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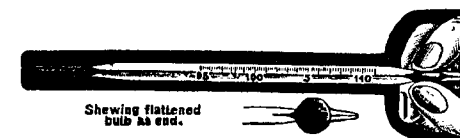
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THE ANTISEPTIC

ZEAL'S
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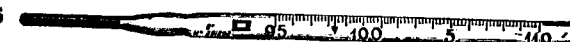
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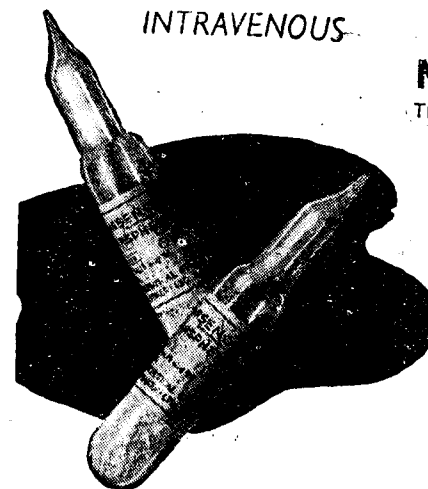
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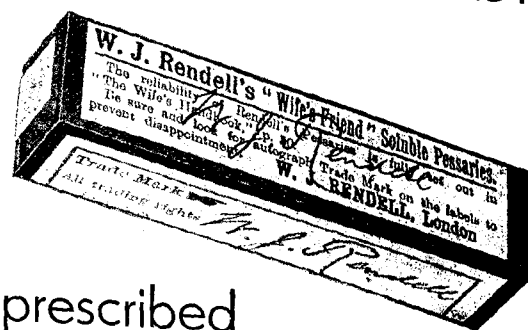
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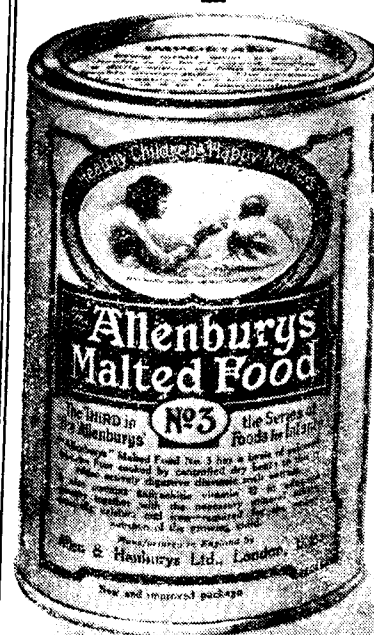
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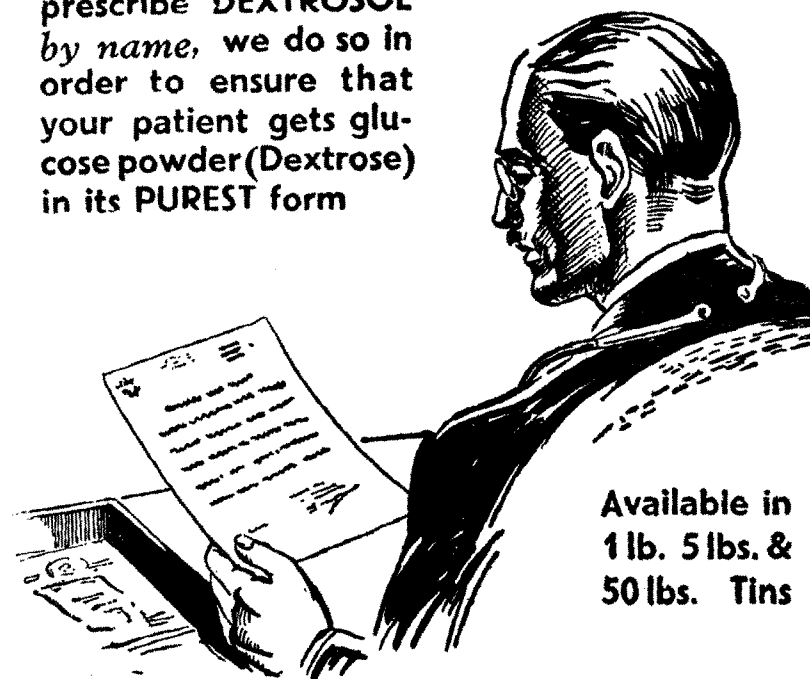
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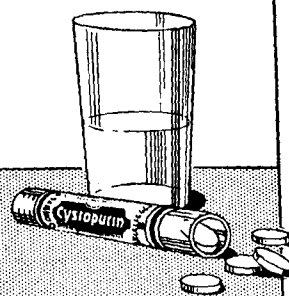
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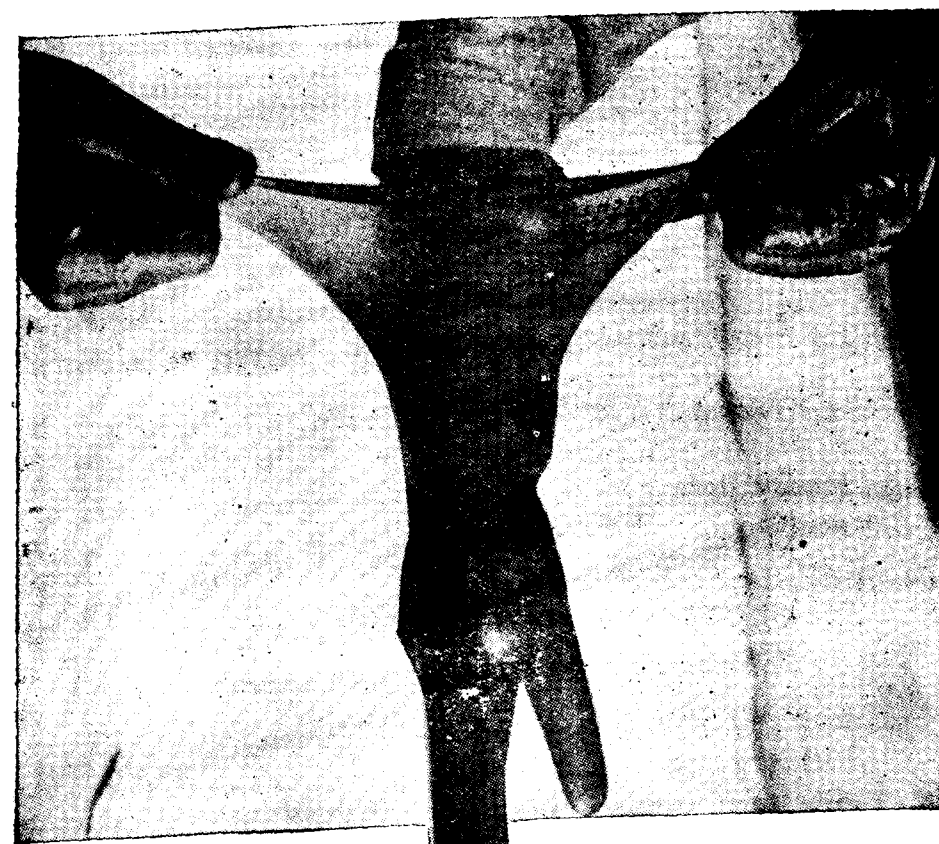
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(Med. Welt, 11, No. 24, 1937).

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It registers the temperature more quickly than any other bulb.

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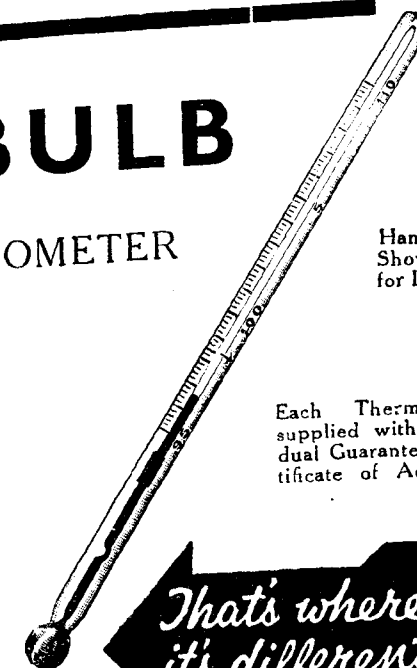
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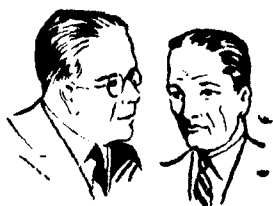
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The SAFE Brand of Aspirin
TABLETTED ASPIRIN IN ITS PUREST FORM

- 1 Instantaneous disintegration.
- 2 No cardiac or gastric disturbance.
- 3 Rapid absorption and immediate action.
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From information received:—

"I used 'Genasprin' in a case of dysmenorrhœa and relief from pain was secured. They are undoubtedly a very reliable brand of aspirin and dependable."

"I find 'Genasprin' so far in advance of most other aspirin that I never in private practice use or prescribe any other brand. I use it, perhaps more than in any other condition, in cases of dysmenorrhœa, from whatever cause, and find its analgesic properties more pronounced in these cases than in any other."

"I gave 'Genasprin' (three doses of 10 grs. every 2 hours) to a female, aged 23 years, who was suffering from spasmodic dysmenorrhœa, and it was effective in relieving pains."

"I must state, that I found your 'Genasprin' tablets the best aspirin tablets I have yet used or prescribed, and I found that I could get the effects much quicker. In dysmenorrhœa I was impressed by the better and quicker results."

"In cases of dysmenorrhœa, 'Genasprin' acts like a charm."

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*Coughs, Bronchitis, Asthma
Laryngitis, and other Res-
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A Bronchial Sedative

Control the cough that weakens your patient.

GLYKERON quickly relieves this distressing symptom because it contains medically approved respiratory sedatives.

Your patients with respiratory affections do better when they sleep better—without coughing.

GLYKERON may be administered to diabetics freely as it contains no sugar or syrup and causes no disturbance of digestion.



Stimulating Expectorant

GLYKERON loosens the mucus in the bronchial passages and aids in its expulsion.

It lessens the hazard of complications by getting rid of germ-laden secretions. Prescribe it for the symptom of cough. Very palatable.

GLYKERON supplied in 3 oz. as well as 16 oz. bottles.

DOSAGE: Adults, one to two teaspoonfuls every two or three hours or at longer intervals as the individual case requires. Children, from ten drops to one teaspoonful, according to age.

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*An energetic TONIC of kn. wn dependability
that can be PRESCRIBED at any season
of the year and for all ages.*

HEMASTO-HEPATINE

COMPOSITION:

Hemoglobin Oxy., Muscular Plasma,
Fresh Hepatic Extract (Wipple
Method) Mucus Ext. of Stomach,
Hypophos. of Sodium, Glycerine.

INDICATIONS:

All forms of ANÆMIA, Chlorosis, Con-
valescence, Malaria, Hepatic insuffici-
ency, Tuberculosis, Pre-Tuberculosis.

ADULTS: one tablespoonful 2 or 3 times a day,
plain or with water, half an hour
before meals.

CHILDREN: Half the above dose.

FRENCH PREPARATION

INDO-CONTINENTAL TRADING CO.

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syringe (an ordinary record 2 cubic centimetre capacity syringe) and needle are also sterilised by boiling. Great care should be taken to select a good sharp and pointed needle for the purpose. The choice quality of the needle is that it may bend but not break. I have found Krupp V 2 A steel needles No. 12 quite good for the injections.

The needle is flamed, fitted to the nipple of the syringe and one cubic centimetre of the solution is drawn into the syringe.

The patient is asked to cough and clear his bronchi before the injection and to lie in proper position, depending on the part to be injected, the main idea being that the patient is comfortable and the intercostal spaces are stretched as wide as possible. When going to inject, the patient is asked to breathe quietly and slowly. Some of them do well if asked to hold their breaths when the injection is being given.

The needle is inserted at right angles to the skin surface through an intercostal space and pushed slowly, keeping with drawing the piston as the needle penetrates. When the air bubbles appear in the barrel, the needle is either in the lung tissue or in a cavity in the lung. In the latter case, the patient starts coughing and says that he smells and feels the taste of medicine in the back of his throat. About half a minute is spent in giving the injection. It is not proper to inject quickly. There is no harm if injection is done in a cavity.

After the injection, the patient is made to lie on the injected side, with arms under the ribs, and is kept in that position for about half an hour. This places the injected lung at rest and avoids the danger of pneumothorax.

In cases in which these injections suit, the treatment is carried on for two to three months. The following are some of the mishaps that occurred in a small number of my cases.

1. *Persistent pain on the injected side of the chest.*—This occurred in one or two cases, and was relieved by the application of hot water bottles and administration of analgesias. The cause of the pain is either injury to the pleura with a blunt needle, extrusion of solution into the pleura or injury to the intercostal nerve. This is never serious.

2. *Appearance of blood in the sputum.*—This also occurred in a few cases, in which the patient had a fit of coughing when the needle was in, but the blood brought out in the sputum was never in appreciable quantity and the sputum got cleared again within twenty four hours, on giving the patient absolute rest and

administering him sedative cough mixture and calcium. I had to give an injection of morphia only in one case in which there was pain at the site of injection and also slight hæmoptysis.

3. *Breaking of the needle.*—I read about it in literature, but little believed in its occurrence. Unfortunately this accident occurred in one of my cases, who, when the needle was in, had a severe fit of sneezing, and with the exertion of intercostal muscles, the needle broke in the chest wall. This case had already received seven injections before, and was doing well with the treatment. On the occasion of this mishap, the needle used was not the one which I always used, but one of a cheaper variety and of a smaller length. Efforts were in vain to take the needle out on the spot, and the patient had to be taken to the central institution where I got him X-Rayed and efforts were made to remove the needle. The accident can be well avoided by using a sharp, pointed, strong needle of suitable length and taking precautions not to bury the needle completely up to its base.

4. *Pneumothorax.*—This occurs in certain early cases, where the adhesions have not formed and patients get violent cough immediately after the puncture of the lung. This may occur, when the lesion or cavity is situated at the periphery, and puncture is made into the cavity. The mishap can be avoided by asking the patient to cough before the injection, so that his bronchi are clear, and also by asking the patient to lie on the injected side half an hour after injection. Pneumothorax may also occur if injection is made in emphysematous lung; luckily I did not get this trouble in any of my cases. Even if it occurs, it is sometimes beneficial.

5. *Injection of fluid into the blood vessels.*—It is a very rare mishap, which can be easily avoided by withdrawing the piston of the syringe before giving the injection. This did not occur in any of my cases. The occurrence is seldom fatal, but is distinctly alarming and causes serious collapse. The treatment is to employ artificial respiration and injection of adrenalin hydrochloride 1/1000 intramuscularly, and taking other steps to combat the failing circulation. The collapse is said to be due to traces of the injection fluid getting into the coronary arteries.

6. *Emphysema under the skin.*—This also did not occur in any of my cases and is very rare. It may occur if the needle passes through a dense adhesion into a cavity. It is said to occur more after injection into the apex of the lung, and when patients get a violent fit of coughing, air finds its way through the adhesions under the skin. The mishap can be treated by strapping that part of the chest and by giving the patient absolute rest and administering a sedative cough mixture.

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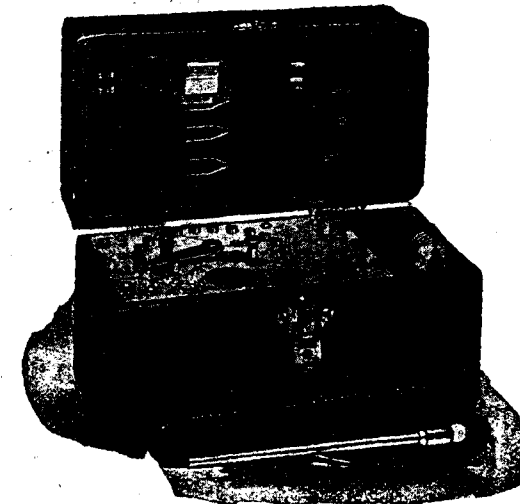
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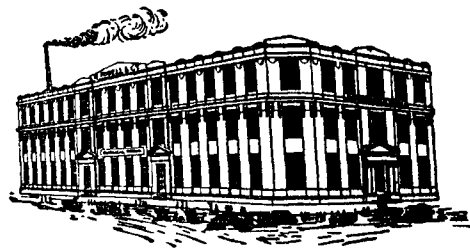


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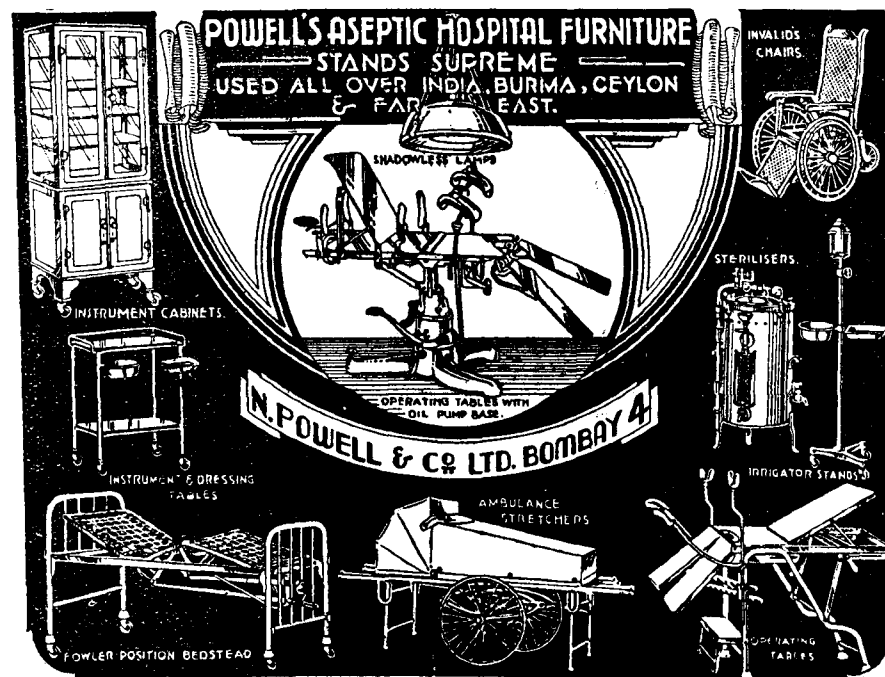
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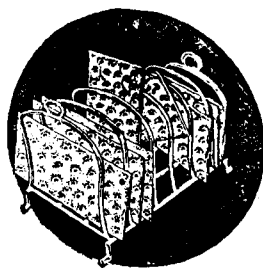
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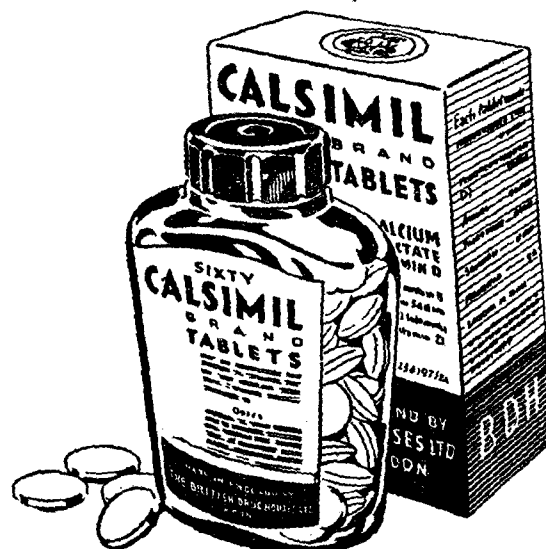
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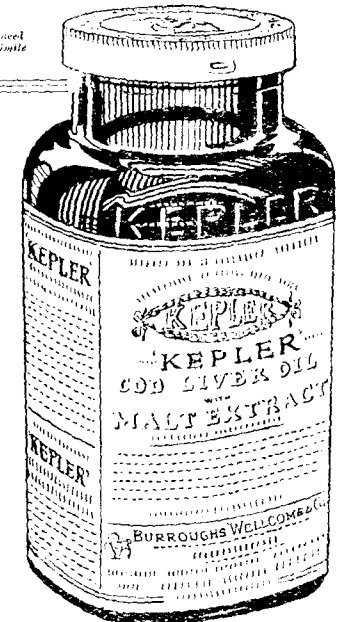
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Vol. 35.

