, and vomiting that sometimes occur when taken in an empty stomach can be overcome by giving it in a capsule with milk. Glossitis is sometimes noticed, and is a side effect which has been described with other antibiotics taken by mouth. With ordinary dosage terramycin excreted in the fæces may produce concentrations as high as 2·5 mg. per c.c. Considerably higher concentrations are attained in the urine with terramycin than with aureomycin.

Organisms sensitive to terramycin are pneumococci, *Staph. aureus*, *Streptococci* hæmolytic and nonhæmolytic, pertussis, *Influenzae*, *Ba. abortus*, *Suis*, *melitensis*, Freedlander's bacillus, *B. coli*, *pyocyaneus*, *P. tularensis*, spirochaetes, Q fever, rickettsial pox and the viruses of primary atypical pneumonia, lymphogranuloma venereum, and influenza. The preliminary clinical trials of Herrell *et al*, King *et al* and Hendricks *et al* in the U. S. A., show that conditions responding satisfactorily to terramycin include pneumococcal pneumonia, urinary tract infections due to *B. coli*, Ba. pyocyaneus and streptococci ; bacteræmia due to susceptible organisms ; lung abscesses ; follicular tonsillitis ; and erythema multiforme. In syphilis, gonorrhœa and granuloma inguinale also, it has given very good results.

Effect of rigid sodium restriction in cases of ascites and cirrhosis of liver.—(*Jour. Lab. Clin. Med.*, 34, 1029-1038).

Eisenmenger and his collaborators studied 13 patients admitted into the Rockefeller Institute Hospital, New York, with cirrhosis of the liver. Ascites was present for 4 to 48 months prior to the onset of low salt therapy and had necessitated 2 to 78 paracenteses. None of the patients were suffering from an enlarged acutely decompensated fatty liver at the time of admission. The diets used were prepared by trained dietitians who kept careful records of the daily intake of protein, fat, carbohydrate and salt.

All the 13 patients studied showed complete cessation of ascites formation when the sodium chloride was limited to 1 gramme per day. Higher intakes caused ascites formation in direct proportion to the NaCl given. An average critical level of NaCl intake was obtained for these patients above which ascites formation occurred. This was 1·2 gm. per day. The reason for this direct relation between NaCl intake and ascites was that the NaCl excretion in the urine was extremely low regardless of how much NaCl was given in the diet ; with this low excretion of NaCl it is apparent that the large part of the NaCl intake is utilised to form ascitic fluid.

All but one of the 13 patients were able to tolerate the low sodium regimen for at least 3 months without ill effects. All of them showed a rise in serum proteins on the low sodium diet. *The general clinical results of a 3 months period* on the low NaCl diet were evaluated by studying the effect of normal sodium intake on ascites at the end of three months. Four patients recovered completely, in that they were able to excrete the increased sodium intake and they did not re-form ascites. These patients gradually absorbed the remaining ascitic fluid and returned to a normal life. Eight were still unable to excrete larger amounts of Na and accumulated ascites on the normal diet. These had not regressed during the 3 months of sodium restriction and all of them appeared slightly improved but they had not been cured. No restriction was reinstituted in these 8 cases; three of them have since showed increased sodium excretion representing loss of ascitic fluid after more than 6 months of therapy; others are being still treated with combined liver extract and low sodium therapy.

In all the patients the diet appeared to be beneficial in stopping the malignant course of events brought about by removal of protein through paracenteses in the already depleted patient, thus enabling dietary therapy to become effective. The long term clinical results are difficult to evaluate but the fact that ascites formation could be completely controlled by rigid sodium restriction was clearly evident.

BOOK REVIEWS

The Practice of Medicine By JONATHAN CAMPBELL MEAKINS, C.B.E., M.D., L.L.D., D.SC., Formerly Professor of Medicine and Director of the Department of Medicine, McGill University; Formerly Physician in-chief, Royal Victoria Hospital, Montreal; Fellow of the Royal Societies of Canada and Edinburgh; Fellow of the Royal Colleges of Physicians, London and Edinburgh &c., &c., &c, 1950, 5th Edition, 1558 pages with 518 illustrations including 50 in colour. [The C. V. Mosby Company, St. Louis.]

This fine text book is intended mainly for the student of medicine and the general practitioner to enable them to solve the many complicated problems which confront them in their daily work. As the author mentions in his introductory chapter, "the practice of medicine deals with human beings and requires a complete understanding of all aspects of human life." The whole book has been written with this aim in view. Beginning with a chapter giving hints as to the proper approach to all patients and to evaluate symptoms in the proper manner, the author proceeds to follow the usual orthodox manner. The diseases of the various systems are described in a detailed manner. There are chapters on diseases of nutrition and metabolism. The subjects of allergy and chemotherapy and antibiotics are thoroughly discussed. Diseases due to chemicals and drugs have a separate chapter. The chapter on psychosomatic medicine requires special mention. All these and other chapters are well written and show the scholarship and broadmindedness of the author. The illustrations are very good and are informative. The general get up and printing are also excellent. We congratulate the author on his great work and recommend it to all concerned.

—J.K.R.

Adolescence Problems By WILLIAMS S. SADLER, M.D., F.A.P.A. Chicago [The C. V. Mosby Company, St. Louis.]

Adolescence is the period of transition between childhood and adulthood. To many youths and to many parents this transition is a very trying experience. Love and proper guidance will solve many of the troubles. This book is written for physicians, parents and teachers and is designed to make available for them the counsel and guidance necessary to help youth to tide over this difficult period. The discussion has been undertaken in six sections—Psychological and emotional life, home and family life, education and schools, social and economic adjustments, sex problems and moral adjustments and abnormalities of adolescence. Such important questions as 'What is Adolescence? What is the value of recreation in adolescence? What is the influence of home and family life on youth? What hints would you give to parents in the management of youth? What are the educational and social problems of adolescence? What are the duties of the adolescent to his country and in what manner can his services be utilised? What are his sex problems? How can we prevent youth from becoming a delinquent? are discussed in detail and many constructive suggestions are given in the answers to these interesting questions. The author has brought to bear on all these problems his experience of over forty years of work and has incorporated in these discussions modern opinion of both educators and psychiatrists. It is a difficult subject well written.

—U.K.R.

History and Trends of Professional Nursing—By DEBORAH MAC LURG JENSEN, R.N., B.S., M.A., 1950, Second Edition, pp 365, Illustrated [The C. V. Mosby Company, St. Louis.]

This book gives a vivid description and the trends which have influenced the development of nursing as a profession, since its very origin from the earliest of times in Europe and America and its influence on the various Eastern countries. The book is divided into XIX units; and begins with pre Florence Nightingale Nursing as a background for the development of Professional Nursing. Development of Nursing has been traced under three periods: (1) From the earliest of times until the latter part of the 18th century. (2) From the latter part of 18th century until the establishment of the first Modern School for Nurses at St Thomas Hospital, England, in 1860. (3) From 1860 until the present.

Writing of ancient hospitals, mention is made of Lord Buddha's instruction to villages to construct and maintain a separate building for the care of the sick. "They were complete with kitchen and operating rooms, and strict and simple regulations were established for the equipment of the hospital. The old Hindu Surgeon was highly respected and capable of considerable surgical technique, though somewhat conditioned by religious ritual. Much was done to look after the patient's spiritual welfare, and kindness was a prominent feature of the institution. It was maintained by a regular tax. Similar institutions were established for the care of the sick animals. . . ." In another place is found: "When we study the state of nursing in a country like India we are impressed with the importance of these factors. . . We see here a country with an age old culture of the highest order, where poetry and other literature rank high, where riches have been amassed almost beyond comprehension, and where religious and ethical philosophy are highly developed, as well as the social structure. Though these may seem strange to the Western minds, they are certainly not primitive or underdeveloped as they are in the Australian or African wilderness." In 1885 under the Lady Dufferin Fund helped by all the royalty and nobility of India, nursing aid to the various institutions were started under the inspiration of Queen Victoria and Florence Nightangle-thus began the modern nursing in India. But it will be very interesting to note, that the Madras hospital began training in nursing as early as 1854. Nursing in India has thus grown to what it is today, striving to bring home modern health conditions to its teeming millions spread through its remotest villages.

It is a very interesting book which would be found useful by all interested in nursing and to the nurse an inspiration.

Scientific Principles of Nursing—By M ESTHER MC CLAIN, R.N., B.S., M.S., 1950, pp. 410, Illustrated [The C. V. Mosby Company, St. Louis].

This book describes in detail how basic science and scientific principles help in training nurses and how nursing procedures may be carried out intelligently in their practice.

The author stresses the need for mental and physical health, alertness, technical competence, dependability, ability to inspire confidence, resourcefulness, poise, consideration for others, co-operation, agreeableness, culture, satisfaction from work, and professional responsibility, to be included in the curriculum guide for Schools of Nursing. These characteristic features must be acquired by every one who wishes to be a nurse. Only then can she exert a good influence in her patients, inspire in them a desire to live, and be an example of mental and physical health.

The book is divided into five units: Orientation to hospital nursing, the patient in the hospital, the patient's needs, making the diagnosis, and the therapeutic measures. A well thought out book which would help all those engaged in the training of nurses in their effects and for the pupil nurses, a very useful guide in their management of the sick.

We recommend it to all our readers and institutions interested in the teaching of nurses. The illustrations, printing and the get-up are of a high order.

Eyes and Industry—By HEDWIG S. KUHN, M.D., 1950, 2nd Edition with 151 text illustrations and 3 colour plates. [The C. V. Mosby Company, St. Louis].

With the growth of industry, the relation of visual acuity to the economy of the industry has been greatly appreciated, and many problems regarding Vision and Industry have of necessity produced what is called Industrial Ophthalmology.

Industrial Ophthalmology demands a thorough understanding of the principles of industry, with reference to efficient vision in all phases of production, and hence it is essential that practitioners doing medical inspection of workers in factories and industries with reference to Eye Sight, must have a thorough knowledge of detecting defective vision correcting these defects, and providing other Ophthalmic Services, illuminative factors, protective services etc., sorting workers for particular work in accordance with visual acuity, so that man power may be conserved, and even the blind and the semi blind can find a place among the workers of a factory.

This book gives all about the need and care of good eyes, and medical men engaged in industry will find much that is needed to produce, to avoid waste, through errors and inaccuracies. One must see, have eyes, and use them effectively, and to have two eyes or even one eye, one must guard them by physical protective devices. This book tells you all about them. There is a very useful appendix. We recommend it to all industrial workers particularly to the medical men

engaged in medical inspection of factories. Here is a much needed book. The illustrations are very instructive.