SEPTEMBER, 1938

No. 9.

ORIGINAL ARTICLES

Backward Displacement of the Uterus and its Treatment*

BY

Dr. Kapur, Bhasheshar Lal, M.D. (BERLIN),

Lahore Maternity Hospital, Lahore.

ONE of the commonest complaints of our women is backward displacement of the uterus. Sometimes we can palpate it without the patient's complaining or knowing of it. According to Gow¹ retro-displacement may be present one day and if examined on the second day the uterus may be in its normal position. But this happens rarely. De Lee² comes across this disease rarely in multipara. Staney³ and Polak found retroversion in 20% of unmarried women and the displacement was of congenital type and gave no trouble. Okinschitz⁴ found backward displacement of the uterus in 4% cases of young women. According to Findley⁵ this disease is found in 25% cases of primipara and 19% cases of multipara after delivery. Five per cent of these cases get retro-displacement in the first two weeks after delivery (V. Lack⁶).

There are two types of retro-displacement, infantile and

* Specially contributed to 'The Antiseptic'.

acquired. According to Falgowski⁷ the uterus may be mobile with or without any manifestation of symptoms. The uterus can also be fixed in the pouch of Douglas. In newly born children the uterus is never found retroverted. In a collection of 40 newly born female children, I found the uteri 3.3 to 3.6 cm. in length. According to Okinschitz⁴ the uterus was 3.5 cm. long. He attributes this length to the hormones of placenta because the uterus decreases upto 2.5 cm. till the second year after the birth of the child and it grows further after this period (Okinschitz⁴). The further development of the uterus may be checked under various circumstances. There may be lack of hormones. The round ligaments grow as the other parts of the body. On account of the disharmony between the round ligaments and the uterus, the latter gets retro-displaced and we should call it infantile and not congenital as many of the authors try to do. The acquired form is met after puberty but in India earlier, as many girls are married very early and consequently begin to deliver early.

The ætiology of the first group (infantile) lies in bad hygienic circumstances. The infectious diseases of childhood play a great role. Lack of vitamins A and D should be a great ætiological factor. Excessive sports lead to malpositions which are more common in labourers due to excessive strain of the body (Evens⁸). The shortness of the badly developed suspensori ovarica may lead to displacement of the uterus (Reifferschied). Elber¹⁰ and Jaschke¹⁰ attribute the malpositions to spina bifida and Flatau¹¹ to the decrease of pelvic inclination to the horizontal lines. Okinschitz⁴ observed in the famine of Russia in 1920—21 that backward displacement was acquired after puberty on account of the general weakness of the body. These patients had general ptosis of internal organs also.

The second type (acquired) is due to tears of pelvic floors which are very common in our country. The retro-displacement is caused by the lack of support (Okinschitz⁴, Moch¹² and Flatau¹¹). Relaxed broad ligaments and the utero-sacral ligaments play a great role in the ætiology of this disease. The abdominal walls are normally a necessary support for the internal organs. Their relaxation on account of too many child births and hernias leads to retro-displacement (Paramore¹³). Further causes are chronic inflammation of the mucous membrane of the uterus and sub-involution after child-birth (Plas¹⁴, Moch¹² and others) and inflammations of the adnexas and parametrium which lead to adhesions and consequently backward

fixation of the uterus. Tumours of the uterus may displace it by their weights and the other tumours of the abdomen by the change of intra-abdominal pressure.

In Insurance practices, patients attribute their retroversion to traumas. Acute displacement may be the result of trauma and the symptoms may arise immediately but they are relieved by the manual reposition of the uterus and hence the disability remains first for a short time. There is never permanent displacement due to trauma (Futh¹⁵ and Moch¹²). It can only create or exaggerate the symptoms of an unorganized but already existing retroverted uterus.

Retroversion need not give any trouble at all (Meyer¹⁶ and Wirz). Jaschke¹⁷ confirms Theilhaber's¹⁴ opinion that simple retroflexion gives no characteristic symptoms excepting palpation findings. But in such cases headache may be present. Some of the patients complain of pains. Uterus may press upon the para-sympathetic ganglion and give rise to referred pain in the epigastrium. There may be pains in the heart region, heart burns, dyspepsia, gastralgia, mastalgia and pains in the inguinal region. Flatulence and vomiting may be present in some cases. Evens¹⁰ has been doing appendicectomy on account of the flatulence and vomiting and the trouble was found to be due to retroversion. Some patients may get curious sensation of '*Dil ka ghabrena*' a type of heart sinking and the limbs are felt as if they don't belong to them. Ultimately some of the patients may get a severe hysteric fit. According to Aievoli²⁰ these psycho-neurotic symptoms are due to unstable mental state of persons. But these symptoms are primarily due to retroversion and secondarily due to hysteria and the small psycho-neurotic and surgical traumas are enough to give rise to these symptoms. These are aggravated by the neuropathic constitution. According to Hoche²¹ a patient may be hysteric when certain conditions are fulfilled and those conditions lie in the abnormal position of uterus. By the conservative treatment of the malposition of uterus only the symptoms disappear temporarily.

According to Sturmdorf,²² Findley⁵ and others, backache is very common even in complicated cases of retroversion. The patients have constant discomfort and they feel fatigued and have aches especially after childbirths (Luckner)²³. According to Swayne²⁴ the symptoms arise from the different pathological lesions. Druner²⁵ and Clare²⁶ attribute many symptoms to congestion. Leucorrhoea, Dysmenorrhoea, and Constipation are

present in almost every patient. Some of the patients complain of menorrhagia. It may happen in elderly women. One is more inclined to think of tumours, but it is due to hyperplasia and hypertrophy of the endometrium.

Sluggish circulation in cervix creates Nabothian follicles (Evens¹⁹). Further cystic enlargement and destruction of normal ovarian tissue may come off. Enlargement of round ligaments and shortening of uterosacral ligaments are usually present.

Pressure on the rectum produced engorgement of the inferior hæmorrhoidal vessels (Evens¹⁹). It produces pain on defæcation and one feels as if more stools have to be passed. The pressure on the bladder leads to pain on and frequency of micturition, hæmaturia etc.

According to William²⁷ and Findley⁵ abortions are very common by retro-displacements. The abortions which happen upto the 10th week should be attributed to the natural cause i.e. abnormal development of the embryo etc.

In puerperium the retro-displacement is very dangerous. The lochia may stop and give rise to sepsis. According to Evens,⁸ dorsal decubitus of uterus may occur.

In many of the textbooks, the authors have attributed sterility to the backward displacement of uterus. According to Hunner²⁸ and Wharton,²⁸ Donforth,²⁹ Galloway³⁰, Nurnberger³¹ and Kavacs³² it plays no role in sterility. Winkel³³ opines that sterility is found in 8% of the women with retroverted uteri and according to Kustner³⁴ it is due to chronic hyperplastic changes of the endometrium. Bernot³⁵ has described two cases of retroversion with sciatica. I have come across a similar case (Case No. 3) who had sciatica and retroverted uterus simultaneously and recovered after Gillam's operation. Dyspareunia may be present in certain cases.

Diagnosis of retroversion gravida puerperales is permissible if a patient had retroversion in the first three months of her pregnancy (Tuma³⁶). As to differential diagnosis we have to think of diseases of the tubes and appendix, general ptosis, chlorosis, anaemia and hysteroneurasthenia also.

The diseases of the blood can be excluded by doing blood examination. General ptosis can be detected easily (see famine of Russia 1920-1921, Okinschitz). Herold³⁷, Meyer and Wirz find pessary a good test for the diagnosis of retro-displacement. If the symptoms are due to retroversion they disappear on application of pessary. But it is not possible in cases of mobile uteri

with psycho-nuerotic symptoms. A pessary has temporary or no effect at all. Such cases should be hypnotised and psychoanalysed first. Because, if the trouble is due to hysteria, the symptoms should disappear altogether and if not due to hysteria, the cure is temporary. (Kapur, B.L.³⁸) It is rather difficult to differentiate retro-flexion from an adnexitis and appendicitis. They all can exist together as in cases of complicated retroversion of uterus. Violet³⁹ looks for appendix and tubes in cases of pains in virgins.

Prophylactic measures lie in proper repairs of the tears, at the most, in five hours after delivery. The stitching of old tears should be done with metal wires as they would suppurate only in 0.7% of cases; the suppuration with silk is in 14% of cases and with catgut in 6.4% of cases (Okinschitz). Metal is very troublesome and patient can't stand it; so it is not possible to use it in India. I had good results with silkworm gut. To avoid tears episiotomy should be done. Food must be rich in vitamins A and D to avoid infection (Green Mellanby and Pinder⁴⁰). Excessive bodily exertion should be avoided under all circumstances. During puerperium bladder must be evacuated at least 6 hourly; in cases of retroversion gravidarum the patient should lie on her abdomen.

According to Hennenberg⁴¹ every retroflexion does not require treatment. If there is no trouble it should be left alone. Jaschke would not treat the mobile uteri at all. Okinschitz treats infantile uteri by hormone-therapy in cases of patients who come very early for treatment. In two of my cases I have succeeded with Preloban and Unden (Bayer). Dysmenorrhoea disappeared in both of them and the position of the uterus also improved.

Pessary is a very popular treatment for the folk as well as the doctor. It must be rightly indicated. In our country the mobile and immobile retroverted uteri are both treated by pessary whereas it is absolutely useless in complicated cases. In puerperium a pessary should be applied on the 12th day if the uterus is found in retroverted position (Findley) and according to Schwarzbach⁴² the examination should be done in the 6th week and if the uterus is retroverted it should be corrected by pessary. According to Jellet⁴³ the cure is temporary. If the uterus remains in normal position after 4 months after taking out the pessary it can be taken as cured (Findley⁴ and Plas⁴⁴). It is further indicated in grave organic diseases of the heart and pregnancy and old age. In spite of these indications the pessary is a big nuisance. It creates unnegligible discharge which may be foul and blood stained suggesting cancer. It can get fixed up

in the vagina and may have to be taken out by operation. Patients have to run to doctors every month for getting it changed. If fixed up properly it relieves a patient from her trouble and she does not get herself operated till she gets all sorts of complications in her old age.

On refusal of pessary by the newly delivered patients exercise of knee and elbow position has been suggested (Findley¹).

The psychoneurotic symptoms of patients with retroflexion of mobile or immobile uterus has got to be treated by operation (see Cases II and III), because a pessary would not help much. Hypnotism and psycho-analysis which are the surest cure of hysteria usually don't help in such cases. I have come across only one case where it was possible to cure a patient with retroverted infantile mobile uterus by means of psycho-analysis (see Case No. IV). In other cases operation was inevitable.

The complicated cases should be treated by operative methods. According to Burch⁴⁴ the indications for operations are relaxation of pelvic outlet, laceration of cervix, pathological conditions of appendages and displacement by adhesions and according to Evens, dyspareunia. I am of opinion that all the patients relieved by pessary should be operated on when fit for the same, except when they are pregnant, or are in puerperium, or have grave diseases of the heart. Green-Armytage⁴⁵ admits that he has done so many operations uselessly. I think he has done a lot of good in relieving the patients from their malpositions and pathological symptoms. The operation should not be postponed for very long but it should be done in young age as long as not contraindicated. For the types of operations I suggest Alexander Adam for mobile and Gilliam for immobile uterus. Lampenscherf⁴⁶ has described Prof-Kroh method of stitching both the round ligaments by means of fascial tissue taken from the Lig-latum of the thigh. Heyrowsky⁴⁷ has described very good results with the high vesico-fixation of Werth and Halban and Stanca⁴⁸ suggests Dolores operation and Horow, Ohlhansen, Ventrification. Luge⁴⁹ describes his own method. Otto⁵⁰ seems to be satisfied with Baldy's method. Donald⁵¹ has rightly suggested curetting for endometritis with retroversion. I usually do curetting after the third month of the Gilliam's operation if the endometritis still persists.

Case 1. Mrs. M. K. 26 years old. Menstruation began at 13th year; always regular but very painful every 4th week. Patient had a baby 4 years ago. Since last three years backache.

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pain in inguinal region, bad appetite, coldness of feet and hands, pains in the epigastrium, sinking of heart "Dil ka ghabrana" and off and on unconsciousness. Further she complains of leucorrhoea and the menstruation is painful.

Healthy looking patient. Uterus retroverted and mobile. thickening in the right adnexa, other organs healthy. Patient was first treated with hypnotic sittings but it gave temporary relief to her neurasthenic symptoms. With pessary there was a little relief to backache. The patient was operated and the round ligaments stitched according to Gilliam. This relieved her from her troubles absolutely. Re-examination after a year,—the patient had no complaints.

Case 2. Mrs. H. R. age 20 years. Regular menstruation every 28 days, great discomfort during menses. Patient had still birth 3 years back. Since last two years she complains of headache. She feels as if her limbs don't belong to her. She has sometimes darkness before her eyes and gets senseless. She complains of pain in epigastrium and inguinal region, backache, constipation and severe leucorrhoea.

Healthy looking middle sized patient, retroverted uterus, size 7.9 cm. mobile, adnexas normal. The application of pessary relieved the backache otherwise it was useless. Psychoanalysis and hypnotism gave just a little relief to hysteric symptoms. It was decided to stitch the round ligaments according to Gilliam and the symptoms disappeared absolutely after operation. Re-examination after two years,—the patient is absolutely healthy.

Case 3. Mrs. V. D. 20 years old, married six years back, one full-term delivery and two abortions. Since three years, complains of backache, pains in inguinal region both sides, headache, discomfort on walking, pain in the leg by stretching.

Examination:—Left leg painful on pressure in gastrocnemius region and posterior region of the thigh. Flexion of left leg in lying dorsoposition, very painful. Reflexes normal. Uterus retroverted, movable with pains 8½ cm. in length. Left tube thickened.

Application of pessary not possible as the trouble increased. Gilliam's operation was done and the patient was relieved of her trouble.

Case 4. P. W. 24 years old, menses began at 15, every 29 days, always regular lasting for 5 days, very painful. Since her marriage 4 years back relief of painful menses. Patient complains

of pains in inguinal region, Leucorrhœa, pains in heart region, heart burns. Since last three years she sees somebody coming and then she gets into a hysteric fit, will pull her hair, beating herself on the breast with or without a stick

An outwardly healthy looking women of asthenic type.

Uterus small, retroverted, of infantile type. All other organs were normal.

TREATMENT.—On application of pessary no improvement was observed.

Psychoanalysis :—After 15 sittings she explained to me that she had taken a portrait painting of Arjuna 3½ years back. That picture was taken away from her room as her aunt had some objections. The patient used to masturbate and it increased all the more since she took fancy for Arjuna. In spite of her marriage she could not give up the onanie. After a few sittings she was absolutely cured. Her infantilism of the uterus was treated with preloban. She delivered a child after a year of her treatment.

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Diet *

BY

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OUR knowledge compared to that of an ordinary physician appears almost imperfect to an average patient, who very often associates his illness from the time of his partaking of certain articles of food and persists in asking odd and seemingly stupid questions about every item and various ingredients that make up his diet. I have often marvelled at the detailed knowledge of every article of food that an ordinary hakim is credited to possess. It is true that only in recent years our conception of the importance of the subject of diet in health and disease has found expression in medical curriculum, for in our own days of studentship there used to be hardly any mention of dietetics or any instruction worth the name imparted on the subject; even in the attached hospitals then, no elaborate arrangement was maintained for preparation of diet or any dietician was employed as a permanent official, for the therapeutical aspect of the effect of diet on the various forms of diseases, was neither carefully studied nor taught, and the physician going round his wards was usually satisfied in prescribing the diet under one of the three headings, 'Liquid', 'Light', and 'Normal', under which it was then classified. The liquid diet consisted of milk, barley water, milk and soda, some soups, mainly vegetable; the light diet was made of rice congee, eggs, bread and fish, whereas, the normal diet consisted of the usual diet of the patient, meat, vegetables, pulses etc. accompanied with bread; it of course varied with the nationality and habits of the patient. Even during clinics the learned physician hardly made any attempt on the subject of balanced diet or discussed the number of calories or the quantity of protein, fat, carbohydrates in the diet. Excepting casual remarks on the salt free diet or diabetic dietary or a mere warning against the use of meat or its derivatives such as meat soups in nephritis, for their supposed strain on the damaged kidneys, the subject was brushed aside lightly and not much thought of. May it be said to the credit of the lightly talked of our two surviving indigenous systems of medicine, *viz.* Ayurvedic and Unani, that each article of food is clearly and definitely discussed, and its physiological

* Specially contributed to "The Antiseptic"

action or rather reaction on the manifestations of the various diseases have been unambiguously explained and useful dietary evolved. I have no doubt that a research student will come across with many examples in both the systems of medicine where a dietetic treatment has a modern note about it. It may interest the reader to know that Hippocrates (460-370 B. C.) the ancient Greek physician, known as the father of medicine, was aware of such diseases as xerophthalmia and anæmia and said that ox liver cured them.

The difficulties that an average practitioner experiences in the direction of selection of foods are enormous, as often not, his texts are of little value to him. For example, the various proprietary foods described in the texts are either not available or, if available, are little sought after. We have our own difficulties in Sindh. They are mainly cost, prejudice and ignorance. In order to be able to prescribe diet in illness with reasonable confidence and to the advantage of the patient, it is well to grasp clearly and definitely the various principles involved in arriving at the balanced diet in health; and to this end it will be briefly discussed.

The Historical Review.—Though our remotest ancients had realized that the food was in some way connected with man's output of work and that the more a man worked, the more he is required to eat, and in order to maintain his body's weight, he had to eat daily and that the man lost his weight if he starved and gained weight if he lived on liberal diet, yet they had failed to deduce any logical conclusions from such simple and straightforward observations. Upto the beginning of the 19th century clinicians regarded food as a means of some sort of vital spirit and meat eating nations thought that taking of meat led to the entry of some vital element into the human body. This was partly due to their ignorance of organic chemistry and to their belief that organic chemistry was beyond their understanding till Wohler, synthetically prepared Urea which was followed by the synthesis of other organic compounds thus paving the way to the understanding of the science of human and animal body. Though the vitalistic theory was dispelled by the work of Liebig who showed that flesh, blood, bones etc. were a mixture of complex organic compounds, the real work, which led to the foundation of our present knowledge, was done by Lavoisier, during the French Revolution. It was he who showed that the metabolic processes resembled combustion except, that they occurred at a much lower tempera-

ture and oxygen intake and carbon dioxide output varied directly with the amount of food burnt up. He further demonstrated that directly the work was increased the oxygen intake and carbon dioxide output also increased proportionately. He was followed by a long line of physiologists who developed his technique and led to the present knowledge calculating basal metabolic rate by means of oxygen consumption.

The Food, its Constituents and their Relative Merits.—

For a comparative study, the human body is often compared to a machine and the food, to fuel. But the analogy is faulty as it is incomplete. The fuel keeps the machine going only. The repairs, extension, (growth), regulation or direction and its protection against damage is beyond its functions. Whereas, the food provides the body with the material for the replacement for its wear and tear, its growth, regulations and protection, and a medium for distribution of digested material to the place of requirement. In short, in conserves, the material of our body maintains its output of energy and regulates its function. A balanced diet is that which contains all the proximate principles and thus fulfils the main functions of the body. The following table modified from Hutchison and Mattram tells us which constituents of our diet supply us with the above needs of the body.

Tissue Builders and Repairers	Heat Producers and Energy Suppliers	Regulators	Protectors	Solvents
Proteins Minerals Water	Fats Carbohydrates Proteins	Vitamins Minerals	Vitamins Proteins Minerals	Water

It will be seen that the constituents of diet which sustain and regulate life in the sequence of importance are: (1) Proteins; (2) Minerals; (3) Fats; (4) Carbohydrates; (5) Vitamins; (6) Water. Before discussing the total requirements of each proximate principle for the efficient maintenance of the body, let us examine each article of food chemically and see what percentage of each proximate principle is contained in them and from which we derive the most. The following table shows the chief sources of food with their subdivisions.

- (A) *Animal Products*:—(1) Meat; (2) Milk; (3) Fish; (4) Eggs. (a) Ghee; (b) Butter; (c) Casein.

- (B) *Vegetable Products*:—(1) Sugar; (2) Rice; (3) Cereals; (4) Wheat; (5) Pulses; (6) Leafy Vegetables; (7) Fruits—dry and fresh; (8) Spices; (9) Flavouring agents; (10) Vegetable Fat.

- (C) *Minerals*:—(1) Inorganic—Sodium Chloride. (2) Organic Compounds: Iron; Calcium; Phosphorus; Sulphur; Magnesia; Iodine etc.

- (D) *Water*:—(1) Oxidation; (2) In food; Pure water—Ingestion.

Chemical Composition:—The food is chemically composed of proteins, fats, carbohydrates, inorganic salts, vitamins and water. A brief summary of their merits and physiological values are given below:—

Proteins:—The word protein means “of first importance”, as it contains the element of nitrogen which is essential in the building of the tissues of the body. They are very complicated substances, and are made of a number of simpler constituents called amino-acids—the building stones from which the body structures are formed. The bulk of protein is digested by the process of hydrolysis by the gastric juices in the stomach where it changes into acid metaproteins and proteosis and the rest is passed on to the intestines to be digested by the pancreatic and intestinal secretions and be disintegrated into peptone and amino-acids. It is not stored away anywhere in the body, the accessories and end products are eliminated by kidneys. Meat, eggs, fish, milk and nuts are known to possess complete proteins and are easily digested. The vegetable food products do not have complete proteins, for example, rice, wheat, barley, millet and pulses—the rice being the poorest in protein contents and the pulses being the richest. The outer cover of the rice, wheat and other millets contain a proportionately higher ratio of proteins than the inner starchy kernel, and if these are highly milled, then much of the protein along with some vitamins and mineral matter is lost. The actual amount of protein needed for the body is about 2-3 ounces of pure or 10-15% of the total calories of food eaten. The work does not increase the wear and tear of body structure to any marked extent, but such activity does cause an increased use of energy yielding foods. The growing children want relatively more protein and the following scale from health bulletin is given as rough guide and it will be seen that this falls short of European standard.

Protein Requirements.

Age and Sex.		Co-efficient.	Grammes per day.
Man	18-60	1.0	65
Woman	18-60	0.85	55
Boy	10-17	1.20	80
Girl	10-17	1.10	70
Child	6-9	0.90	60
Child	2-6	0.60 to 0.80	40-50

The Commission of League of Nations recommends that "During pregnancy and lactation, some animal protein is essential, and in the growing period it should form a large proportion of the total protein".

Protein material can also be used as a source of energy, and when in this way, it yields 4.1 calories to the gram, or 120.3 calories in an ounce of pure protein; but this function is of less importance than the tissue building one. The following table gives the most commonly used articles from which the protein is obtained. Their caloric value per ounce, along with the percentage of fat, carbohydrate, mineral salts and vitamin contents is given below:—

Name of food.	Percentage Composition.													Calories. per ounce.
	Water %	Protein. %	Fat. %	Carbo- hydrate %	Fibre. %	Mineral Salts.				Vitamins.				
						Calci- um %	Phos. %	Fe. %	Total.	A	B ₁	B ₂	C	
Beef ...	74.3	22.26	2.58	—	—	0.004	0.190	0.77	0.98	59	50	—	—	37.7
Egg—Duck ...	71.0	13.5	13.7	0.7	—	0.073	0.261	2.97	1.03	1233	—	—	—	60.1
Egg—Fowl ...	73.65	13.33	13.3	—	—	0.056	0.271	2.07	1.97	—	—	—	—	57.7
Fish—Mangalore small ...	77.8	21.49	1.63	—	—	0.055	0.413	2.28	2.03	25.6	—	—	—	37.4
Mutton ...	71.46	18.54	13.30	—	—	0.147	0.151	2.52	1.26	30.8	60	—	—	64.6
Milk ...	87.6	3.3	4.0	5.0	—	0.120	0.093	0.24	0.70	180	—	+	+	20.5
Beans, Soya ...	8.08	43.22	19.50	20.85	3.72	0.237	0.689	11.50	4.63	710	300	+	+	14
Peas, roasted ...	9.90	22.94	1.39	23.43	—	0.033	0.357	5.0	2.34	—	—	—	—	11
Walnuts ...	4.53	15.65	64.49	10.90	2.60	0.095	0.384	4.79	1.84	—	150	—	—	228

Fats:—The fats contain the chemical elements of carbon hydrogen and oxygen which are especially valuable on account of their ability to yield energy to the body. They are absorbed in the intestines by the process of saponification and emulsification, that is, during the process of digestion, they are first broken into two constituents, fatty acids and glycerine, which later on are again united to form emulsified fat—the fat that is broken into very small droplets as in milk and cream. In this form the fats are carried into circulation and are made available for the tissue needs. The vegetable fats are obtained from liquid vegetable oils and the animal fats, being more solid in consistency, are more useful to the body. Besides, butter, ghee and cheese contain vitamin A, which is absent in vegetable oils. The fats as a group supply heat and energy and when stored in the body are a ready reserve of energy-yielding substance. The fat deposit is not only directly derived from the intake of fatty substances, but also from the protein and carbohydrates taken as food, for it can be formed from them. It is calculated that 1½ to 2 oz. of fat is consumed daily. A few of the more common foods that supply a liberal amount of fat to the body will be found in the table given below under 'carbohydrates'.

Carbohydrates:—All vegetable foods contain carbohydrates in varying proportions. Similiar to fat they have the chemical elements carbon, hydrogen and oxygen but the proportion of oxygen is greater. They are the most important of energy yielding substances. The carbohydrates are represented by the sugars, starches and woody fibre of plants. The sugars are wholly carbohydrates and are found in nature in honey, fruits, and sugar-cane, the commonest being glucose, levulose, cane-sugar and milk-sugar. The starches are white, granular and tasteless and are found in grains, fruits and nuts. They are insoluble but the cooking and baking change them into soluble ones called dextrin. Most of the carbohydrates are derived from starch which forms the main part of food. The cellulose occurs in the frame work of the plant and is not easily digested but it forms the ballast or roughage which helps the elimination from the intestinal canal. The carbohydrates are digested in the stomach by the action of saliva and in the intestines by the pancreatic and intestinal juices. During the process of digestion, the more complicated carbohydrates are converted into simpler forms—for example, starch is converted into common glucose or grape-sugar and in this form it circulates in the blood. It supplies energy by the process of oxidation and what is not oxidised is

stored up in the form of muscle starch in the structure of liver and muscles to be kept in reserve for use during heavy work or the periods of starvation or insufficient intake. Hence it is essential to increase the proportion of carbohydrates if any heavy work is to be undertaken. It is estimated that 60 to 65% of the total calories are derived from carbohydrates. The common sources of carbohydrates are given under this table.

Name of Food.	Percentage Composition.										Vitamins.				Calories per ounce.
	Water.	Protein.	Fat.	Carbo- hydrate	Fibre.	Calcium	Phos.	Fe.	Total.		A	B ₁	B ₂	C	
Wheat	12.77	11.77	1.45	71.30	1.20	0.054	0.315	5.34	1.49	130	230	4	—	—	115.2
Wheat flour	13.30	11.00	0.99	74.10	0.30	0.020	0.092	1.00	0.40	—	—	—	—	—	116.2
Arrow root flour	16.51	0.17	0.06	83.14	—	0.009	0.017	1.00	0.12	—	—	—	—	—	111.3
Barley	12.48	11.47	1.28	69.39	3.92	0.025	0.225	3.70	1.51	—	150	—	—	—	111.6
Rice—raw	12.19	8.49	0.35	78.27	—	0.007	0.165	2.22	0.70	—	100	—	—	—	117.0
Rice—milled	12.96	6.44	0.55	79.14	—	0.007	0.108	1.02	0.50	—	26	—	—	—	117.0
Sago	12.20	0.24	0.17	87.09	—	0.019	0.006	1.27	0.30	—	—	—	—	—	117.0
Gram—green	10.92	23.96	1.20	50.09	4.1	0.143	0.281	8.40	3.57	—	—	—	—	—	—
Juar Millet	11.23	12.30	4.55	60.62	7.95	0.026	0.287	6.25	3.24	—	195	—	—	—	111.2
Bajrai	12.91	11.59	5	67.14	1.22	0.049	0.352	8.84	2.65	—	—	—	—	—	119.7

Mineral Salts:—The mineral salts are the ashes of food, that is the material that is left after the food is burnt. They occur in the state of organic compounds and are simple in character, consisting of Potas, Soda, Magnesia, Lime, Iron, Sulphur, Phosphorus, Iodine etc. They are mostly available in varying proportions in fruits, green vegetables, milk, eggs and whole grains. The foods that are near to their original forms are richer in the salts than are those which have been subjected to a process of preparation, such as highly milled cereal products, in which the milling removes some of the coarser part of the grain which is rich in these salts. It is estimated that an average body contains about 7½ lbs. of the mineral. Though some of them occur in very small amount, they are very useful as tissue builders and regulators, for example, iron is only 1 in 25000 parts of the body weight, yet without it tissue activity

would come to a stand still and no blood would be formed. Normally the tissues are faintly alkaline in reaction. When the body is active, acid substances are produced: these mineral salts help to regulate the amount of acid present, and by neutralizing it, aid in its elimination.

Calcium:—Children, pregnant and nursing women require calcium proportionately more than adults. The best source of calcium is milk though it occurs in vegetable leaves also. It is calculated that the daily calcium requirement for adults is 0.68 gm. and for children 1.0 gm.

Phosphorus:—The daily requirement of phosphorus is calculated at 1 gm., but it has been found that the diet which contains sufficient amount of calcium, is quite satisfactory so far as its phosphorus content goes.

Iron:—The daily requirement of Iron is estimated at 20 mgs. and its chief source is pulses and meat. It is used in the building of blood as it enters into the molecule of hæmoglobin and it is through this that oxygen is conveyed to the tissues of the body. Diet rich in iron will prevent diseases like anaemia but will not cure them.

The list of articles rich in various salts is given below:

Rich in Salts:

Fruits.
Milk.
Eggs.
Vegetables.
Whole grains.

Poor in Salts:

Polished rice.
Refined corn meal.
Sugars.
Syrups.
White flour.

Vitamins.—Vitamins were introduced only in the year 1912 by Dr. Casimir Funk, though the deficiency diseases were known thousands of years ago. It was left to a Japanese admiral to find out that Beri-Beri was curable by liberal allowance of vegetables, fish and meat. The pioneer work of Sir Hopkins and his experiments with synthetic diets laid the foundation of our present knowledge of vitamins and during the last 25 years by joint effort and judicious pooling of the results obtained by workers in the different parts of the world, a great progress has been made in our knowledge of these substances. Vitamins are known by the letters of the Alphabet.

Vitamin A:—Vitamin A is found in greatest concentration in halibut liver oil though it is present in fats of animal origin,

namely, milk, butter cream, eggs, liver fat and cod-liver oil; the carrots and other vegetables contain a substance, an orange red pigment, called carotene which can be transferred in the body into vitamin A. It is absent from lard and fats of vegetable origin such as olive oil, linseed oil and cocoanut oil. The greener the vegetables, the better the contents of vitamin in them. It is fairly stable and is not destroyed by the ordinary process of cooking and boiling. At present the knowledge of the requirement of the vitamin is limited and that a daily minimum of 3000 International units is considered sufficient. The needs of children are of course greater than those of adults. Any deficiency of vitamin A is followed by lowering of general resistance to diseases such as pulmonary tuberculosis, broncho-pneumonia etc., etc., and gives rise to night-blindness or inability to see in light.

Vitamin B₁:—It is present in yeast, pulses, seeds, eggs and slightly in meat. It is called anti-beri-beri Vitamin and is now isolated in pure form and cures the beri-beri.

Vitamin B₂:—It is an important food factor and is mainly present in milk, yeast and meat. Excepting certain pulses *e.g.*, Bengal, black and red grams, the green vegetables and some roots are fairly rich in its contents. Fruits seem to contain very little. Its absence in diet causes a disease called pellagra, characterised by abdominal symptoms, pigmentation of skin, changes in mental and nervous systems. The soreness of the angles of mouth and tongue commonly seen in children is probably the result of the deficiency of Vitamin B₂ in diet and it is cured rapidly by the daily consumption of a pint of milk and $\frac{1}{2}$ to 1 oz. of dried yeast.

Vitamin C:—It has been isolated in pure form as Ascorbic acid. It is found in oranges, lemons and green leafy vegetables such as raw cabbage leaves, tomatoes and potatoes. It is destroyed when vegetables become dry and stale and also when heated in the alkaline medium in the presence of air or oxygen. Hence it is destroyed when soda carbonate or bicarbonate is added in the vegetables in the process of cooking. Its absence in diet causes scurvy which is cured by a daily dose of a small quantity of orange or lemon juice. It is absent in pulses and cereals but is formed in grain if it is allowed to sprout. It is calculated that a well balanced diet should contain 30 to 50 mgs. of this vitamin daily. Babies and children living on dried milk require an addition of fresh fruit juices, especially of limes and oranges.

Vitamin D:—Vitamin D is recently isolated in pure

crystals and is artificially produced from a substance called ergosterol by the irradiation with ultra violet rays. It has been shown that the Vitamin is formed in the skin by the action of sunlight, hence deficiency diseases due to lack of the vitamin *e.g.*, rickets in children or osteomalacia in pregnant women who live in the dark and purdah. It is present in cod liver oil, milk, butter and yolk of eggs.

Vitamin E:—It is present in seeds and green vegetables. Due to its deficiency there is premature death of foetus at the early age of development.

Water.—Water like air is provided free and it is only second to oxygen which keeps up the flame of life by the proper working of the complex biological processes in the animal organism. Water forms 70% of body weight and it provides a vehicle through which chemical actions can occur and through osmosis and diffusion the necessary transference of chemical compounds through the tissue membrane is effected. It is constantly lost through skin, kidneys, lungs and bowels, and is generally replaced before it reaches the dangerous concentration. It is calculated that animals can exist without food for eight weeks but without water death will take place in 3 or 4 days. The total requirement is still a debatable question. Sanderstrom and De Bois give the following daily requirements for an average normal individual:

Water intake :—

Drinking water	...	300	grms.
Water in milk, tea, coffee	...	580	"
Water in solid food	...	770	"
Water from oxidation of 100 grms. of food			
protein	...	41	"
fat	...	118	"
" 244 grms. carbohydrate	...	135	"
Total	...	1944	"

Water output :—

Through kidneys	...	750	"
" Bowels	...	300	"
" Skin and Lungs	...	750	"
Total	...	1800	"
The amount retained	...	144	"
Gain in body weight	...	100	"

The selection of food is not only made on account of its nutritive values described in detail above, but there are other factors also which determine its usefulness in the human scheme of life. The nutritive values or proximate principles of any article of diet are but the chemical subdivisions of it. There are other tests and values for which the food is to be selected. They are :—

1. *Physiological Value*:—The food when introduced into the system should be such as to be thoroughly utilized by various physiological processes to its maximum nutritive values and without damaging any organs of the body that make up human machinery. We know that every article of food that is eaten is first digested i. e., its various units are separated by certain ferments present in the stomach and the intestines, then it is absorbed, i.e. it enters the blood stream circulating in the body to be used up wherever required and perform its main functions of production of heat, repairs and growth or to be left on as reserve for future use. What is not digested is left behind to be finally evacuated by intestinal movements through bowels. But human being is mostly a herbivorous animal, and if kept on food which leaves little or no residue, suffers from intestinal affections, which may prove fatal. Hence it is almost a necessity to have an addition of food which leaves undigested some definite amount of residue, popularly termed as roughage or ballast. There are certain substances such as saw dust, agar etc., which, so far as their chemical composition is concerned and the physical properties of heat production go, are complete foods. But they lack the above merits of digestibility and absorbability. Similarly, the poisonous vegetables are unfit as edibles. To summarize the food selected as non-poisonous, easily digested and also leaving some roughage :—

The following table worked out by the American Agricultural Department as regards the absorbability of each constituent of food is given below.

Name of Article.	Protein %	Fat %	Carbohydrates %
Eggs	97	95	98
Meat	97	95	98
Milk and its products	97	95	98
Cereals	85	90	98
Sugar and Starches	—	—	98
Vegetables	83	90	98
Total Vegetable foods of mixed diet.	84	—	95
Total Animal Foods	97	95	98
Fruits	85	90	90

The carbohydrates are completely absorbed and sugar enters the blood almost to the last grain. Next proteins are completely absorbed, especially animal ones. Thus it will be seen that the diet composed of animal proteins and carbohydrates, such as rice and sugar will leave a small residue in the intestines.

2. *The biological value*:—The human body, like man-made machine, cannot go on long without the replacement of its wear and tear; besides, human body requires material for its growth also. It has been experimentally proved that certain amino-acids (tryptophane, lysine, tyrosine, arginine) contained in the molecules of animal proteins being nearer to the human amino-acids, are easily digested and used as bricks for the building of human cells. The other amino-acids found in vegetable proteins such as zein in maize or proteins in gelatin, being devoid of above mentioned property, are not of much use in the production of human protein. This property of proteins by which they can replace the wear and tear by building up tissues is called the biological value. This term, biological value, is applied to proteins only, as they alone can replace wear and tear of the body. Some articles of diet have a higher biological value than others. For example, the proteins of milk supply the requisite material of growth at lower figure for intake than those of wheat. It therefore follows that a greater quantity of blood containing proteins of lower biological value, is required to counteract the body katabolism and that the animal proteins are more nutritive than the vegetable ones. It has been known that the proteins of higher biological value when eaten along with poorer proteins raise their biological value also. Hence milk, fish, eggs, cheese etc. when taken with vegetable proteins of wheat, cereals, pulses, etc. render them more nutritive. The biological value is expressed in figures as under. If 100 parts of food proteins can replace 100 parts of body proteins then that food is said to have a value of 100. If, however, 100 parts of food proteins replace only 40 parts of body proteins, then it has the value of 40 only.

3. *The Physical Value*:—Proteins, fats and carbohydrates are oxidized or burnt in the body to provide the necessary energy or heat for life. This amount of heat which food yields on complete combustion is taken as source of energy. The unit of heat production is expressed in calories. A calorie is defined as the amount of heat required to raise the temperature of 1 gramme of water through 1°C. But in food calculations, the amount of heat required to raise a litre of water through 1°C is taken as a calorie. The method of determining the caloric yield of foods is by the burning of a weighed sample of the product in question in an apparatus called a bomb calorimeter. This instrument is supplied with accurate thermometers which register the heat produced in burning the sample of material whose heat-yielding

value is to be determined. By its use the calorific value of fat, carbohydrate and protein is calculated as under.

NAME.	PER GRAMME.	PER OUNCE.
Protein.	... 4.1	116
Carbohydrate	... 4.1	116
Fat	... 9.3	264

In drawing up the food schedule, it is necessary to see that enough food is taken in order to ensure the sufficient production of energy.