Mastering Your Nerves—By A. T. W. SIMEONS M.D. First Indian Edition; Published by D. B. Taraporevala Sons & Co., Ltd., 210, Hornby Road, Fort, Bombay-1. Price Rs 4/-

Messrs Taraporevala Sons & Co., Ltd., deserve to be complimented on bringing out a cheap Indian edition of this highly instructive and useful foreign publication. It is a mine of information which should be studied by every one anxious to preserve his or her health. The intention of the book, as stated by the author, is to prepare the patient and put him on the right track. The people have been brought up to believe in *mind over body*. So one gets terribly alarmed when the body shows signs of usurping power over the mind. But the truth is that when the mind and body quarrel, it is always the body that comes out on the top. The human mind is generally foolish; the body never. The trouble with the mind is that it does not appreciate the basic fact that all the internal activity in the body is governed by a nervous system which is very largely independent of the higher centres of the brain and is therefore called the ***autonomous nervous system***. The mind therefore continues to hurl unjustified abuse and slanderous invectives at its humble servant as a result of absolute ignorance as to how the body and its nerves work. Once we understand their ways our nerves cannot get the better of us so easily as is the case with many at present. Written in very simple and easily understandable language, its great merit lies in its highly practical and feasible suggestions. Divided into 16 chapters, it deals practically with every supposed ailment and gives out useful suggestions to get over it. It would be a great boon to the public who are unfamiliar with the English language if the book is translated at least in the most important regional languages and the knowledge made available to them. The get-up leaves nothing to be desired.

From the Hills—By JOHN ZAHORSKY, M.D. Published by The C. V. Mosby Company, St. Louis, U.S.A.

The title of the book might lead one to think that it is either a story from the hills, or one describing something notable and important in the hills. It is neither the one nor the other. It is a very interesting, educative and highly instructive autobiography of a pediatrician who worked his way up from very small beginnings and secured a leading position among the pediatricians and who still continued to carry on in the third or declining period of his life. The love for the family name is so great in him that he has chosen its English equivalent as the title of this book. While the author thinks that this book may be interesting to his grandchildren if they ever have enough leisure to read it, or to some of his former little patients, grown up now, we are sure that the history of the trials and tribulations he had to pass through early in his course and the perseverance and industry with which he overcame them all, are object lessons for budding practitioners aspiring to rise high in the profession. The time when he started practice was not propitious; the financial depression which had begun a few years earlier persisted; the political atmosphere was saturated with accusations and recriminations between the rival parties; money was scarce; the price of necessities had advanced sharply; the factories and shops had requested their employers to march for gold; and sick people everywhere crowded into the free clinics for medical advice and the family doctor was dismissed. Yet, undaunted, he carried on in hope, and that did not fail him. The secret of his success lay in the correct code of conduct he laid down for himself. We shall quote his own words: 'It is an old economic law that no one can acquire great wealth without making some one poorer. This law also applies to the medical profession. An epidemic invariably makes the doctor prosperous and his clientele poorer. An era of prosperity acts the same way, for the parents desire protection for their offspring. They consult physicians for trivial disorders and go to the highest priced specialists who are assumed to be better than the family doctor. When a financial avalanche descends, the pediatricians must repay his friends by lowering his fees and increasing his charitable contribution. His net income skids down and he finds himself in the valley where he started. Despite the precipitous descent, I never became morbidly depressed. Had not the children's doctors with the help of scientific research conquered the contagious diseases? Had not the death rate of infants and children fallen more than fifty per cent? Can dollars yield as much satisfaction as a conviction that a powerful barrier against disease has been constructed? I thereforth resisted the temptation to acquire great wealth." We are sure that every one of the members of the profession and the public would be greatly profited by reading this book which has been written in a very simple and good style. The printing and get up are of the usual Mosby standard.

The Mask of Sanity—By Hervey Cleckley, M.D., Professor of Psychiatry and Neurology, University of Georgia School of Medicine, Augusta, Georgia; Second, revised and re-written edition. 469 pages. Published by The C. V. Mosby Company St. Louis, U. S. A.

The first edition of this book which was published ten years ago was based primarily on experience with adult male psychopaths hospitalised in a closed institution. During the last decade a much more diverse group has been available. Female patients, adolescents, people who have never been admitted to a psychiatric hospital, all these in large

numbers have afforded an opportunity to the author to observe the disorder in a very wide range of variety and degree. This additional clinical experience, helpful comments in the reviews of the first edition, enlightening discussion with colleagues, an improved acquaintance with the literature, all have contributed to help the author to *modify* concepts formulated ten years ago. He had therefore practically to write a new book. The chief aim of this study is to bring before psychiatrists a few of these cases typical of hundreds more who have proved so interesting to the writer, so difficult to interpret by the customary standards of psychiatry, and, all but impossible to deal with or to treat *satisfactorily* in the face of prevalent medico-legal viewpoints, so that it may be of interest to physicians *in general* practice, and to medical students, as well as to those whose work is confined more specifically to personality disorders. These people called psychopaths naturally present a problem which must be better understood by lawyers, social workers, school teachers and by the general public, if any satisfactory way of dealing with them is to be worked out. It is the opinion of the author that *before* this understanding can come, 'the general body of physicians to whom the laity turn for advice must themselves have a clear picture of the situation. Much of the difficulty which mental institutions have in their relations with the psychopath springs from a lack of awareness in the public that he exists. The law in its practical application provides no means whereby the community can protect itself from such people. And no satisfactory facilities can be found for their treatment". It is with these thoughts especially in mind that the author has sought to present the material of this work in such a manner that the average physician who treats few frankly psychotic patients might see that the subject lay in his own field scarcely less than in the field of psychiatry. After all, the author says, "psychiatry, *though still a speciality, can no longer be regarded as circumscribed within the general scope of medicine*". The author therefore considers that some modifications in medico-legal attitudes are imperative: (1) The patient's actual performance should be given consideration equal to that given to his rationality by verbal and theoretical tests; (2) it should be granted that there are degrees of competency and legal responsibility instead of continuing on the present rather large assumption that *this* is a sharp either or question, that the patient must be called totally sane or totally irresponsible; (3) when anti-social acts are carried out by persons who show the easily recognised disorder, now classified with other conditions as psychopathic personality, they should not be sentenced to various arbitrary and limited terms of imprisonment; and (4) legal facilities for placing the psychopath under medical care and supervision should be established, not only for those whose felonous acts constitute a great menace to the community but also for those whose persistent incompetency is obvious in other ways. We hope that the frank and detailed discussion made by the author in this notable book will, at least, draw the attention of all concerned to the magnitude of the problem. The Mosby touch stands outstanding in the printing and get-up of this book.