How to measure the food values:—The following two methods are given to measure the calorific value of food from the known percentage of its proximate principles :

1. Pure proteins or carbohydrates yield per ounce 116 calories; 1.16 is one per cent of the total yield of an ounce of pure material. This is taken as the factor, *e.g.*, if a food sample has 5% of protein, the caloric value is calculated as 5×1.16 , *i.e.* equal to 5.8 calories. Similarly 2.64 is taken as the factor for fat, then taking the percentage of fat in a given food and multiplying by 2.64, the calories of fat per ounce are determined. The following is an example of how the method of computation is applied to milk :—

	PROTEIN	FAT	CARBOHY- DRATE.	TOTAL.
Percentage composition...	3.3	4.0	5.0	
Factor	... 1.16	2.64	1.16	
Calories to an ounce	... 3.8	10.6	5.8	20.2

2. METHOD :—Multiply the percentage figure given in any table of protein and carbohydrate by 43 and that of fat by 91. Add all together and divide it by 35. For example, applying this method of calculation to milk :—

	PROTEIN	FAT	CARBOHY- DRATE	TOTAL.
Percentage composition...	3.3	4.0	5.0	
Factor	... 43	91	43	
	35	35	35	
Calories to an ounce	... 141.9 + 364	+	215	720.9 = 20.5
		35	35	

Satiety Value:—The power of satisfying hunger lies in the physiologico-psychological quality of foods which differs greatly in

various diets depending on several factors, such as time food lies in the stomach or the juices it is able to stimulate. For example, fat and butter have a higher satisfying value than bread, fish, fresh fruits, or fresh vegetables.

Protection Value:—It has been conclusively proved that the prevalence of rickets, scurvy, poor musculature, dental caries, poor skin, anæmia, sub-normal growth and weight are the direct result of malnutrition due to the inadequacy of food and that these are preventable and curable by the administration of certain common articles of food ; these are called protective foods as these are rich in elements necessary to prevent the incidence of specific maladies referred to. The protective foods consist mainly of dairy and garden products and include meat, milk, eggs, cheese, vegetables, fruits and potatoes. Of all the protective foods, milk is given the place of choice, as it contains all or most of the materials necessary for the growth and for the maintenance of life and provides these in a form ready for immediate utilization by the body. Next in importance are the fruits because of their high vitamin C content, citrous fruits (lemon and oranges) being the richest.

The Economic Value of Foods:—The diet is judged by its merits and though the cost is a great consideration yet it can only be economically sound if it has the following four cardinal values : (1) Energy yield ; (2) Protein yield ; (3) Inorganic salt content ; (4) Presence of vitamin.

A food may yield valuable inorganic salts and vitamins, and yet be of little value so far as calories are concerned. The food of high cost and fancy appearance is not always best. The good and wholesome food is more expensive, as in our country garden and dairy products are luxury to most.

Personal Factor or Human Factor:—There is always a personal equation in all matters concerning human activity which may or may not have a scientific basis, *e.g.*, personal likes and dislikes or individual idiosyncrasies. The writer knows a person in whom curd gives rise to symptoms of diarrhoea. There are several people who cannot stand milk or eggs.

Climate:—It is well known that in tropics the digestive powers are not so vigorous as in cold climates. In this part of the country where the climate is often extreme in both seasons, it is the experience of all that the bodily activity in summer is greatly reduced and that the food of higher specific dynamic action such

as proteins (egg, meat) in excess is rightly regarded as heating diet and that the excessive production of heat in the body is not only uncomfortable but may positively be injurious as the peripheral circulation and sweat glands are taxed for radiating the body heat into the already hot dry air. One of the reasons for constipation being more observed among the people living in tropics is that the general musculature of the body including intestinal muscles is not kept in that tone which is common in the residents of cold countries. A predominating protein diet is more likely to lead to the habitual constipation as it is almost absorbed, leaving little or no residue or roughage. This habitual constipation in its turn leads to the intestinal stasis and absorption of toxic end products which further gives rise to numerous tropical diseases such as sprue, neurasthenia and mental disturbances.

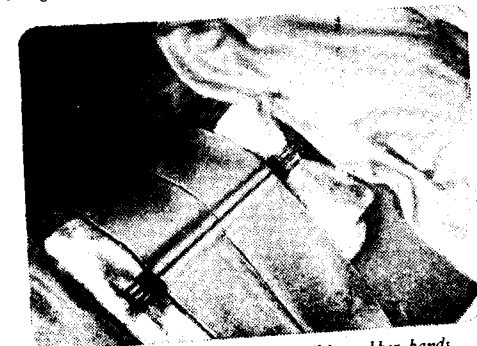
Quantitative Food requirements :—The total amount of food required for an individual or group of individuals depends on the factors such as age, sex, occupation and physique. The percentage of optimum quantities of the three proximate principles protein, carbohydrate and fat required for keeping the body in health and efficiency vary according to individual requirements. Adaptability is a remarkable human quality and it is therefore wrong to apply a hard and fast rule as to what the percentage of these proximate principles should be. It is well known that underfed individuals who live on insufficient ration, have so adapted themselves to the low level of vitality and impaired strength that they themselves scarcely realize that they are under-fed. As an average Indian is engaged in manual work, he requires a larger proportion of protein in his diet, in order to supply the building material for the body. It has been estimated that the protein in the individual who is engaged in active work should not fall below $2\frac{1}{2}$ ounces per day which should contain sufficient quantities of good protein *i.e.*, of animal origin. But the European writers fix the essential protein intake at about 120 grammes or $3\frac{3}{4}$ for 24 hours, thus making about 500 calories of diet. The body heat is supplied by carbohydrates and fats. Theoretically it is immaterial as to how much the total requirements of energy are obtained from each of these. But, if carbohydrates are mainly depended upon for the supply of energy, a larger amount is to be taken with the consequence of over-loading the stomach and intestines, resulting in indigestion and other intestinal affectations. In the

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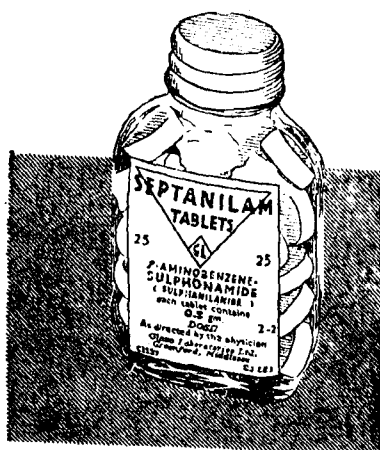
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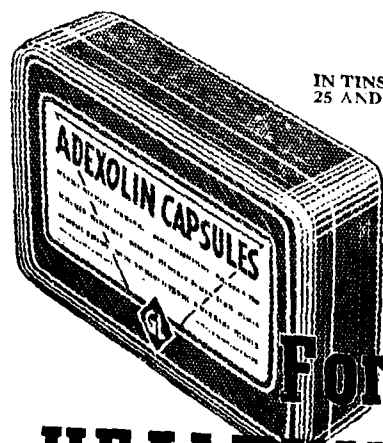
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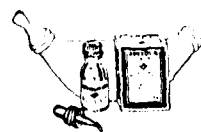
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same way, if fat is ingested at the expenses of carbohydrates, a major portion of it may not be absorbed, causing nausea and diarrhoea. The absorbed fat may cease to be normally metabolised, giving rise to ketosis and acidosis. In India people take a higher percentage of carbohydrates than fats, for cereals and other common articles of food are rich in carbohydrates. It has been estimated that in India out of the total caloric requirements, 20—35% are from fat and 55—60% are from carbohydrates. Further simplify it, usual ratio of 2 to 1 of carbohydrates to fats is considered ideal. This is known as anti-ketogenic ratio.

The qualitative food requirements:—We have seen that besides the proximate principles, the body requires minerals and vitamins. For example, the calcium requirements of expectant mothers are higher than those of ordinary individuals, the bones of healthy 3 months old, breast-fed baby are entirely made up from mother's blood and milk, and if her food is deficient in calcium, she will suffer in health along with the child. The vitamins which are very necessary for the health and maintenance of an efficient body, have now been clearly understood. The diets should contain adequate amounts of these.

Basal requirements:—The supply of daily rations must be in proportion to the amount of heat required for the expected work from the body. Such a life is active and even when the body is kept at perfect physiological rest, there is constant oxygen consumption per unit of time, and this represents the amount of combustion necessary to produce sufficient energy for the essential physiological systems, such as respiratory and cardiovascular systems. This is taken as the basal requirement. From the basal metabolism the actual number of calories can be calculated, corresponding to the oxygen consumption necessary to maintain the subjects in existence. Therefore all the dietetic considerations must begin with this number of calorie as basis. An expert commission of the League of Nations has drawn up the following statements about energy requirements :

(1) An adult male or female living an ordinary every day life in a temperate climate and not engaged in manual work is taken as basis on which the other age groups are reckoned. An allowance of 2400 calories net per day is considered adequate to meet the requirements of each individual.

(2) The following supplements of muscular activity should be added to the basal requirements.

(a) Light work up to	75	Calories per hour of work.
Moderate work up to	75—150	do.
Hard work up to	150—300	do.
Very hard work up to	300	Calories and upwards per hour of work.

It has been suggested that as India is a warm country, the basic requirements could be reduced by 10% from that recommended by the League of Nations. Hence an average Indian of sedentary habits will require only 2150 calories per day. But if he works leisurely for six hours, then he requires 6 × 75 = 450 calories in addition *i.e.* 2600 calories. This is considered adequate for an average agriculturist's daily caloric needs. But for a hard working labourer, an athlete or university student, 2800–3000 calories are necessary. The diet needs of women and children are assessed as fractions of those of an average man. Various co-efficients are given from Health Bulletin and are said to be sufficiently accurate for all practical purposes.

	CO-EFFICIENT.	CALORIES.
Adult man (over 14)	... 1.0	2600
Adult female (over 14)	... 0.8	2080
Child 12 and 13 years	... 0.8	2080
Child 10 and 11 years	... 0.7	1820
Child 8 and 9 years	... 0.6	1560
Child 6 and 7 years	... 0.5	1300
Child 4 and 5 years	... 0.4	1040
Child 2 and 3 years	... 0.3	780
Child 0 to 2 years	... 0.2	520

The League of Nations recommend for women as under:—

Pregnent women	... 2400 Calories.
Nursing women	... 3000 Calories.

These figures are definitely higher for the Indian women but it is safer to err on the right side.

Balanced Diet.—A balanced diet must contain sufficient quantities of protein, fat, carbohydrate, vitamins, and inorganic salts. The Chittenden standard, believed to be satisfactory, allows about 10% of calories in the form of protein, 25% in the form of fat, and the remainder, *i.e.* 65% in the form of carbohydrates. It will be seen that a very low proportion of protein is allowed, as the higher protein ration is not considered desirable or essential.

It is believed that excess of protein, though able to yield energy to the body, is an expensive form in which to supply it, and requires more energy on the part of the body for its utilization. Besides, there are other advantages in lower protein diet, which will be discussed fully later on. The Health Bulletin No. 23 gives the following composition of the well-balanced diet.

Protein	...	73	gms.
Fat	...	74	„
Carbohydrate	...	408	„
Total Calories		...	2590
Calcium	...	1.02	gms.
Phosphorus	...	1.47	„
Iron	...	4.40	„
Vitamin A (International units)	...	7000	
Vitamin B	(over)	400	
Vitamin C	(about)	170.0	

It will be seen from the above table that protein and fat are nearly allowed in equal quantities and each forms nearly $\frac{1}{3}$ of the total quantity of proximate principles. Two ounces of good fat are considered sufficient.

Ideal Diet.—It is impossible to draw up a definite list of foods answering the requirements of all persons, since there are certain individual variations in the utilization of food. Opinion is veering round the Lacto-vegetarian diet, that is, a diet consisting of fruits, grains, nuts and vegetables, plus milk and is considered by many as ideal food for human consumption.

(To be continued).

Action of Vitamin A on the Blood Sugar Curve.—M Antonini Lattante 8:551 (Oct.) 1937.

Blood sugar curves were plotted from determinations made during fasting and each half hour following the ingestion of 1 gm. of dextrose per kilogram of body weight. Two curves were made from each of 20 patients, one as a control and one after the patient had taken vitamin A for from six to eleven days. Both the curve during fasting and the curve following ingestion of dextrose were lower when the patient was receiving vitamin A.—*American Journal of Diseases of Children.*

Pulmonary Tuberculosis and its Treatment with Intra-pulmonary Injections*

BY

Dr. Khushdev Singh, Captain, M.B. B.S.,

Medical Officer-in-charge, State Hospital, Samam.

PULMONARY tuberculosis has become a very common disease in India, affecting masses of humanity and causing a great number of deaths every year.

The number of Sanatoria in India is ridiculously small as compared with the number of patients requiring treatment, and the length of time and expenses that it involves are beyond the pocket of middle class men, who unluckily form the majority of the sufferers.

Various preparations of Cod liver oil, calcium, creosote, gold and other chemicals are available in the market on the chemotherapy side, but not one is such as can be called a specific, and every preparation has got, if at all, its own limited value.

Artificial Pneumothorax, Oleothorax, Thoracoclysis, Thoracoplasty and Phrenic Evulsion are some of the surgical measures, which have proved of certain but distinctly limited benefit in a very small proportion of cases.

Collapse Therapy is the most popular and is practised by a great number of medical men, but after all it is only of use in a very few unilateral selected cases, where the adhesions are absent and in patients who can continue the treatment for years, which is a very lengthy process.

The procedure of intra-pulmonary injections of dilute Antiseptic solution, is one that was taken up and tried by medical men in America, years ago, but the results were far from encouraging. Various drugs as Sodium Morrhuate, Emulsions of Oleum Caryophylli, Cinnamic acid, Creosote and others were used one after another and given up after a short trial.

Recently the procedure of direct attack on the lesion has been taken up by Lt. Col. James R. Robert, C.I.E., M.B., M.S., F.R.C.S., of Dewas, who is the greatest advocate of the process,

* Specially contributed to "The Antiseptic"

at the present time in India and is doing these injections for the last ten years.

It is not definitely known how these intra-pulmonary injections affect the diseased lungs, but the results in a large number of cases are very encouraging and a number of cases show marked improvement in the symptoms. Cases running in an acute and active form are sometimes better affected than those having chronic form of the disease. The general, dietetic, medicinal and symptomatic treatments are of course carried along with injection treatment.

I started giving these injections in 1936 and within this period of about two years, I have given 500 injections in 37 cases. All these patients were from a poor or lower middle class, with lesions in one, or both the lungs. In cases with unilateral lesions, where adhesions were absent, I always preferred Artificial Pneumothorax, and in cases where adhesions were intense, I always did intra-pulmonary injections. In two cases I did intra-pulmonary injections on one side and carried on Artificial Pneumothorax on the other side. It was my keenest desire to keep a record of these cases as perfect and up to date as possible, but due to circumstances beyond my control, I could not follow all my cases from the beginning to the end though most of them remained under my treatment and observation for more than six months.

The following table shows the result of the injections done on the patients.

No.	Lesion.	No. of patients	Improved.	Stationary.	Got worse.
1.	Acute form unilateral lesion with adhesions ...	3	3	—	—
2.	Acute form bilateral lesion ...	10	7	3	—
3.	Chronic form unilateral lesion ...	2	1	1	—
4.	Chronic form bilateral lesion ...	22	15	4	3

I have deliberately used the word improved in the place of cured in the above table, as one cannot take a patient for cured, until his improved condition continues for some years and is not followed by a relapse.

Generally I give the injections every day or on alternate days to start with, trying to inject the solution as near the lesion as possible. After giving six to eight injections, I increase the

intervals between the injections, to three to four days, and carry on with this for some time.

If the patient is going to improve, he will show signs of improvement after six to eight injections and if no improvement is shown after ten injections I do not go any further with this line of treatment.

The effect of injections is that night sweats get less, temperature slowly comes down, appetite improves, weight shows a slight increase, cough and expectoration get less though the latter takes a little longer time.

The solution I use is the same as advocated by Sir James R. Robert and is as follows:—

R Acid Carbolie	... m xv
Novocaine	... gr. xvi
Glycerine	... m xxx
Aqua Distilata	... ℥ ii

Acid Carbolie is dissolved in distilled water, Glycerine is added next, and Novocaine last of all. The solution is allowed to stand for twenty four hours to sterilize itself. It can be either kept in sterilised rubber capped phial, or in glass stoppered bottle, narrow mouth, in screw cap, nickel plated nickel case, or best of all in "All glass solution bottle, Braun's, adapted for sterile preservation and sterile supply of solutions for injections", available from Bombay Surgical Company, Bombay.

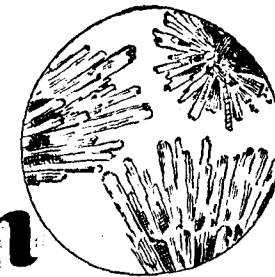
Site:—The solution can be injected into the lungs from different places, depending on the site of the lesion, the effort being to inject the solution as near the lesion as possible, at the same time, avoiding to injure any important viscera or blood vessel.

Apex can be approached either from the front by injecting into the subclavicular space, avoiding subclavicular vessels and also aorta on the left and superior vena cava on the right side or from behind by injecting in the supra scapular space.

The middle part and the base of the lung can be similarly approached either from behind by injecting in the interscapular space (which can be further increased by asking the patient to raise his arm upwards and forwards) or from the front by injecting in the mid or posterior axillary line from the sixth to eighth intercostal space.

Technique:—The skin is thoroughly sterilised either by ordinary petrol (Gasoline), ether or by absolute alcohol. The

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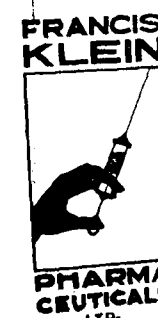
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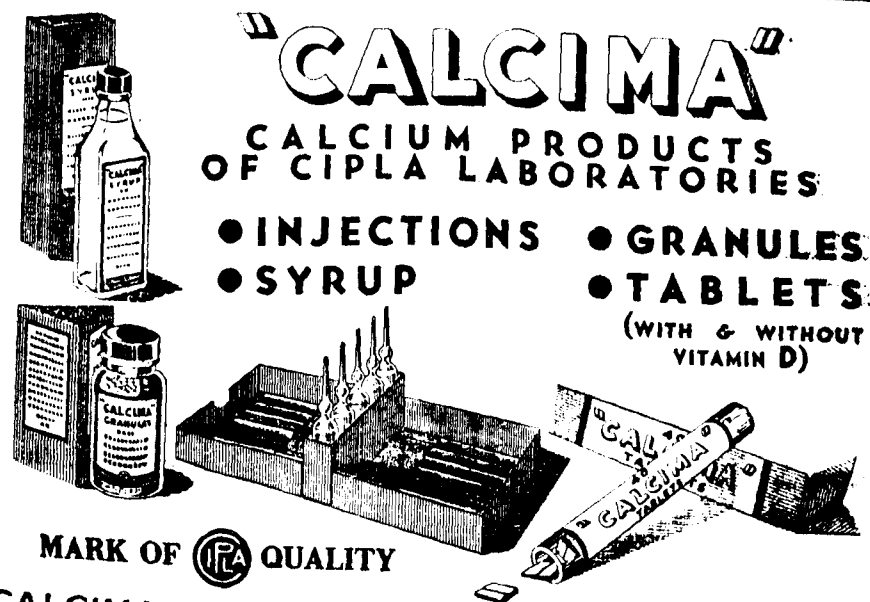
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CASES AND COMMENTS

Cornification of the Skin as a Manifestation of Injury or Infection

BY

Dr. F. D. Bana, M.B., M.R.C.S., D.P.H., D.T.M. & H., J.P.,

Administrative Medl. Officer, Bombay Port Trust, Bombay.

IT was some fifteen years ago in the 'Practitioner' I drew attention to the heaping up of the superficial epithelium or cornification of the skin, especially in the exposed parts of the body like the palm and the sole, after injury such as a blow, abrasion or penetration by a sharp body due simultaneously to some sort of septic infection of the dermis or the soft tissues underneath.

One has only to see a few cases of minor injuries in the labouring class of people to be convinced of the fact that after some interval in trivial accidents such as commonly occur in those handling tools or implements, as a result of injury or laceration some infiltration of the tissues occurs; for example, after piercing of the skin by a splinter of metal, wood, etc. accompanied by a low sort of infection this phenomenon occurs alongside with heat, pain and loss of power in the member. This is more of a protective and warning nature, and gives an additional sign or notice of the injury sustained in the shape of a corn or heaping up of the corny layer of the epithelium. One always feels a roughening of the epidermis or cornification in such cases within a few days if abscess formation is not limited to deeper parts. The following are a few typical illustrative cases describing the process and can be multiplied at length.