CORRESPONDENCE

To The Editors, THE ANTISEPTIC, Madras.

Eversion of Flap after Cataract Operation

Sirs,

Under this head in 'Cases and Comments' section of the December Number of the ANTISEPTIC appears a short case note on page 972. Here it is stated that in a case after cataract extraction the conjunctival flap completely everted as a result of the patient sneezing continually on the night following the operation. It is also stated that this accident is rare.

I wish to point out that this accident is not so rare as one imagines but is in my experience quite as common as an inverted flap, corneal or conjunctival, both occurring from the same causes mentioned by the author of the Case Note *i.e.*, coughing, sneezing, restless winking under the bandage.

In such cases my practice has been, where it is possible, to foresee the incident before operation to abolish the cough reflex by an injection of morphine and atropine and to treat the nose or nostrils with packs of adrenaline 1/1000 and cocaine 4% (a few drops each). This treatment can be given if the incident arises suddenly after operation. Incidentally the sneezing is very often effectively prevented by squeezing the nose hard two or three times whenever there is an attempt to sneeze.

The inversion or eversion if slight (turned section), it is best reposed with a repositor and after A, the eye is tightly bandaged for 2 or 3 days, barring the occasions when the eyes are opened for A; instillation. Some cases present an elevated section only but no turning; these are handled in the same manner.

In case of obvious inversion or eversion, after reposing the flaps a single suture is applied, as stated in the case note, to anchor the lower lip with the upper lip of the section, but the best way to handle such cases is to prevent such accidents by carrying out a simple procedure in one of the following three ways:

1. When the operation is over, and where a conjunctival flap has been taken out, suture the lower to the upper lip by a single silk suture as the last step before bandaging the

eye ; where a bridge flap has been taken out the step is not called for

2 In addition or instead of the above procedure, one brings the centre of the upper lid margin to that of the lower lid by a single suture, the free ends of the thread not being cut close but left loose for a few inches and then cut. This is to help cutting or releasing the suture easily on opening the eye on the 2nd or 3rd day, when one gently pulls on the free ends and then cuts the knot with fine scissors, *Or*, one passes a silk thread through the skin in the centre of the upper lid margin and ties a knot ; the free ends are not cut but brought down a little firmly on the malar prominence of the same side and anchored on the same by one or two pieces of sticking plaster.

These procedures prevent harmful working and exert some pressure on the section and prevent in many cases the accidents mentioned in the case note.

I have not seen after such accident any loss of vitreous but only a vitreous bulge in a few cases.

In the pre-penicillin days, after the best treatment of such cases, the results in respect of vision were poor, the eye being, in the large majority of cases, destroyed by a plastic iridocyclitis, but a smaller number of cases did get some vision and a case here and there was none the worse for the accident. But after penicillin therapy a distinct improvement is noticeable. This treatment I carry out as follows : The patient gets as soon as the accident is noticed 4 to 6 lakhs of penicillin per day intramuscularly in 2 or 3 doses of hourly instillation of penicillin solution into the eye, the strength being 10000 units to the c.c. of distilled water.

Yours faithfully,

Ambi House,
79 & 80
Lingappa St,
Kancheepuram.
16-12-'50.

Capt. A. CHANDRAMOWLI,
L.M.S., B.S.Sc., L.O.,
Physician and Eye Surgeon.

To The Editors, THE ANTISEPTIC, Madras.

An Interesting Case of Primary Peritoneal Pregnancy

Ref. :—Page 975, Dec. 1950 issue.

Dear Sirs,

There are cases on record of peritoneal pregnancy. The accepted theory is that these are cases of tubal pregnancy at the fimbriated end of Fallopian tubes which gradually extend into the abdomen.

In 1934 when I was a House-Surgeon in Patna Hospital for Women an interesting case was detected by us and reported by the then Professor, Dr. A. N. Sarkar, M.R.C.O.G., in *British Journal of Obstetrics and Gynaecology*. The history of the case was interesting. A lady came with a history of 14 months' pregnancy. She said that at the eighth month she had all the symptoms associated with labour but only a little vaginal discharge of blood. Afterwards the size of the abdomen started to get smaller and smaller.

I was referred to the case by the junior staff as he could not make out anything. On examination I found the uterus normal in size—the tubes and ovary normal and a tumour in the abdominal cavity. Per abdomen I could make out the head and 2 limbs. There was difference of opinion. The majority were of opinion that it was a case of dermoid cyst. X ray came in my favour.

On operation, A mummified child was found. The placenta, sac all adherent to the omentum, gut and neighbouring viscera.

In this particular case the author says that the uterus was of the size of a cocoanut—why? Was there any blood clot or anything?

Secondly, he has not mentioned whether on P.V. examination the size of the uterus could be made out or not ?

Thirdly, how could he detect unruptured membranes per vaginum ?

Fourthly, abdominally, could he not differentiate between 2 tumours (one the enlarged uterus and the second the foetus) ?

I have not become a general practitioner and have forgotten many things and hence the author will excuse me for the questions asked which are all due to curiosity.

Yours faithfully,

Kadamkuan,
Patna-3.
15-1-'51.

S. SAMADDAR

NEWS AND NOTES

All-India Conference on Dermatology and Venereology

The Hony. General Secretary writes :

An All-India Conference on Dermatology and Venereology will be held at Calcutta on Saturday, the 14th April and Sunday, the 15th April, 1951, under the presidency of Dr. A. C. Rebello of Bombay.

Papers of scientific and clinical interest will be read. Demonstrations (clinical, microscopic etc.) will be arranged. The Committee would be most grateful for any suggestion and would welcome any request. Prior intimations from the delegates will be much appreciated by the organisers. We appeal to the members of the profession for papers and contributions for the Conference. Such contributions, or at least an abstract of the same, should reach the Secretary before the 15th of March, 1951, for their inclusion in the Programme.

All communications should be sent to the Secretary at 15, Camac Street, Calcutta-16, Telephone Number—Park 1540.

Blood Plasma from Seaweed.—British scientists have evolved a method of producing blood plasma from a seaweed. The only known sample in the world of this unique new chemical is now at the Seaweed Research Institute in Scotland.

This substance for blood plasma has been named "Laminarin" and is a type of seaweed starch. One ton is produced from about 100 tons of seaweed. The amount of dried seaweed which can be gathered from the Scottish coasts each year is not far short of 200,000 tons.—L.P.S.

* * *

Simplifying Cardiac Diagnosis.—An instrument which makes a completely new contribution to the field of electro medical science and provides the most modern and for immediate diagnosis of cardiac conditions has been produced by a London firm. Designed in the shape of a suit case it can be used in the consulting room the hospital or the private home.

The instrument in which the heart impulses are amplified by an electronic valve, actuates a unit which records permanently and directly on to special sensitivised paper. This enables the instrument to be small and light—its weight is only 5½ lbs. It is fully tropicalised and operates from 50-cycle alternating current mains of either 100-125 or 200-250 volts.—B.I.S.

* * *

"Atomic Age" Wing for Manchester Hospital.—"Manchester's First Atomic Age Building" is the description given to an extension to Christie Hospital which has just been opened.

This extension is fully safeguarded against the gamma rays of radioactive isotopes and X-rays given off by radium. The scope of the hospital's treatment centre will be doubled by the new block, which includes a pathological laboratory, office accommodation and treatment rooms for X-ray therapy.

Solid concrete walls 2½' thick, brick walls covered with ray proof barium plaster and control cubicles with lead insulated walls will protect the staff and patients from the gas dewing rays which have been harnessed for healing. A Manchester-built 3,000,000 V. deep therapy machine operated by remote control and a radium "bomb" for deep treatment of malignant growths will be used in the new building.—B.I.S.

* * *

India Honours Discoverer of Penicillin.—The world looks upon Sir Alexander Fleming as a brilliant scientist. To-day, at 70, this white haired, soft-spoken man—known the world over as the discoverer of the wonder drug penicillin—is the Emeritus Professor of Bacteriology in the University of London. India has honoured him by just electing him an Honorary Fellow of the National Institute of Sciences of India.

Inheriting a small legacy at the age of 20 when he was an office boy in the city, he invested it in a medical education. After a brilliant academic career, winning all prizes and medals, he began to work in the Inoculation Department of St. Mary's Hospital under Sir Almroth Wright, the founder of vaccine therapy and went with him to France during World War I, where they established a Research Laboratory in Boulogne Casino. It was this research team that introduced the use of the saline treatment of war wounds. After the war, he returned to St. Mary's and became Assistant Director of the Inoculation Department. In 1919 he was also Hunterian Professor at the Royal College of Surgeons. In the same year he became Professor of Bacteriology in the University of London at St. Mary's Hospital. He was appointed Director of the Hospital's Department of Systematic Bacteriology, and since 1948 he has been Emeritus Professor of Bacteriology in the University of London.

Fleming's interest in antibiotics continued in the years that followed World War I. His further study of antiseptics and leucocytes led to a demonstration of the destructive action of antiseptics on the leucocytes in 1924. A recognised authority on vaccine treatment and antiseptics, he contributed to the research which established the value of M. & B. 693.

In 1928 came the great discovery for which all these years of anti bacterial research provided the back ground. When investigating the staphylococcus, Prof. Fleming noticed a growth of mould on one of his culture plates, which seemed to be dissolving the germs round it. He was "sufficiently interested" to investigate the mould—and discovered penicillin, a substance poisonous to microbes but not to the human body. Howard Florey, the famous biochemist, began a series of experiments which transformed the green mould into a miracle of healing.

Many honours came to the discoverer of penicillin during World War II. He was elected F.R.S. in 1943, was made an Honorary Member of the New York Academy of Science and in December of the same year received the annual award of the American Pharmaceutical Manufacturers' Association. He was knighted in 1944, elected F.R.C.P. in the same year and received many other distinctions. Created Nobel Laureate in Medicine in 1945, he presided over the Inter-American Medical Congress at Rio de Janeiro in September 1945. India has honoured herself by honouring this benefacter of mankind.