Case 1:—Dr. A hurts his right thumb whilst attempting to break a piece of wood when a small splinter pierced the thumb. This was removed partially leaving a little bit embedded underneath the cutis. The event was forgotten, until there was increasing pain and tenderness on touching things or holding articles between fingers and the thumb. At first, a small clear sago-grain-like swelling appeared, gradually increasing with considerable thickening of the epidermis, marking off the original site of injury. Instead of having it incised, it was pared with a sterile safety razor blade several times, obtaining temporary relief from pain. Soon the epidermis grew over the spot, forming

a regular corn which was very tender to touch. Finally this had to be opened up with a surgical knife when some infected material of putty-like consistency *i.e.* dried up pus and a small foreign body—the tip of the splinter came away and healing was uneventful. One could see in this all stages leading up to excessive formation or heaping up of the epidermis to its regression after the incision, *i.e.* successive layers of the epidermis, forming like the leaves of an onion and gradually dissolving, the epidermis assuming its normal appearance and level in about 4 days' time soon after incision. The whole formation of such a lesion of the skin shows how nature takes a hand in a protective mechanism when there is a penetrating injury by a foreign body accompanied by some sort of infection either from the blood or outside. To the classical signs of Inflammation in such lesions or swellings, of Pain, Redness and Loss of power, must therefore be added this additional sign of cornification to make the surgical picture complete. It shows how nature helps to limit and draws attention to the infection and the defensive fight going on between the tissues and the "Causus Belli". The cornification also serves as a protective envelope for injured tissues *i.e.* blood vessels and nerves underneath from further infection or injury through rough use of the member or limb. Such trivial infections and injuries are more liable to occur in the daily occupation or life of a man working outdoor and more so of a workman who is handling tools and articles, which are liable to cause injury or hurt. In open cuts or incision with or without suppuration, there is an outlet for effete materials *i.e.* pus and debris to come away but when the point of entry is small or the suppuration occurs in the fatty areolar tissues lower down, the point of entry having healed up as in a case of a sebaceous cyst, this cornification is well marked and draws the surgeon's attention prominently.

*Case 2:—*B, a labourer working in the workshops with hammer and file, got injured in the palm with a superficial abrasion and a small piece of iron which he was filing entered it. The hand was dressed with Iodine and the incident forgotten. After 8 days he comes up with a very large tender swelling in the middle of the palm, which is fomented for 4 days when the abscess is located and incised; about four ounces of pus and small particles of filing came away and the wound healed up in 8 days. Here the thickening of the epidermis over the abscess was typically thick parchment or India rubber-

like, almost resisting cut by the knife and faded away at the edges. The swelling in such cases is often so tender that the patient dreads to have the knife used and would try to carry on the fomentation indefinitely and suffer till the surgeon prevails by putting his knife through to end the misery quicker. After incision, the soddened thick epidermis resorbs and gradually assumes its normal structure.

*Case 3:—*A labourer C, got his toe trod on by another. Iodine was applied and the incident forgotten for a few days. Six days later, he complained of swelling and throbbing pain in the toe with very rough, tender and thickened epidermis all round the surface, and was unable to wear his shoe. The toe had swollen to half its size again with a thick corn surrounding it at the tip and below. I am specially remarking on the point, as I am at a loss to understand why if there is extravasation of bruised tissue or blood or pus in a limb and if that fluid causes tension and swelling of the parts the skin should not stretch and be thinned out as one would expect as in a toy balloon instead of its putting on a rough appearance with extra coating of the epidermal cell layers as in all such cases. It is therefore a definite formation and a non-regressive phenomenon that occurs as a result of injury and partial or complete infection of the subcutaneous tissues, bruised or injured by accident. With preliminary fomentation followed by incision and dressing aseptically it led to healing in about 10 days.

In all these cases, including injuries where no breach of open surface skin occurs as in a cut causing discharge of blood or pus later, if infected, the superficial layer of the epidermis assumes this peculiar thickening process and is a very objective and definite sign for such class of injuries. This part of the skin which has no blood supply assumes thickening or cornification indicating sub-infection of the member and its ultimate location for obtrusion later on either by Nature or through the Surgeon's knife. My aim therefore is to point out the invariable formation of this cornification in all cases of injuries whenever a surgeon is called on to treat painful or tender swellings especially in the toes, fingers, palms, soles of working class men and others. It will give the surgeon some thought in a trivial matter which has received so far scant or no mention in either medical or surgical practice.

An Interesting Case of Acute Ascending Paralysis (Laundry's)

BY

K. K. Mehta, F.C.M.S.,

Retired Civil Surgeon, Multan.

A PERSON named Jind Wada Khan of Mouza Obavara South (Jalalpur Pir Wala), District Multan, aged about 48 years, was admitted in my hospital (Mehta General Hospital) on 29-5-1937. He was brought on a charpai. He complained of:

1. Inability to move his lower limbs.
 2. Fever.
 3. Palpitation.
 4. Feeling of numbness in the lower part of the abdomen.
- Duration.....10 days.

On examination, his temperature was 100, pulse 128, tongue thickly coated, looking seriously ill, complete Motor Paralysis of legs—of a flaccid type. Sensation to touch and heat present—deep reflexes abolished. Blood pressure normal—systolic 132, diastolic 98. Nothing abnormal in urine or in blood.

History of Present Illness.—Ten days ago, he had fever which remained continuous for 5 days and became intermittent. While perspiring, felt hot; he was exposed to chill. Of course, he put himself under treatment of some local Hakim, next day he noticed that there was numbness in his lower limbs and that he could move them with great difficulty. Every limb he felt to be very heavy upto the thighs and the condition went on ascending towards abdomen. The fever continued, but temperature did not go higher than 101. His bowels remained costive throughout.

Personal History.—He is a married man and has got healthy children, is not addicted to alcohol or any other narcotic drugs, except tobacco smoking. No history of venereal disease.

I put him on small repeated doses of calomel followed by saline—imperial drink frequently given, and a dose or two of Plasmoquin compound in a day. On the third day, his temperature came down to normal, his tongue got clean and moist but he began to complain of numbness in his arms and the next day complete Motor Paralysis of the arms as well. His

SEPT. '38] CASE OF CARCINOMA OF RECTUM—RAJA RAM 779

sphincters remained intact. I at once diagnosed acute ascending Paralysis (Laundry's) and immediately put him on:—

R	Ext. Ergot Liq.	...	m	20.
	Pot. Iodide	..	gr.	3.
	Tr. Digitalis	...	m	20.
	Syr. Auranti	...	m	20.
	Aqua ad	...	℥	1.

To be taken thrice daily and Strychnia was given daily in 1/12th gr. doses, with one full dose of Quinine once a day.

On the 10th day while in hospital, he began to move his legs and raise up his arms; pulse came down to 100. On the 18th day he began to tie his turban and walk with the aid of a stick. Quinine was stopped but the mixture and the injections were continued till he completely recovered. He was discharged on the 7th July 37, quite hale and hearty. The recovery was unaccidental.

An Interesting Case of Carcinoma of the Rectum

BY

Dr. Raja Ram, M.R.C.S. (ENG.), L.R.C.P. (LOXD). P.C.M.S.,

Phillaur.

A PATIENT named Sahib Khatu, aged 38 years, Mohamedan female, resident of Kunch, Tehsil Khushab, District Shahpur (Pb.) was admitted in the Civil Hospital, Shahpur, under my treatment on 24-1-37.

History:—On admission, she complained of pain, hæmorrhage and discharge, severe constipation and extreme degree of emaciation. The duration of this trouble was said to be about three years.

Clinical Signs:—On examination she was found anaemic, emaciated with sunken cheeks and sorrowful face. Thoracic and abdominal organs were normal and healthy. On examination per rectum, a hard ulcer with averted edges was felt digitally on the right lateral wall of the rectum about 2½" above the anal margin. The base of the ulcer was fixed and there was thin sanguinous discharge. The lumen of the gut was much constricted to admit the finger further than the ulcer. The mucus membranes of the other side of the rectum were freely moveable and no

lymphatic gland was palpable. The vagina and uterus were normal and so also the urinary bladder.

The general condition of the patient being very poor, I at first hesitated to adopt surgical measures. She was put on liquid diet and an enema was administered with unsuccessful result.

25-1-37. Her condition was stationary.

26-1-37. The patient was in great agony and for the first time I noticed peristaltic movements of the colon above the constriction. She was in a miserable state on account of absolute constipation. It was a suicidal policy to wait any longer. I therefore decided to perform left inguinal colostomy which was successfully performed under intra-theecal anaesthesia. Paul's tube was inserted into the colon and bottle drainage was provided through a long India rubber tube.

27-1-37. It was found that she passed restful night. Her pain was relieved considerably and she passed one full bottle of liquid faecal matter and plenty of gas was evacuated from the newly formed artificial anus. The dressing of the wound was changed.

28-1-37. The condition of the patient improved marvelously. During this period of 24 hours she passed about 4 lbs. of liquid faecal matter and felt appetite for the first time after such a long time. She was put on carminative mixture, an ounce every four hourly, and was advised to take only liquid diet like milk etc. Her dressing was also changed twice a day and glycerine injected into the colon for its laxative and lubricating action.

On the following consecutive days, her general condition went on improving gradually with putting on weight and flesh.

10-2-37. She felt quite healthy.

15-2-37. The artificial anus was well formed, so the Paul's tube was removed and the drainage stopped. Henceforward she passed motion through the artificial anus and she was put on ordinary diet. The ordinary diet of a Punjabee is chapaties, dal and vegetables. She could digest it easily and was fit enough to walk about.

I was so much encouraged by the satisfactory working of the artificial anus and the improvement in the general health of the patient that I made up my mind to excise the rectum and sigmoid colon under intra-theecal anaesthesia. The patient was therefore prepared for the operation which was actually performed on 4-3-37. The excision was performed through the perennal route. The rectum, sigmoid colon, coccyx and the sacrum were excised in one mass.

Pathology.—On opening the wall of the rectum and sigmoid colon and examining them internally a scirrhous ulcer was seen with the naked eye, situated about $2\frac{1}{2}$ inches above the anal margin on the right lateral wall of the rectum. It was hard in consistence, nearly round in shape, about $1\frac{1}{4}$ inches in diameter. The edges were averted, the base was fixed to the sacrum and coccyx. There were a few hard nodular glands, hardly about the size of a pea along the course of mesenteric vessels within the radius of 2 inches from the malignant ulcer.

The patient stood the operation well with a slight degree of shock which was well managed by the hot drinks and warmth to the body. She did suffer from the retention of urine for a few days which was treated by catheterisation, bladder lavage and urinary antiseptics. On account of trauma of the operation, she developed mild cystitis which was cured by 25-3-37. The wound healed by granulation and the patient was discharged cured on 18-4-37.

At the time of her discharge from the hospital the artificial anus was working satisfactorily and she was advised to keep the opening covered with a vaseline gauze and to change it whenever she has to pass stool.

Peculiarities.—The case is interesting in many points of view. The age of the patient was about 38 years. Though she was nearing forty, yet it is rare to come across cases of cancer at this age. The generative organs and bladder with urethra were not affected, though they are the adjoining organs. The condition of the patient was very poor and she was refused operation by various doctors; yet sometimes such cases, if handled intelligently, could be cured and saved from life-long misery. Such cases could be successfully treated by lumbar anaesthesia. In fact it is lumbar anaesthesia that saved her life. The opportunities to the rural surgeon are great but facilities are too meagre. The lumbar anaesthesia has proved a great success in their hands and has removed many obstacles from their way.

Conclusion.—The writer thinks that such cases could be treated successfully in rural practice, if judiciously managed. The rural surgery in the Punjab is progressing by leaps and bounds and very interesting operations are being performed, but unfortunately, the surgeons are so much overworked and overtaxed that they do not get time to write down their notes for submission to the medical journals.

A Case of Horse-Shoe Kidney Diagnosed Post-Mortem

BY

Binooy Sekhar Dutt, M.B.,

Chittagong.

IN January 1937, while supervising the dissections by a batch of students of the Chittagong Homoeopathic Medical College, I came across a case of Horse-shoe Kidney. The kidneys were joined together across the vertebral column by a bridge of kidney tissue at their lower poles. They were almost normal in their position. Each half was provided with a ureter which passed downwards in front of the uniting bridge. There were two distinct pelves. No microscopical abnormalities were noticed in any of the other organs. The body was of an adult male. The cause of death was not known.

According to Beattie and Dickson, this is the most usual form of congenital malformation. Rose and Carless mention in their Manual of Surgery that the condition is found once in about 1100 bodies examined. Robinson says that the condition is found at post-mortem examination in 1 out of every 600 to 700 bodies.

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Determination of Vitamin C.—A. Escudero and S. G. Waisman, S., Rev. med. latino-am. 22 : 772 (April) 1937.

Escudero and Waisman review the methods of quantitative determination of ascorbic acid in biologic mediums and describe a method applicable to the urine. The urine is acidified with 5 per cent acetic acid and titrated with 2,6-dichloro-phenolindophenol.—*American Journal of Diseases of Children*.

A Case of Pneumococcal Meningitis

BY

Dr. Haridas De,

Late Senior House Physician, Campbell Hospital, Calcutta.

ON the latter part of April last I visited a two year old daughter of a Mahomedan, headman of a village two miles off Raiganj. The child was suffering from high fever, attended with cough since a few days back. She was at first treated by a Homeopath who diagnosed it as convulsion due to worms.

I found the child crying and rolling her head incessantly with gaping mouth. Temp. was recorded as 104.6° F. Pulse rate 110/40 per minute; Eyes—both congested, pupil dilated on both sides. Heart—nothing abnormal could be detected. Lungs—crepitant rales on both sides, dull on percussion—all signs of pneumonia present. Spleen—palpable two fingers below the costal margin. Liver—not palpable but tender on palpation. Bowels—constipated. Urine—scanty and high coloured. Neck-muscles—a little bit stiff.

I was at first puzzled and couldn't come to a correct diagnosis of the case. However, I gave her the following mixture to be taken every three hours :—

℞ Sodi citras	...	gr. iii.
Sodi bicarb	...	gr. ii.
Vinum Ipecac	...	℥ i.
Pot. Bromide	...	gr. ii.
Syrup simplex	...	℥ x.
Aqua chloroform	...	℥ i.

Bowel was moved with glycerine enema and Antiphlogistine was applied over both the lungs and the chest was bandaged up.

Next morning, I found her condition no better; moreover, the patient looked exhausted, as she had not had a wink of sleep for the last 24 hours.

Neck was found more retracted and stiff. Muscles of abdomen and leg also were noticed to be rigid. The retraction of her neck struck me and I examined her again thoroughly. I found Brudzink's sign, Kering's sign and Babinsk's sign—(the positive signs of meningitis) all positive and marked. I at once hurried to the conclusion that it was a case of Pneumococcal Meningitis and adopted the following line of treatment with promising result.

Lumbar Puncture was done and cerebrospinal fluid was found in high tension. About 10 c.c. of the fluid was withdrawn and 6 c.c. Polyvalent Pneumococcal Serum (P.D. & Co.) was injected intrathecally; gave her Pot. Bromide and Chloral Hydrag mixture. In the evening the condition of the patient was noticed to have much improved. She had good sleep in the noon. I again injected 5 c.c. of Pneumococcal Serum subcutaneously. The same Bromide mixture was continued and constant ice application over the head was advised.

Next morning I again made L. P. and about 8 c.c. of C.S. fluid was withdrawn in high tension and 4 c.c. Pneumococcal Serum was injected intrathecally.

In this way after the total injections of Polyvalent Pneumococcal Serum 9 c.c. intrathecally and 15 c.c. subcutaneously, i.e., (24 c.c. in all), the case was cured after 10 days. After this Sandoz Calcium Chocolate was prescribed. The child is quite all right at present.

Review of the Italian Contributions to the Study of Mineral Balance in Infants in Respect to the Pathogenesis of Rickets and of Tetany.—D. Pacchioni, Arch. ital. di pediat. e puericultura 5:297 (Aug.) 1937.

Pacchioni, of the University of Genoa, in a review of 132 Italian articles on this subject, summarizes his considerations as follows:

Phosphorus.—The phosphatas are activated not only by actinic radiation but also probably by radiation emitted from the living substance, especially in the physiologic disintegration of certain organic phosphorus compounds, chiefly nuclear. The activation of phosphatas appears as a function of cellular metabolic activity. In rickets, the nucleocytoplasmic activity of cartilage cells being diminished, there is less retention of organic phosphorus compounds and consequently less activation of phosphatas and less transformation of phosphoric esters into organic compounds. Furthermore, in rickets there is a particular neurohormonic situation having its basis in a relative vasomotor insufficiency.

Calcium.—The spasmophilic action associated with a calcium deficit depends perhaps on the relationship between calcium and guanidine metabolism. Therein tetany resembles more a disturbance of the muscular than of the nervous system.

Potassium.—As the organism tends to re-establish the electrolytic equilibrium rapidly, so soon as it is disturbed, the dystonia of tetany persists, perhaps because of changes arising in the tissues.

Magnesium. The consequences of the diminution in calcium in the blood and in the tissues in tetany are probably compensated for, at least in part, by magnesium. In tetany, magnesium is less diminished than calcium.

The paper was presented by Pacchioni at the International Congress of Pediatrics at Rome in 1937.—*Amer. Jour. of Diseases of Children.*



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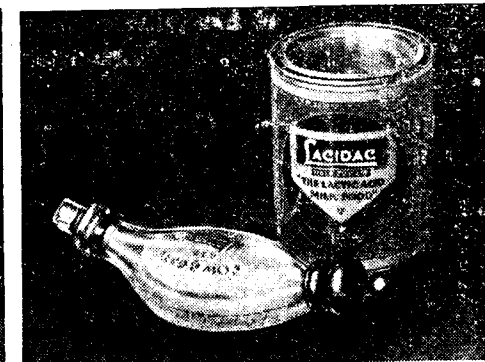
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EDITORIAL

Provincial Medical Service and Private Practice

THE disallowance of private practice by Government Medical Men seems to be seriously engrossing the attention of the Government at the present time and is the natural sequel to the stoppage of further recruitment for Provincial Medical Service and the employment of Hony. Physicians and Surgeons on a wider scale. No doubt a hue and cry will be raised against this measure, as the Provincial Medical Service men had already had a good slice of their pay cut off in common with the rest of the Government Servants in the general scheme of retrenchment and this would mean a further sacrifice on their part. While the Indian Medical Service men are fully protected by the terms of their contract with the Secretary of State, and by the safeguards in the Government of India Act and are free to carry on private practice unhampered with and draw their stipulated emoluments untouched, that the Provincial Medical Service men alone should be subjected to this double penalty is indeed hard and unjustifiable. On the other hand, the Hony. Physicians and Surgeons are depending solely on private practice for their bread and while they are prepared to sacrifice a portion of their time and energy for public good and do honorary

service, so that scientific medical aid may be available for the poor masses in a much larger measure than hitherto, it stands to reason that something must be done by Government to enable them to shut off wolf from the door and keep their bodies and souls together. The provision which the Government have made for these honoraries is no more than a pittance and the Government are no less convinced than the public and the profession of its utter inadequacy. To keep them above want, they must be allowed to reap the full benefit of their private practice and must not be let loose to find their way out in an unequal competition with the state-aided medical men with all the resources of Government at their command. For all practical purposes, the sick people may be divided into the rich, the middle and the poor classes. The rich patients who can afford to pay, seek the best medical and surgical aid by enlisting the services of a reputed I. M. S. Officer or Provincial Civil Medical Officer for treatment or any equally reputed Private Medical Practitioner, who runs a nursing home and is provided with all the modern and up-to-date equipment. The Government Medical Officer gets his consultation fee and if the case is such as to require institutional treatment, he at once admits the patient into his ward and treats him there. This practice which goes by the name of 'Chit system' has been in vogue for a long time in Madras Hospitals and we have been pleading in vain for its abolition from its very inception as it interferes with the normal and rapid growth and development of the Independent Medical Profession and removes the paying patients altogether from their field of service. While these high grade Government Medical Men have by a Government Order, recently been precluded from having Nursing Homes of their own, there is nothing to prevent them from continuing to have recourse to this 'Chit system', so long as they hold a hand in the administration of these hospitals and can also carry on private practice.