* * *

New Machine Aids Heart Operation.—A glass machine that can perform the functions of a patient's heart and lungs during an operation has been developed at Antioch College in the United States. The new machine weighs less than four pounds. It uses electro-magnetic gas valves to control the alternating pressure and suction that duplicate the hearts' pumping.—*U.S.I.S.*

* * *

Lowest Death Rate.—The death rate in the United States during 1950 was 9·6 per 1000 persons, according to the Metropolitan Life Insurance Company. This was the lowest level on record and represented a decline of one per cent from the 1949 rate.—*U.S.I.S.*

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Argenti Nit. Crys. 5-8; Argyrol Eng. oz. 5-12
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Rs. 1-2	1-4	1-7	1-11	1-13	1-15	each

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A.H. Penicillin Lozenges 20 doz. 13-8
„ „ Skin Oint. 12-12; Eye Oint „ 8-0
„ Sodi Glycerophosphate 12 x 1cc. box 0-8
Angiers Emulsion sm 21-12; Large doz. 40-8
Antiphlogistine trail 25-8; Small „ 48-0
Aletris Cordial Rio 13-8; Celerina bot. 17-0
B.B. Sarsa sm. 21-8; Large doz. 36-12
„ Gripe Mixture „ 18-8
„ Easton Syrup 4 oz. 4-8; 1 lb. bot. 7-14
Bayer's Atebrin 15 1-6; 300 tabs „ 14-0
„ „ 0-1 gm. 1amp. 0-12; 50amps. box 29-8
„ „ 0-03 gm. 2 amp. 3-4 25 amp „ 30-0
„ Luminal 10 tab. 1-2; 50 tab. 4-4
„ Prontosil Album 20 1-10; Rubrum [20 tabs. each 2-9
„ Lacranol 5x1c.c. 4-4
„ Campolan 5x2 cc. 5-14
„ Neosti Bosan:—

¾ grs.	1½	3	5 grs.	
Rs. 1-0	1-3	1-10	2-4	each

B.D.H. Multivite 30 2-2; 60 tabs bot. 3-14
Boots Acriflavin 500 tabs 4-0; Burnol ea. 1-2
„ Phurvite 100 caps. 7-8; Gastomeg 2oz 1-2
Blood Pressure Tyco's 104-0; Baumometer 140-4
„ „ Mercurial German „ 82-0
BENZEDRINE INHALER 18-12; 30tabs. M.J. doz. 46-8
Bed Pan E.I. Med. 5-4; lg. each 6-12
B.D. Stethescope 23-8; Triple „ 39-0
Bicolates Stearns tabs. doz. 48-0
Bristol Sarsa sm. 7-8; large bot. 13-8
Breast Pump. Ind. 1-2; Ger. 2-2 U.S.A. 27-0

British Schering:—

Atophan 20 2-14; 100 tabs. bot. 12-4
„ Amps I.M. 11-0; amps I.V. box 9-8
Cylotropin amp. I.V. or I.M. „ 5-0
Urotropin 20 tab. 2-1; Tube. 5 amps. box 4-0
Veramon 10. 1-9; 20. 2-14; 100 tabs bot. 11-8
B.W. Atrophia Sulph 1/100 gr. 20 tabs tube 0-8
„ Emitin hydro ¼ gr. 12 or 1 gr. 6 tabs „ 5-12
„ „ „ ½ gr. 12x 1c.c. box 9-0
„ „ „ 1 gr. 6x1c.c. „ 9-0
„ „ „ ½ gr. 100x1cc. „ 80-0
„ Sulphagunadine 100 2-12; 500 tabs „ 13-8
„ Kepler Codliver Malt Ext sm. doz. 38-0
B.W. Kepler Cod Liver Malt lg. doz. 71-0
„ „ „ „ C/Hypo sm. „ 49-8
„ Digoxin 25 2-2; 100 tabs bot. 6-4
Barbitone 2-8; Sodium Pow. Eng. oz. 3-8
Benzyl Benzoat Eng. lb. 8-4
Bismuth Carb 1 oz. oz. 3-0
Bismuth Carb 30-0; Borax Eng. lb. 1-0
„ Sub Nitras 25-8; Calomel Eng. „ 15-0
„ „ „ 1 oz. oz. 2-8
Caffein Citras 2-0; Calomel „ 1-4
Calci Chloride 4-8; Hypho Eng. lb. 10-8
„ Gluco 6-12; Lactate „ „ 4-8
Camphor Cakes lb. 12-0; 1 oz. oz. 1-0
„ Monobrom 2-12; Creosot „ 1-12
Codena Phos Govt. 5-4; Dionin Govt. dr. 5-12
„ „ B.D.H. 7-0; „ Eng. „ 10-8
Chinchona Febrifuge Eng. 21-0; L.P. 1 oz. 2-0
Chlorbutol 2-12; Chlorodine oz. 1-4
Cream of tart 2-14; Chlorodine lb. 4-10

Carnick's G.W.:—

Erythgen Liver Ext. 10 c.c. vial 3-2
Hormotone "T" 40 tabs. 9-0; Incretone ea. 7-0
Hormotone 50 tabs 5-12; 100 tabs. „ 8-14
Calsoid 30 tabs 4-6; Neurophosphate. M.J. 5-0
Carter Liver Pills 16-8; Cactina Pillets „ 58-8
Catgut Sterilizer plain „ 11-8
Catheter I.R. Ind. 8-4; German „ 18-0
Check Pessary 4-8; Ring „ 2-8
Ciba's Cibazol 250 tabs bot. 17-0
„ Coramine Liq. 15c.c. 3-14; 20 tabs. „ 3-5
„ „ 1.7c.c. 5 amps 2-12 20 amps 10-8
„ Dial 20 tabs. 2-2; 100 tabs. bot. 12-4
„ Enterovioform 20 2-14; 100 tabs. „ 12-4
Crooke's Calcium V.D. 6x1c.c. box 2-10
„ „ „ 15c.c. 4-0; 30c.c. vial. 7-0
„ Argentum Oral 4 oz. bot. 2-8
Corn's Dextrosol 4 oz. 9-12; 1 lb. doz. 26-4
„ Glucovita 4 oz. 9-12; 1 lb. „ 26-4
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Dispensing scale 4-8; Sup. each 5-8
Douch fitting set Ind. 10-8; Italy doz. 15-0
„ Can. E.I. Complete 2 pts. each 2-2
„ „ „ „ 3 pts. „ 3-10
„ „ „ „ 4 pts. „ 4-2
Deschins Hepethemo Sm. 6-4; lg. bot. 11-4
„ Hamoglobin Sm. 4-8; Lg. „ 6-8
Duretine 1 oz. 2-2; Gentian Violet 1 oz. 1-14
Elixir Neogodine 55-8; Hepetoglobin doz. 60-0
Ethyl Chloride Spray 100 gm. Eng. „ 48-0
Eserin Sulph 5 gr. 4-8; 15 grs. tube 11-8
Evan's Sarsa 13-8; Wilkinson Sarsa doz. 61-8
Enema Syringe Ger. 3-4; Goodrich each 4-4
Eucalyptus Menthol Pastiles 2 oz. doz. 9-12
Evan's Camphor-in-Oil 3 gr. 12x1 cc. box 1-0
„ „ in Ether with Oil 1½gr. 12x1 cc. „ 1-4
„ „ „ „ 3gr. 12x1cc. „ 1-8

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Evan's Mercury Biniodide 12 x 1cc. box 0-10
„ Sodium Glycerophos 3 gr. 12x1cc. „ 0-12
„ „ Methyl Arsonate 1½gr. 12x1cc. „ 0-10
„ Strychnine Hydrochloride 12x1 cc. „ 0-12
Endo's Emitin Hydro ¼ gr. 6x1 cc. „ 2-4

Endocrine—Spicer's Eng.—

Hydrageri Iodidum Rubrum 12x1 cc. box 0-8
Sodium Cacodylate 0·01 gm. 12x1 cc. „ 1-12
Strychnine Hydrochloride 12x1 cc. „ 0-8
Eu Quinine Holl 7-0; Java 7-8; Roche oz. 8-8
Eye Dropper Usa type doz. 0-5
Elastoplast 2½x5 yds. 2-4; 3x5 yds. each 2-8
„ First Aid Dressing Pkt. 0-4
Ferri Et Quinine Citras Eng. oz. 2-14
„ „ Ammonia Citras „ lb. 7-8
Fountain Pen Battery each 4-0
Finger Stall doz. 1-0
Feeding Cup E.I. 33-0; China doz. 9-12
First Aid Dressing Box Comp. U S.A. each 8-8

Eng. Tablets.—

Acriflavin 500 3-0;	1000 tabs.	bot.	5-8
Aspirin 5x100 0-14;	1000 „	„	6-4
„ Caffein 100 2-4;	1000 „	„	14-8
Blaud Pill 5gr. 100 0-14;	1000 „	„	8-0
„ C/Aloin 100 1-6;	1000 „	„	8-8
„ C/Cascara 100 1-5;	1000 „	„	8-8
Calcium Gluconate 7½ gr.	100 „	„	1-8
„ 7½ gr.	1000 „	„	8-8
„ Lactate 5gr. 100 0-15	1000 „	„	6-4
Calomel 1gr. 100 1-4; 5 gr.	1000 „	„	21-8
„ 2gr. 100 1-12; 2 gr.	1000 „	„	13-8
„ 3gr. 100 1-14; 3 gr.	1000 „	„	15-0
EastonSyrup ½dr. 100 2-4;	1000 „	„	18-0
„ „ 1dr. 100 3-8;	1000 „	„	25-8
Ephidrin Hydro ½gr. 25 1-0;	100 „	„	2-4
LaxativeVegetable 100 2-0;	1000 „	„	15-0
Nicotannic Acid 0·5gm.	500 „	tin.	4-8
Sulphanilamide 7½gr.	1000 „	„	13-8
Sulphagunadine	1000 „	bot.	28-8
Sodamint 100 0-14;	1000 „	„	2-8
Soda Citrate 2gr. 100 0-13;	1000 „	„	3-12
Sulphadiasine 25 3-0;	1000 „	„	12-0
500 52-0;	1000 „	„	90-0
„ 100 tabs. 1-8;	1000 tabs.		6-8
Yeast		doz.	7-8
Eng. Belladnona Plaster		„	15-8
„ Gripe Mixture		box	2-4
„ Caffin Soda Benzoat 12 amps.		„	0-4
„ Mop Iodine (External use) 6 amps.		„	4-8
„ ProcainHydrochloride 1% 3cc. 25		„	
F.L. Durex 0-14; Silvertax		doz.	0-12
„ Paragon Washable 3-0 Crocodyle		„	9-0
Guiacol Carb 2-4; Idoform		oz	2-0
German Stethescope Complete		each	11-8
Glass Rods 1-12; Cork Screw		„	1-0
Glycerine or Ear Syringe Metal 2 oz.		each	6-4
„ Syringe Plastic 1 oz. 3-2; 2 oz.		„	4-2
Glaxo D ½ lb. 13-12; 1 lb.		doz.	31-8
„ Adexolin Liq. 14 cc. 2-1; 100 caps		bot.	6-4
„ Berin 1 mg 25 tabs. 0-9; 100 tabs.		„	1-2
„ „ 1 mg. 500 „ 5-8; 1000 „		„	10-12
„ „ 50 mg. 10c.c. 4-10; 100 mg.		ea.	7-10
„ Fersolate 100 1-11; Codopyrin 10 tab.		bot.	0-12
„ Erbolin 10 tab. 1-4; Kapalin Liq		„	2-2
„ Celin 6x1c.c. box 5-4; „ 6x1bc.		box	5-4
„ Minadax Syrup 38-0; Ostomalt ½ lb.		[doz.	27-0
Glaxo's Ostocalcium 50 tab. 2-2; Stibatin 100 mg. 30 c.c. each			4-6
Grimault Syrup 30-0; Santal Midy		doz.	61-8
Gauze 6 yds. Pkt. doz. 5-8; 1 ib. Pkt. lb.			4-12
Gynomin tabs. (Speeton)		doz.	31-8
Haemoglobin Scale Book		each	2-12
Hewlett's Santal Flava 4 oz.		doz.	60-0
„ „ „ 10 oz.		„	123-0
„ Mist Pepsin With opi. 4 oz.		„	52-8
„ „ „ „ „ 10 oz.		„	111-0
„ „ „ Without „ 4 oz.		„	53-8
„ „ „ „ „ 10 oz.		„	111-0
Huxley's Nervigour Plain 42-0 Formate		„	43-8
„ Wintogeno Cream 32-8; Kugloids		„	66-0
Himrod's Ashthama Cure		„	96-0