The middle classes generally go to the Private Medical Practitioners for treatment for the simple reason that they are easily accessible and that their consultation fees are much less than those charged by Government Medical Men or in most cases practically nil. In cases of complications, a consultant is called in and treatment carried on under his advice. This is as it should be. Unfortunately, these Private Practitioners labour under some handicaps. Barring a few exceptions, the majority of them have no facilities whatsoever for blood-examination, X-ray, and other modern equipments, for which he will perforce

have to seek the aid of Government Medical Men. The Government Medical Men, thus come in for a fair share of the proceeds of the Private Medical Practitioner, apart from the income he gets from his own independent practice. The poor classes either go to the hospitals or go without any treatment whatsoever and suffer in silence. If the underlying principle of the Hony. Scheme is to give adequate facilities for the treatment of these silent sufferers, by conserving all they spend now under "Medical Establishment", it behoves the Government to keep the honorary staff contented and above want.

We would, therefore, suggest the following for the earnest consideration of the Ministry :

- (1) Should the Provincial Medical service men have to forego their private practice in the interest of the Independent Medical Profession, their original salary must be restored and no cut of any kind should be inflicted on it. They must also be made available as 'consultants' and they must be approached only through a Private Medical Practitioner.
- (2) The scale of fees for consulting practice should be fixed by Government so that they may not be prohibitive or extravagant.
- (3) No Government Medical Officer should admit his private patient into the hospital in which he is working or of which he holds charge. In cases of grave emergencies, however, patients may be admitted into the hospitals with the consent of Medical Men in charge, subject to the Rules and Regulations of the Hospitals. This, in our opinion, will encourage the establishment of a number of up-to-date and well-equipped private nursing homes, which will go to relieve, to a great extent, congestion in State Hospitals.
- (4) The existing facilities such as blood and other bacteriological and specialist examinations must be extended and made available at much lower rates than at present.

These proposals, if approved, would not put the Government Medical Men, alarmingly out of pocket, as, with their old pay restored and with the fees obtained as 'consultants' they may not be seriously affected, The Hony. Physicians and

Surgeons or rather the Independent Medical Profession may then be able to build up a steady private practice and place themselves above want and we hope the Ministry would consider the whole question seriously on all its bearings and come to a reasonable decision, without hurting the cause of either the Government Medical Men or the Independent Medical Profession, who are the two limbs of the body 'Medical', which would suffer if any one of them is injured.

GLEANINGS FROM MEDICAL PRESS

Medicine and Therapeutics

The Differential Diagnosis and Treatment of Comatose Conditions.—From a survey of Prof. *H. v. Hoesslin* (Director of the Int. Dept. of the Ziethen Hosp., Berlin-Lichtenberg).

Diabetic coma is characterised by deep sopor, voluminous respiration, no cyanosis, a peculiar redness of the face, smell of acetone, small, frequent pulse, soft eyeballs, dry skin, taut abdominal wall whilst the extremities are flaccid. The urine procured by catheterisation contains sugar, acetone, diacetic acid, traces of albumin, much granulated, short cylinders; the blood shows hyperglycaemia, lipidaemia, impoverishment in alkalies.—Hypoglycaemic coma is characterised by a moist skin, uneven respiration, hyperexcitability of the muscles which may reach such a degree as to result in tonic-clonic spasms, a slight indication of Babinski's phenomenon, the pulse at first full, the eyeballs firm with wide pupils, possibly slight oedema of the legs (insulin). The smell of acetone is not a reliable mark of distinction.—In any case—whether it be a case of acid coma or of insulin coma—the best we can do for the patient is to try and make him take sweetened water or, if he is past automatic movements of swallowing, to administer it rectally or inject grape sugar intravenously. If it is a case of coma due to insulin, the patient will wake up in 15–30 minutes. An injection of adrenalin may accelerate the re-establishment of the normal blood sugar level. With acid coma, 50–100 insulin units should be given intravenously together with 20–30 c.c. of a 20–30% grape sugar solution in order to prevent insulin coma. In addition to this, apply remedies affecting the circulation (Cardiazol, Coramin, Sympatol), alcohol, chloral hydrate, hot

packs.—With cerebral arteriosclerosis, transient comatose conditions with convulsions and even hemiplegia may occur. The best therapy is Euphyllin intravenously.—It may be difficult to interpret the symptoms of apoplectic coma, especially if there is no paralysis; but even where this is present, the healthy side is generally as still as the paralysed one; short clonic twitchings of individual muscles may occur on either side. Note the deep red colour of the face, the deep, often stertorous breathing, slow pulse, increased blood pressure, the temperature which may run high even without pneumonia. Lumbar puncture produces blood-tinged cerebrospinal fluid under increased pressure. If the patient is comparatively young and his blood pressure is not increased, cerebral syphilis (absolute Argyll Robertson's pupils, examination of the blood and cerebrospinal fluid) should be thought of.—Epileptic coma may be recognised by the anamnesis, the fact that the first symptom was an attack of convulsions, cyanosis, wide, rigid pupils, deep, frequently spasmodic and rattling respiration, muscular tension, grinding of the teeth, hyperreflexia, positive Babinski's phenomenon, possibly biting of the tongue. By the intravenous injection of 100–150 c.c. of a 3% magnesium sulphate solution the tension may be abolished, quiet sleep produced and the heart thus relieved.—A gradually developing coma from which the patient can, in the beginning, be easily roused by calling him, is indicative of hæmorrhagic pachymeningitis (hæmatoma of the dura mater). Occasionally the patient's history reveals alcoholism, trauma, hæmorrhagic diathesis. The trouble may, however, have an acute onset and continue to develop by attacks. At times unilateral symptoms of irritation, slight rigidity of the neck, choked disc and fever may occur. The cerebrospinal fluid is at times normal, then again yellowish, containing traces of albumin and sparse erythrocytes; increased pressure. With increased pressure of the cerebrospinal fluid repeated lumbar puncture may afford alleviation. The patient may recover even after having been ill for months or die in deep coma.—With meningitis (tuberculous, epidemic, etc.) we find muscular rigidity, Kernig's sign, grinding of the teeth, irregular muscular twitchings. At first the rigidity of the neck is slight and is therefore often overlooked. The pupils are of unequal size and react slightly or not at all. Examination of the cerebrospinal fluid certifies the diagnosis. Therapy: frequently repeated and liberal lumbar punctures, intralumbar injections of equine serum or anti-meningococcus serum, as the case may be.—With serous

meningitis the cerebrospinal fluid is clear, containing albumin but few cells. (Ther. d. Gegenw., No. 1-2, 1938.) *Ans. Medici.*

Intradermal Skin Tests in Migraine. Here is the order of frequency of positive skin tests obtained in a series of cases of headache and gastro-intestinal manifestations of allergy:

Food Tested.	Number of Tests Performed.	Percentage of Positive Reactions.
Banana	107	96.0
Egg white	199	79.4
Tea	194	54.0
Oatmeal	188	51.0
Pea	184	46.7
Milk	198	40.9
Pineapple	118	34.7
Potato	195	22.6
Pork	199	14.1
Beef	195	12.3
Fowl	195	12.3
Wheat	199	7.5
Fish	188	7.4
Lamb	196	5.6
Bean	181	3.0

Chocolate and onion are also frequent offenders.

No test should be regarded as a complete diagnostic factor; but skin testing in food allergy ranks high as compared with tests in most other diseases when it is used as a link in the chain of evidence.

Complete elimination of the offending food is the most certain way of obtaining relief.—*Clive Sippe, Med. Journal of Australia, May 21, 1938, pp. 893.*—*Medical World.*

Epistaxis.—By L. Graham Brown. Medical Press and Circular, 2: 572-574 (Dec. 29) 1937.

Bleeding of the nose is a common complaint and usually ceases spontaneously although in some unusual cases it may bring about grave consequences and even death unless adequately treated.

In every case of hemoptysis or hematemesis the nose and nasopharynx must be carefully examined if doubt exists as to

the source of the bleeding. The nasal mucosa is extremely vascular, the largest arteries of supply being the posterior ethmoidal and the sphenopalatine.

The principal causes, local and general, that may lead to epistaxis are as follows:

Venous congestion in the nasal mucosa caused by adenoids, obstructions in the nose such as enlarged turbinates, deflections, low ridges and spurs of the septum, etc.

Hyperemia produced by acute and chronic inflammations, such as enteric fever, diphtheria, rheumatic infection, chronic nasal catarrh.

Venous congestion in the nasal mucosa due to causes at a distance, including portal obstruction, pressure of the veins of the neck, plethora, vicarious menstruation, arteriosclerosis, Bright's disease, and right-sided heart lesions.

Certain blood diseases, as hemophilia, scurvy, purpura, and leukemia.

Specific ulcerations of the nasal mucosa, like syphilis and tuberculosis.

New growths of the nose and nasopharynx.

Injuries.

Active treatment is not demanded by every case of epistaxis unless some constitutional factor or organic disease is responsible for the bleeding. Rest with the head and shoulders raised, cold compresses to the nose and pieces of ice to suck will ordinarily suffice.

When the hemorrhage is free and continuous or recurrent, more active treatment is necessary. The bleeding site should be located. Blood clots should be cleared away with cold saline or a weak solution of hydrogen peroxide. In about 80 to 90 per cent of cases the bleeding arises on the anterior and inferior part of the nasal septum and here it is easy to apply pressure, with gauze soaked in a solution of cocaine and adrenalin. Caution with silver nitrate or chromic acid or electrocautery may be used.

When the bleeding is general and the source cannot be located a tampon is required.

The hemostatic drugs most commonly used are hemoplastin, coagulin ciba, and horse serum. The constitutional factors should be dealt with.—*Jour. P. I. M. A.*

Protamine Zinc Insulin. The nourishment of diabetics has been brought appreciably nearer to that of healthy people by the use of insulin.

In exchange for this the diabetic has had to assume one burden: the necessity of daily and in severe cases three times daily, injections. These are more and more troublesome in the course of years. Research work on insulin has always been directed towards obtaining insulin which is slowly absorbed in order to achieve a sort of "depot-therapy" with as few injections as possible. For this purpose substances were added which retarded absorption, as gum-arabic, gelatine, etc., or the insulin was prepared in an oily suspension. None of these preparations has got beyond the experimental stage. Protamine insulin is claimed to be of practical utility. It is based on the following principle: if a certain amount of protamine (a basic protein extracted from fish) is added to the insulin solution, and if this is then brought to the alkalinity of the human blood through a buffer-salt, a fine deposit is precipitated which proves to be chemically a protamine-insulin complex which is slightly soluble. After the injection this complex is slowly rendered soluble and is absorbed by the tissue fluid, so that a protracted effect results (about 12 hours). This result was improved by adding to the preparation small amounts of zinc which delays the effect still further, so that one injection lasts for about 24 hours. Protamine-zinc-insulin is dispensed in bottles having a special stopper. A clear protamine insulin solution is in an ordinary insulin bottle; in the specially shaped rubber stopper a glass tube is inserted which contains the buffer-salt. Before use the rubber stopper must be closely pressed together so that the glass tube breaks and the buffer-salt drops into the clear solution. This causes an immediate milky opacity, the hardly soluble protamine insulin complex. The insulin is ready for use after slight shaking and is, as usual, taken out by piercing the rubber stopper. The opaque solution keeps for at least three weeks; the clear protamine insulin before addition of the buffer-salt has the usual durability of about two years.

The administration of protamine zinc insulin is still in the experimental stage, and calls for thorough testing before it comes into general use.—*Medical World (Lond.)*

New Treatment of Pernicious Anæmia.—Okada and his associates direct attention to the importance of liver and stomach therapy in pernicious anæmia and to the fact that histamine-like

substances contained in these organs exert a hæmopoietic action. Histamine-like substances are found not only in animal tissues but also in plants; for instance, in spinach. An extract of spinach with histamine-like action was found to stimulate the gastric secretion and the hæmopoiesis. It was decided to use this extract and a spinach powder in the treatment of a severe case of pernicious anæmia. At first the patient was given daily 1 gm. of spinach powder and three injections of 0.7 c.c. of the spinach extract. These doses were gradually increased to 5 gm. of spinach powder and 4 c.c. of spinach extract. Under the influence of this treatment the hæmoglobin content and the erythrocyte count increased greatly, but only to a certain point. When a reduced iron was added to the spinach treatment, only a temporary improvement was noted. Since a further increase in the dose of reduced iron was not tolerated, the patient was treated with gastric juice, obtained from a healthy subject according to Castle's method, and with beef. To this treatment the erythrocytes responded with a further increase. The authors reach the conclusion that the efficacy of liver and stomach therapy can be further improved by combining them with spinach therapy.—*Nagoya Journal of Medical Science, Dec., 1937, p. 147.*
—*Thro' Medical World (Lond.)*

The Diagnosis and Treatment of Tuberculous Tracheo-bronchitis—by Wadsworth Warren, Arthur E. Hammond, and W. Tuttle. *Amer. Rev. Tuber.* 37: No. 3 (March) 1938.

Tuberculous tracheo-bronchitis is manifested clinically by symptoms of obstruction such as dyspnoea, wheezing, difficulty in raising sputum, or persisting cough, etc.

The diagnosis of the disease can be made chiefly by bronchoscopic examination. The ulcerative lesion in the tracheo-bronchial airway due to tuberculosis is presented in two types: the discrete ulcer and the granulating ulcer.

The discrete ulcer has a limited area of erosion with a sharp border. Its depth varies from a fraction of a millimeter to several millimeters, depending on its localization and the thickness of the bronchial wall; the margins are not, or only very slightly, raised above the level of the surrounding mucosa; the base is smooth, but may have the appearance of small tufts of granulation tissue growing there; the color varies from bright red to deep violet. The ulcers may occur anywhere in the tracheo-bronchial tree, but are more often located in the main bronchi or about the orifices of the various lobar bronchi.

The granulating ulcer has no clear-cut border but tends to fade through a halo of edematous mucous membrane into normal mucosa. The base is composed of numerous tufts of extremely friable granulated tissue. These may not rise above the surface of the surrounding normal mucosa or may be elevated several millimeters above it. The color is bright red except in cases where granulations are exuberant. In such instances the tips of the granulation tufts may be greyish-white, and the base may vary from brilliant red to purple.

The stenosing lesions are presented in two types, healed and ulcerating. The healed stenosis represents the healed ulcerative lesions. The surface is smooth and the reduced lumen is often covered with a pale mucous membrane. It occurs most commonly at the entrance of the main bronchi and in the lower trachea. The ulcerative stenosis represents a stage midway between the healed, cicatricial stenosis and the granulating ulcer. The lumen is reduced and from the inner wall of the stenosing band, easily bleeding, necrotic, tufted granulation protrudes.

The therapeutics of tuberculosis tracheo-bronchitis consists in three local treatments: first the application of live-wire cautery; second, the use of the Kernan cautery coupled with the Bovie electro-surgical unit using a low coagulating current; third, the application of silver nitrate in dilutions of varying strength.

The authors treated fifty-seven cases of tuberculous bronchitis or tracheitis, with the following results: thirty-four healed, ten progressed or did not improve, and nine are still under treatment.—M. Q.—*Jour. P. I. M. A.*

Surgery

Bacterial Flora of Clean Surgical Wounds.—In studying the bacteriology of surgical wounds and its importance in relation to the problem of wound infection, Ives and Hirshfeld made cultures of the wounds during the actual operation in 30 cases in which there was no infection. With the exception of one thoracoplasty, all the wounds were in the abdominal wall. No case was studied if there was any possibility of contamination with feces, pus, urine or bile. Positive cultures were obtained from the skin in 86 per cent. at the start of the operation and in 100 per cent. of the cases at the close of the operation. Their observations and those that they were able to collect from the literature justify the conclusion that well over 50 per cent. of post-operative infection of wounds is caused by either *Staphylococcus aureus* or

Staphylococcus albus. These organisms are present in the air of the operating room and on the skin of the patient. They unquestionably contaminate wounds during operations, and they may be recovered from the wounds by suitable culture methods. The incidence of infected wounds can be lowered by eliminating these bacteria from the air and skin. The methods which have been used to sterilise air in the operating room are as yet clumsy and difficult to employ, but until a satisfactory method of preventing the contamination of wounds with staphylococci from the air of the operating room is developed, wound infections will continue to occur.—*Annals of Surgery*, April, 1938, p. 607.—*Medical World*.

Low Back Pain.—Straight leg raising is the test for the differentiation of disorders in the lower part of the back. It is performed correctly by flexing the thigh with the knee extended and the foot held in a position of 90 degrees dorsiflexion in order to keep the gastrocnemius, as well as the hamstrings, taut. The leg should be raised slowly with one hand under the lower part of the patient's spine. As the hamstrings tighten, leverage is gradually applied to the side of the pelvis. If pain is brought on before the lumbar spine begins to move, a lesion which may be either an arthritis or a sprain of the ligaments involving the sacroiliac joint is probably present. If pain does not come on until after the lumbar spine begins to move, the disease or injury may be either in the sacroiliac or the lumbosacral articulations but is more likely to be lumbosacral. The straight leg raising test should be repeated on the side opposite to that of which the patient first complained. In this instance, if the lesion be lumbosacral, pain should be felt when the leg is raised to approximately the same height as that which produced pain when the leg was raised on the affected side. If the lesion is primarily sacroiliac it should be possible to raise the leg on the less involved side to a much higher level than on the side complained of, without pain. Acute or chronic inflammation of lumbosacral or sacroiliac joints due to trauma, such as an acute or chronic back strain, or to infection such as tuberculosis, pyogenic arthritis or degenerative changes in the articulations themselves, may be the predisposing factors.—*Medical World*.

Post-operation Pulmonary Complications.—Figures from various sources (Stewart, Eliason and McLaughlin, Battle) indicate that the average post-operation pulmonary morbidity rate

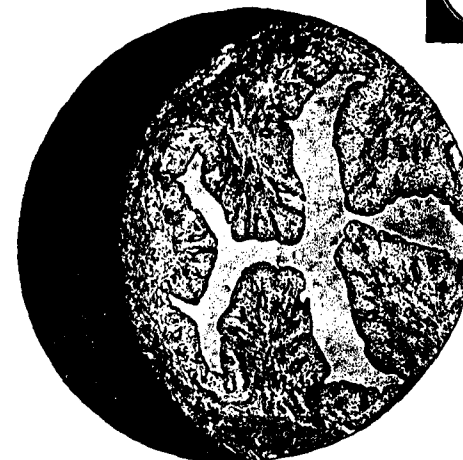
is from 2 to 4 per cent., and the average mortality rate of these cases is 40 per cent. This means that of every thousand surgical operations, 8 to 16 patients will die as a result of lung complications, and not from their original disease.

Post-operation pulmonary complications fall into three groups, bronchial obstruction leading to atelectasis, infections producing broncho-pneumonia, and vascular obstruction resulting in embolism. Of these, atelectasis has been recognised in recent years as being the most frequent type of complication; and if this is not dealt with at an early stage it may go on to pneumonia, which is responsible for the highest pulmonary post-operation mortality rate. Investigations into the causes of pulmonary complications will help to avoid a number of these. From assessed figures, pulmonary complications appear to result equally from inhalation, spinal or local anaesthesia, and the type of anaesthetic has little bearing on the cause.