Hoechest German:—

Neosalvarsan 0-15 1-14; 0·3 2-8; 0·45 each 3-0
Novalgin 10x2c.c. 8-10 box; 10 tabs „ 2-2
Salyrgan 5x2c.c. 6-4; 10x2 c.c. box 7-0
„ 5x1c.c, 4-8; 10x1c.c. „ 11-0
Hydrogen Peroxide 4 oz. Ind doz. 8-4
„ „ Eng. 5 oz. 2-0; 8 oz. bot 2-8
Hyd. Iodide Rub. 1 oz. 2-2; Oxide Flava oz 1-10
„ Ammonata 15-8; Cum Creta lb. 6-0
Hexamine 3-12; Ichthyol B.P. „ 16-8
Hypo Record Needle M.D. 4-4; Star doz. 4-0
„ „ „ Japan 3-4; Italy „ 3-8
„ „ „ German 3-0; Down „ 4-12
„ All Glass „ Japan 3-8; German „ 4-0
„ „ „ „ U.S A. 6-0; Italy „ 4-4
„ Needle B.D. 11-8; Perfectum „ 5-12

Hypo. Syringe All Glass Nacket :—

C.N.:—	2c.c.	5c.c.	10c c.	20c.c.	30c.c.	50c.c.	
German	1-8	2-8	3-8	5-12	—	—	E
Italy	1-14	2-14	3-14	6-10	10-0	13-8	a
Ideal	5-12	7-10	10-0	11-0	16-8	22-8	c
Japan	1-6	2-6	3-6	5-8	8-0	11-0	h
S.N.:—							
German	—	4-0	5-0	6-12	—	—	E
Italy	—	4-8	5-8	7-8	11-0	14-8	a
Ideal	—	9-0	11-4	12-0	18-0	25-0	c
Japan	—	4-0	5-0	6-4	8-8	12-0	h

Hypo. Syringe All Glass in Metal case with 2 Needles :—

C.N.:—	2c.c.	5c.c.	10c.c.
German	4-0	5-8	6-8
Italy	3-10	5-12	6-12
Japan	3-8	5-0	6-0
S.N.:—			
German	—	8-0	10-0
Italy	—	8-4	10-0
Japan	—	7-12	9-0

Hypo. Syringe Record Nacket :—

C.N.:—	2c.c.	5c.c.	10c.c.	20c.c.	30c.c.	50c.c.
Bostan	5-10	6-12	8-0	11-0	14-4	27-0
German	4-4	6-8	7-8	—	—	—
Italy	4-0	5-4	6-6	9-0	12-8	19-0
S.N.:—						
Bostan	—	8-4	9-12	12-4	15-8	28-0
German	—	8-4	9-12	13-8	18-0	25-8
Italy	—	6-12	8-0	10-0	13-8	20-4

Hypo. Syringe Record in Metal Case with 2 Needles (C.N. 2 c.c.)

German	Italy	Bostan
7-4	6-8	7-12

COLLOSOL CALCIUM *with* VITAMIN D

Recommended as a general tonic **treatment in all debilitated states. Specifically, in the treatment of Rickets,** Tuberculosis (where a rapid "build-up" of vitamin D is necessary), Dental Caries (which can be checked and controlled), Osteomalacia and Cœliac disease. **Collosol** Calcium with Vitamin D for intramuscular and subcutaneous injection is supplied in 15 c.c. and 30 c.c. injection bottles and in ampoules (boxes of 6) 1 c.c. and 2 c.c.

THE CROOKES LABORATORIES LIMITED (Incorporated in England)
COURT HOUSE · CARNAC ROAD · BOMBAY 1

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