Pre-operation respiratory infections with special mention of the common cold are potent factors in producing lung complications. Where possible, operation should never be undertaken during any infection of the respiratory tract, and in the case of the common cold should be postponed for a period of 14 days. Where respiratory excursion is limited, such as occurs with operations on the upper abdomen and in the presence of constricting binders, the incidence of these complications is increased. Prolonged recumbent posture is also a predisposing factor, and this accounts for the lowest rate of pulmonary infections accompanying gynaecological operations, where the adoption of the Trendelenburg position permits free drainage of the bronchial tubes. Morphia given pre-operatively is another serious factor in producing pulmonary complications. Danger of "over-morphinising" patients in relation to thoracic complications has been emphasised by Chevalier Jackson in the following words: "The cough reflex is the watch-dog of the lungs. It seems strange that medical men should drug the watch-dog asleep when his efforts are most needed. Morphia and heroin have indirectly killed thousands by the abolition of the cough reflex for every death that has resulted from their direct toxicity." A dose of morphia post-operatively, by easing abdominal pain, will however, encourage deeper breathing, and so avoid hypoventilation. Atropine should be used before operation but not after, owing to its tendency to produce a viscid secretion which blocks the bronchus. During operation cyanosis should be avoided, for it has been aptly said that "a patient

[1938]

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PROC. ROY. SOC. MED., JULY, 1936, p. 1094

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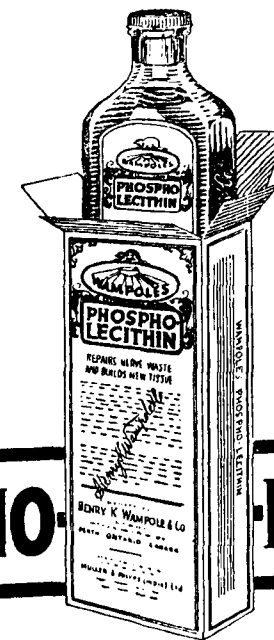
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Perforation Peritonitis.—especially in cases of appendicitis and ulcer, was the subject of a report by Prof. P. Clairmont, (Chief Surgeon of the Surg. Univ. Clinic, Zurich) at the Medical Congress of the Alpine Countries. In accordance with the established doctrines of Kirschner, drainage of the abdomen is rejected on principle. Any attempt to drain the free abdominal cavity is ineffectual because adhesions are formed round the drain in a short time and, moreover, it is useless, for when the infected effusion has once been removed by aspiration and swabbing, the escape of the newly-formed exudate which possesses a certain protective quality is undesirable. Even the insertion of strips of gauze injures the endothelium. To this must be added that drainage increases the danger of paralytic ileus and the formation of solid adhesions which involve the risk of the kinking of the intestines. Drainage is indicated, on the other hand, if the point at which peritonitis develops is entirely or partly extraperitoneal so that it is inaccessible to the peritoneal protective forces and prevents the formation of a closed peritoneal cavity. Finally, unsafe fastenings and bleeding surfaces must be drained. At the Zurich Clinic, the mortality of serious cases of peritonitis was 28.5% without drainage but as high as 57% with liberal drainage. Marchini, amongst others, records, in his cases of diffuse peritonitis, 31 deaths among 70 cases with drainage and only 7 deaths among 34 without.—The only suitable solution for douching is a hydrochloric pepsin

solution (*Schoenbauer*) possibly also 70% alcohol (*Behan*). Peritonitis serum is very valuable.

The post-operative control of circumscribed accumulations of pus which fortunately follow established laws is of great importance. Such accumulations lead, after improvement for 2-3 days, to a subacute, infectious aspect of disease which threatens the patient's life if the abscess remains undiscovered and unopened. As has been proved by post mortem examination, it is just to unrecognised complications of this kind that the higher mortality among drained cases is attributable. Following natural laws, suppuration in cases of appendicitis ascends from the original focus towards the right and up into the anterior and posterior subphrenic space, or inward and downward through the true pelvis towards the left whence it may again ascend as far as the diaphragm. In this way the pleura and lungs, especially of the opposite side, may be infected and so on. In accordance with *de Quervain's* classification, the following types of undrained cases may be recognised: they may however exist simultaneously or in succession to one another. 1. An anteroparietal abscess which frequently originates in a mesocæliac abscess in the iliocaecal region. It is evacuated spontaneously or can be easily reached through the wound with dressing forceps.—2. An ileo-inguinal abscess on the right side which can be easily recognised by the broad, superficial, possibly fluctuating resistance above Poupart's ligament.—3. An abscess in Douglas' pouch (passing of mucus, leucocytosis, generally a merely unsteady temperature curve) which can hardly be overlooked if rectal palpation is made daily or every other day (its omission is malpraxis!). In cases of peritonitis with profuse exudation, its formation is desirable and should be encouraged by *Fowler's* semi-upright position. Incision is only indicated if the condition remains unchanged for 1-2 days with the patient in the said position and if pus is extracted with puncture. It should be made under local anaesthesia after dilatation of the sphincter along the curved puncture needle which has been left in place. A drain should be inserted into the opening and left in for 2-3 days.—4. An abscess above the symphysis or floating abscess over the vertex of the bladder (urinary disturbances) which can be easily palpated and incised.—5. An abscess on the left side two fingers-breadth above Poupart's ligament internally to the flexure, which occurs absolutely with children and juveniles. It is superficial and is usually easily palpated and incised.—6. A subserous lumbar abscess either left or right, frontal and external

to the colon descendens or ascendens as the case may be (pain, dullness, increased resistance in the flank). The incision should be made as far to the side as possible; the abdominal cavity may be free internally and above.—7. There is usually a continuation of the above abscess as a left or right subphrenic lienal abscess. It may be reached from a lateral incision by introducing dressing forceps in an upward direction. The right subphrenic abscess may be localised to the front or (as is usually the case after appendicitis) to the back. It should in any case be opened extraperitoneally. The transpleural opening of an anterior abscess is obsolete. With posterior abscesses, lesions of the pleura can be avoided by making the incision 3-5 mm. below the periosteal margin after resection of the twelfth rib.—8. A large abscess in the middle of the abdomen (large, round, painful resistance) is a rare occurrence. It may be possible to open it by introducing dressing forceps through a small median incision below the umbilicus into the depth, carefully feeling one's way between the loops of intestine.—9. If a hernia is present, the peritoneal exudate may empty itself into the hernial sac. This abscess in the hernial sac (fluctuation!) may resemble an incarcerated hernia.

In combating post-operative ileus, Prostigmin and Vasopituitan, in very severe cases enterostomy, have proved successful. (*Wiener klin. Wschr.* No. 1. 1938.)—*Ars Medici.*

Obstetrics and Gynaecology

The Application of Ecbolics,—writes Prof. *E. von Schubert* (Augusta Hosp., Berlin), is now finding great interest; firstly, because feebleness of labour pains appears more often and, secondly, because deliveries at home under the care of the private practitioner are again increasing.

Artificial induction of parturition principally comes into consideration with an overdue birth. Experience teaches us that children which have been retained too long often die without further premonition. An attempt to induce parturition should be made, at the latest, 14 days after the computed term and if a second or even third attempt remains unsuccessful, surgical delivery should be taken into consideration. However, the statements of the women are often unwaredly or awaredly (question of father, etc.) inexact. It is therefore so important to examine the pregnant women repeatedly, personally to

activity. In such a case narcotics often act miraculously, similar to the effect of opium with spastic obstipation. One injects subcutaneously 0.04 morphium, 0.02 Pantopon, 0.0015 Dilaudid, or 0.03 Narkophin; a suppository of extr. belladonnae 0.02 0.03+0.25 Octinum or an original preparation, Pavyco (Papavudrin+Verasulf), may be given. If the woman is thoroughly exhausted, a higher dose may be administered in order to give her a complete rest for a few hours. After this regular labour activity often starts of its own accord. If the os is as large as the palm of the hand and labour is painful, one may occasionally accelerate delivery by rupturing the membranes under aseptic precautions.

For the expulsion period, i.e., when with fully dilated parturient canal the action of the somewhat abating uterus musculature is to be encouraged, pituitary preparations are the remedies of choice. The practitioner should absolutely be warned against using ergot preparations in this stage, as is again being recommended by certain authors. Somewhat stronger doses of pituitary preparations may be given during the second stage of labour. Thus $1\frac{1}{2}$ —3 Voegtlin units can be administered intramuscularly; intravenously only in exceptional cases while controlling the cardiac tones most carefully and being prepared for immediate forceps delivery the moment the child seems in danger. Even during the expulsion period too much should not be expected from ecbolics. Often episiotomy facilitates the passage of the foetus better than whipping up labour too much, an act not quite harmless for the child. Even a dexterously executed forceps delivery is often more sparing of mother and child. If all ecbolics are unsuccessful, one must naturally decide on operatively terminating the birth.

During the third stage of labour the uterus has to throttle the blood vessels by its contractions, sever and expel the placenta. The more it is left alone the better does it mostly master this task. Without the strictest indications, ecbolics should not be administered nor should the uterus be mechanically stimulated at this point. Prophylactically, however, ecbolics are indicated when the uterus has been emptied unphysiologically rapidly through operative interventions. Here 3 Voegtlin units of Orasthin or another pituitary preparation which does not cause a rise in blood pressure are injected intravenously after vaginal delivery (forceps, version, breech extraction), and directly into the uterus wall with surgical delivery.

If the placenta is already born, 1 c. c. Gynergen or 1 c. c. of the excellent Neogynergen can be given intramuscularly for stimulating permanent contraction; intravenous injection of ergot preparations is not to be advised and is certainly superfluous.—Births taking a spontaneous course should only be interfered with when a severe external hæmorrhage appears, when it is recognized that the uterus is taut because it is filled with blood or when the pulse of the newly delivered woman gets worse. In such cases 3 c. c. Orasthin are given intravenously and after the expulsion of the placenta, an ergot preparation; for the Gynergen previously administered can cause lasting contraction and thereby retention of the placenta.—In child-bed ergot preparations are also useful and often necessary to stop bleeding and promote the involution of the uterus. In such cases one gives them by mouth (drops or tablets), but guards against thoughtless over-dosaging, an act which has occasionally led to gangrene of the extremities. (Fortschr. d. Ther., No. 1, 1938.)—*Ars Medici*.

BOOK REVIEWS

Dispensary Label Book: Printed at the Merchants Press, 85, Nainiappa Naick St., P. T. Madras. Price: Re. 1/-.

In this, the medicines are arranged in alphabetical order and their doses given. These comprise 113 pages. Then a few blank sheets are left and after that, 'Poison' labels and other 'direction' labels are printed in *Red Ink*, as they ought to be. This Label Book will be found very useful for Dispensaries and will greatly facilitate their work in labelling their medicine bottles.

Introduction to Short-Wave Therapy: By H. G. Fischer & Co. 2323—2345, Wahensia Ave, Chicago.

This booklet can be said to be 'a brief, yet, authoritative guide to the clinical application of this new modality.' The publishers have taken immense pains to collect all the necessary information from authoritative sources and prepare this treatise which, though not exhaustive is yet 'a concise statement of present-day knowledge of Short-Waves and their use.' The booklet abounds with illustrations and is neatly and nicely got up. In the words of the publishers, "it will prove a worthy aid to earnest practitioners in overcoming technical as well as theoretic difficulties and enable them

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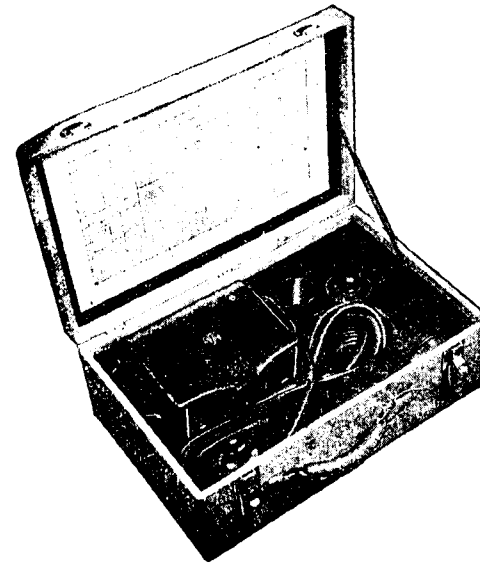
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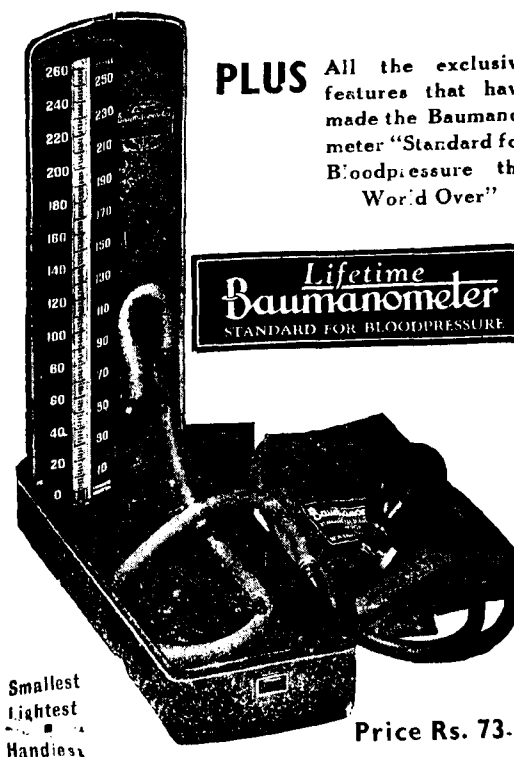
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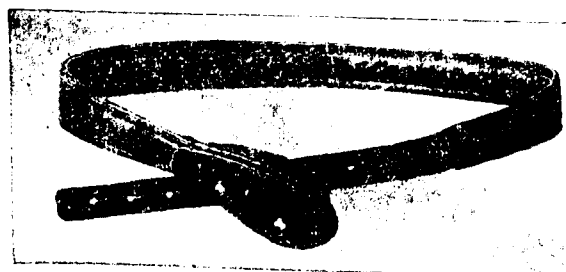
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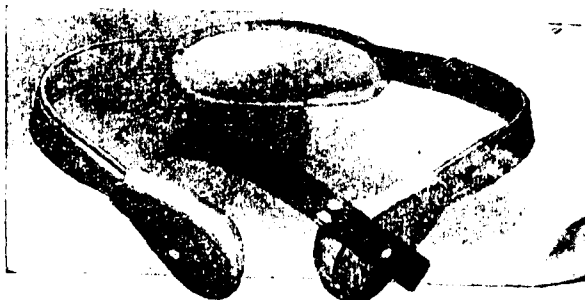
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INDIAN MEDICAL GAZETTE

Special Tuberculosis Number, September 1938.

Original Articles:—1. Deductions from Experience in a Tuberculosis Ex-Patients' Colony in India. *By: P. V. Benjamin, M.B., B.S. (Mad.), T.D.D. (Wales), and R. M. Barton, M.A. (Oxon);* 2. The Seriousness of Tuberculosis in India as shown by a study of Incidence and Type. *By: P. V. Benjamin, M.B., B.S. (Mad.), T.D.D. (Wales);* 3. Methods of Destruction of Tubercle Bacilli in the Sputum for Use in Indian Homes, with Some Experiments. *By: R. M. Barton, M.A. (Oxon);* 4. A Study of the Anti-Tuberculosis Activities in the West, with Some Suggestions for the Campaign against Tuberculosis in India. *By: C. Primodt-Moller, C.B.E. (Hon.), M.B., Ch. D. (Copenhagen);* 5. The Campaign Against Tuberculosis in Italy. *By: T. J. Joseph, B.A., M.B., B.S. (Mad.);* 6. Anti-Tuberculosis work in Bengal. *By: A. C. Ukil, M.B., M.S.P.E. (Paris), F.S.M.P. (I.C.), F.N.I., (with 6 figures);* 7. Tuberculosis in the Zemna. *By: Rosa A. Risto, D.Sc., M.D. (with 1 chart consisting of 2 figures and 2 graphs);* 8. Role of Solaria in Anti-Tuberculosis work. *By: B. Jayaram, M.B., B.S., T.D.D., L.R.C.P. & S. and A. K. Sheriff, M.D., B.S., T.D.D. (with 3 figures);* Special Article. B. C. G. Vaccination in Practice. *By: L. Negre, and R. K. Goyal, D.Sc., Ph.D., M.R.C.P.*

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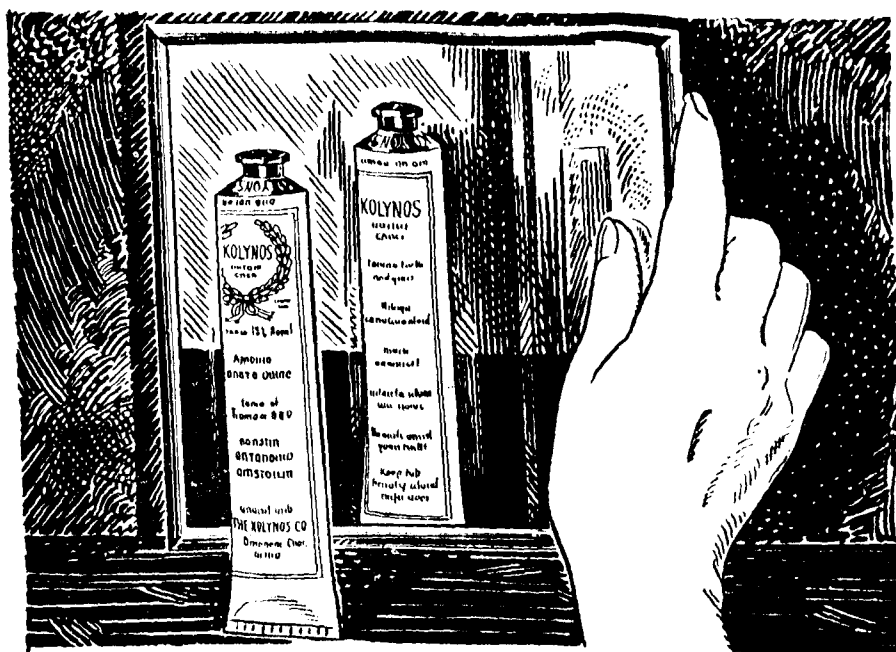
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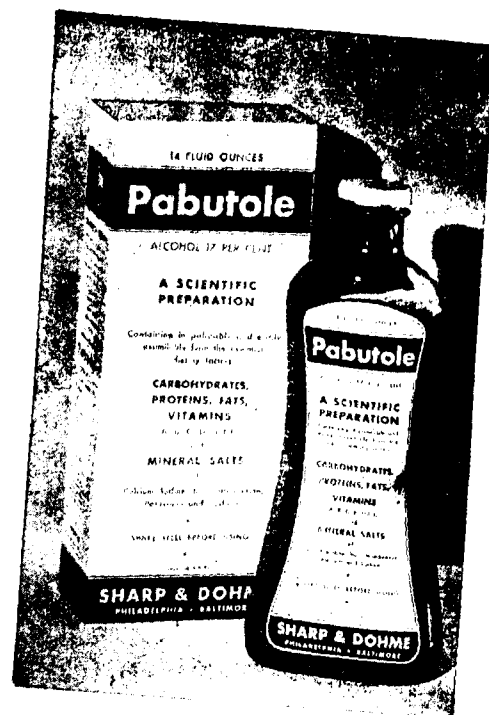
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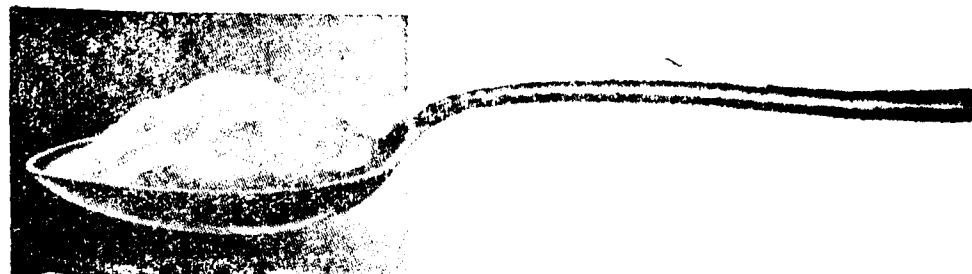
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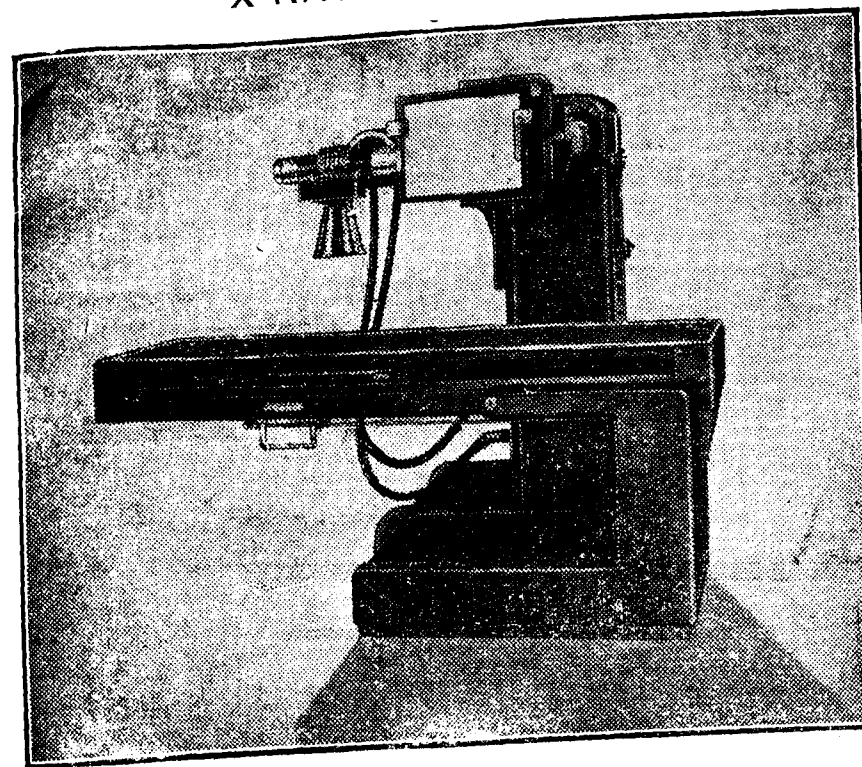
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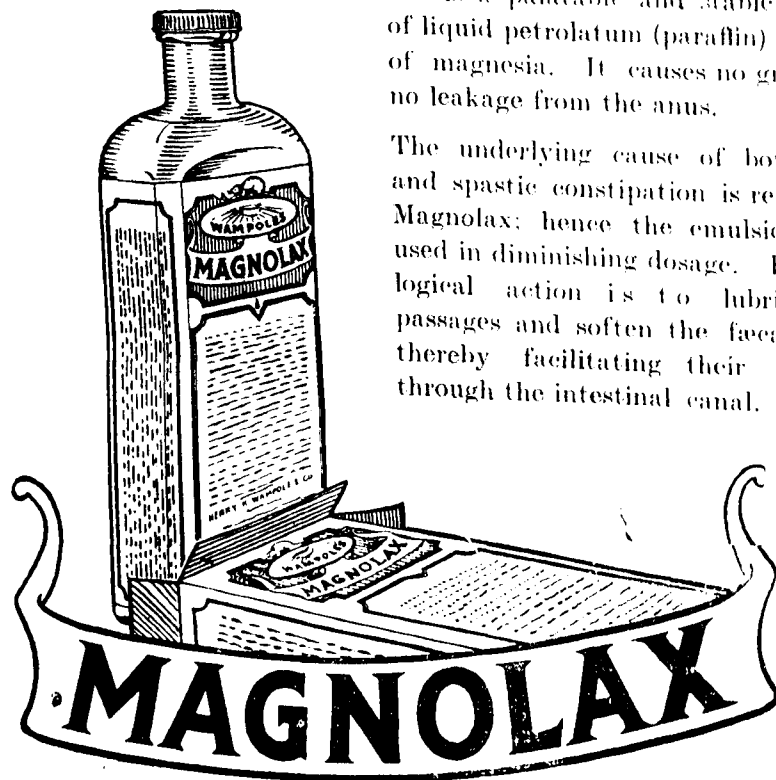
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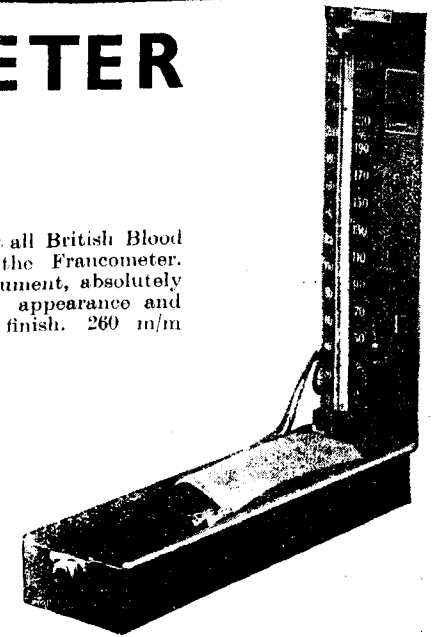
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(Ztschr. diät. and Phys. Ther., 7, No. 10)

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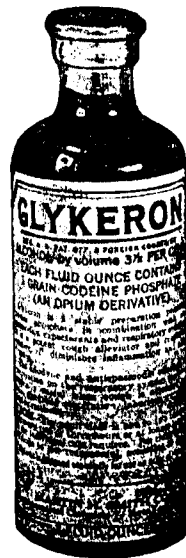
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Control the cough that weakens your patient. GLYKERON quickly relieves this distressing symptom because it contains medically approved respiratory sedatives.

Your patients with respiratory affections do better when they sleep better—without coughing.

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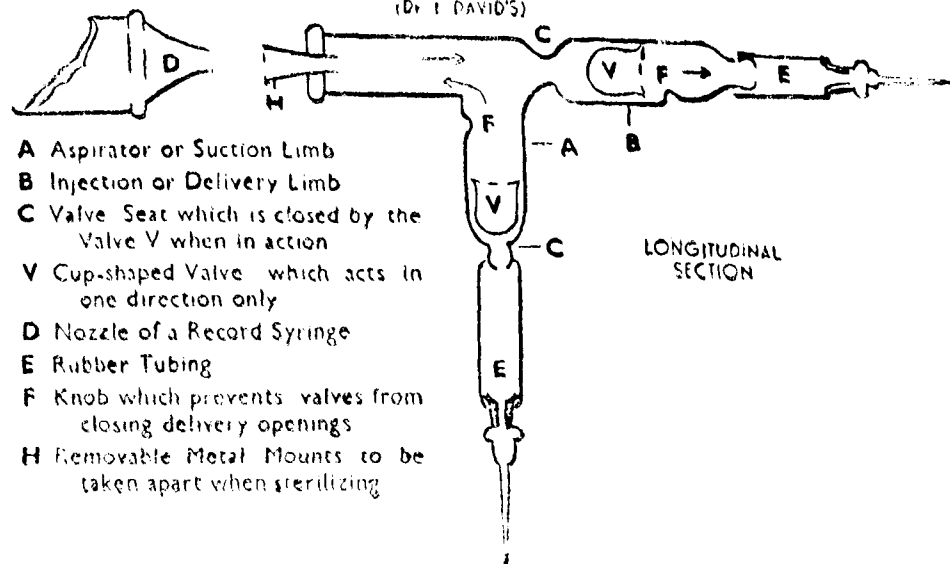
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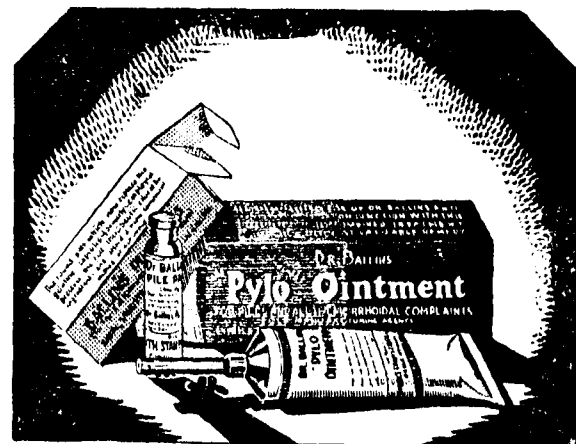
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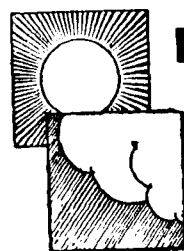
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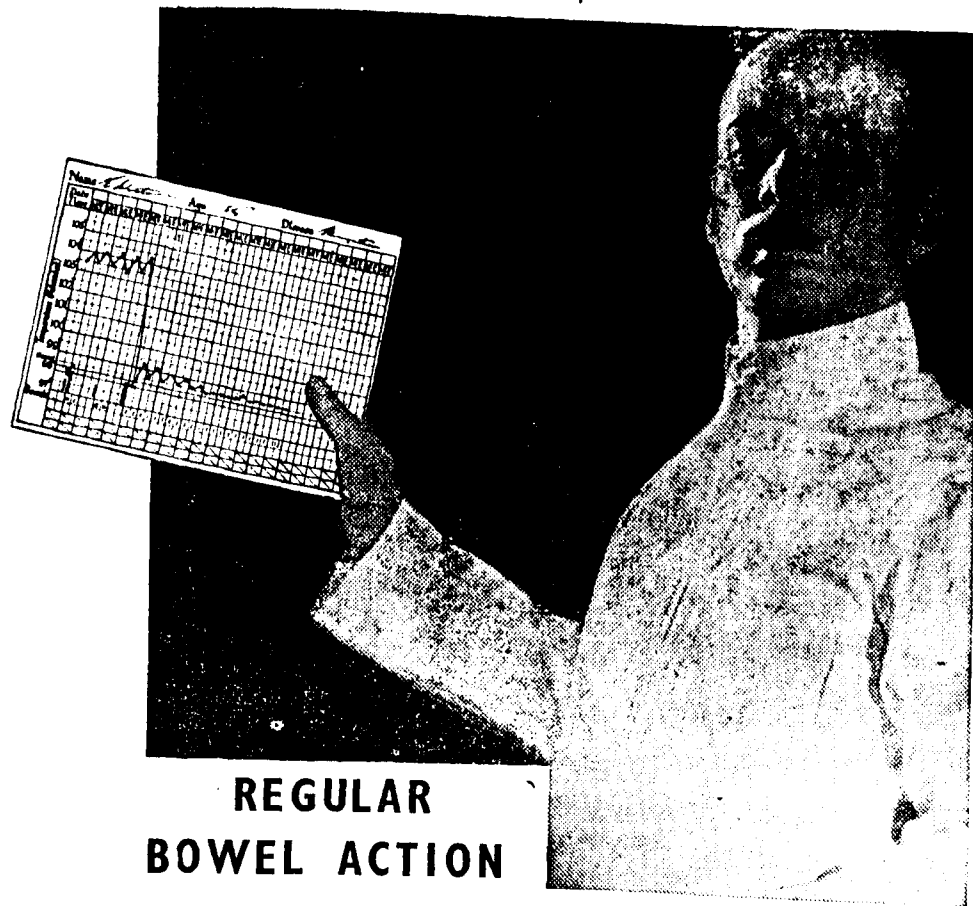
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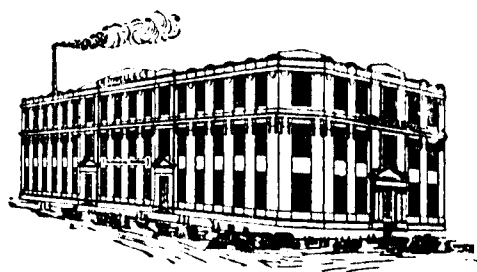
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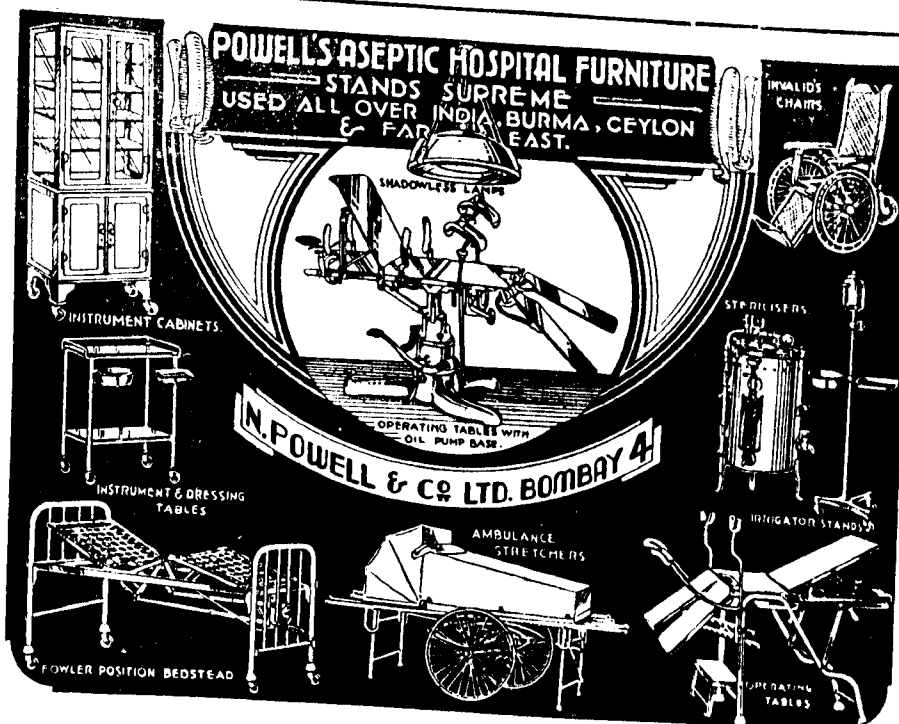
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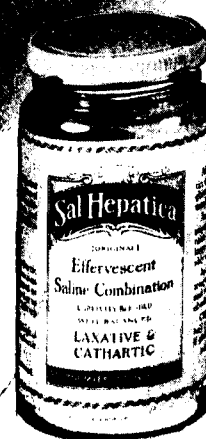


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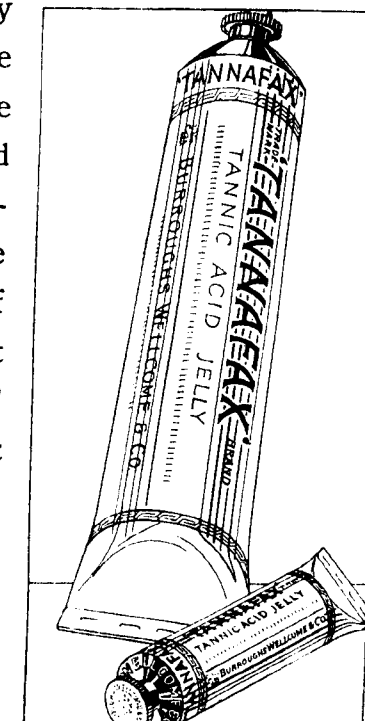
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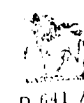
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Vol. 35.

OCTOBER, 1938

No. 10.

Treatment of Bronchial Asthma

BY

Dr. B. P. Sur, M.B., M.R.C.P., M.R.C.S.,

Hon. Visiting Physician,

Campbell Medical School and Hospital, Calcutta.

TREATMENT may be discussed under two headings—viz: the immediate treatment of the acute attack, and secondly, the intensive treatment to prevent further attacks.

For the immediate treatment of the acute attack, the first step should be to give an injection of adrenalin chloride solution hypodermically. This is the most effective drug in all types of attack and has practically no contra-indications. The dose necessary to relieve the spasm through stimulation of the broncho-dilator fibres depends upon the severity of the attack, the duration of the disease, and the patient's previous experience with the drug. One to five minims of the 1 in 1,000 solution of the drug given hypodermically should bring relief in a few minutes, and the earlier the injection is given, the smaller the dose required.

If neither atropine nor adrenalin relieves the attack, an injection of morphia gr. 1/4 to 1/6 with atropine sulphate gr. 1/150 should be given. Morphine should be used only sparingly but should not be withheld when it is definitely called for. Only a small amount is to be used; big doses are unnecessary and

harmful—unnecessary because, morphine has no dilating effect on the bronchi and harmful because the cough reflex may be abolished and the patient may be drowned in his own sputum.

In status asthmaticus where the patient suffers from the attack for days together, Hurst advocates continuous administration of adrenalin. After the initial injection of adranalin, the needle of the syringe is constantly kept in place and one or more minims of adrenalin solution are injected every 14, 30 or 60 seconds, according to the reaction of the patient. This procedure may be continued for half an hour or longer. For severe cases, Bray (1937) recommends a combination of adrenalin, morphine and atropine solutions. He takes two solutions (1) adrenalin solution 1 in 1,000 and (2) a solution containing morphine sulphate gr. 1/4, atropine sulphate gr. 1/100 and adrenalin chloride solution m. 10 : of the solution (1), one minim is injected every half to one minute and of the solution (2) one minim is given every fifth minute till the spasm is relieved or till all the ten minims are exhausted.

Græser and Rowe (1935) have used adrenalin inhalation to cut short the attack. A 1 in 100 solution of adrenalin chloride is used in a specially-made inhaler.

Davidson (1935) recommends apomorphine gr. 1/100, Codeine gr. 1—2, adrenalin (1 in 1,000 solution) 9 minims. One-third is administered every five to ten minutes until the whole has been given.

Other drugs—such as ephedrine, in general, is of use only in mild cases or as a preventive. Ordinary doses (3/8 to 3/4 gr. for an adult) do not influence severe attacks and larger doses occasionally lead to unpleasant symptoms.

Gases alone have been recommended. Hurst (1931) has advised the inhalation of carbon dioxide directly into the nose as a sedative to the nasal irritation and rhinorrhœa that sometimes precede an attack. Barach (1935) found inhalation of helium 80% and oxygen 20% gas mixture of considerable benefit in cases of severe intractable asthma since this relatively light gas could be breathed with less effort.

Normally there is a tendency to vagotonia in the early hours of the morning and probably this may account for the attack of asthma to occur in the early part of the day. There is also alkalosis associated with vagotonia and this alkalosis causes loss of calcium from the serum and a consequent increase of potassium, which produces greater tonicity of the vagus. In addition to vagotonia, the asthmatic has a low blood calcium, and

consequently greater muscular irritability. It is therefore necessary to give the asthmatic proper doses of calcium to keep its level up in the serum.

Sprays are frequently advised, but the apparatus required for their administration is generally cumbersome. In the "Apney" inhalation apparatus oxygen sprays adranalin and aromatic oils into the air breathed.

Anæsthetics, especially chloroform, and narcotics will bring relief to some cases, but are rarely advisable or necessary since they depress the respiratory centre and abolish the cough reflex.

Inhalations, powders and cigarettes generally contain potassium nitrate and the dried leaves of *Datura* and *Stramonium*.

Medicines are prescribed with great regularity, but it is doubtful if they even exert any beneficial effect in a fully developed case. Those commonly used are aspirin and various combinations of potassium iodide, lobelia and stramonium and more rarely benzyl benzoate (dose 10 to 30 minims) liquid extract of *grindelia* (dose 10 to 20 minims) and tincture of *euphorbia* (dose 10 to 30 minims).

General measures.—A purgative should be given at the onset, calomel followed by saline does very well, later, a daily dose of a laxative should be used to keep the bowels open.

In cases where the attack is known to have followed a heavy or indigestible meals or some special food, an emetic should be given. On children, the emesis may be produced by tickling the throat. Big doses of sodium bicarbonate, table salt or 1/2 ounce doses of vinum ipecac may be used to produce vomiting.

During the first 24 to 48 hours the patient should be starved and after that, easily-digestible food should be gradually added. Sufficient fluid and glucose should be gradually added, during the first 24 hours to 48 hours.

The intensive treatment of the Asthmatic sufferer: Avoidance or Removal of the specific cause.

In cases where some specific cause is found, it should be avoided. Foods which disagree may be eliminated and when the allergy is due to some occupational factor, if possible the occupation should be changed. It is very difficult to avoid dust, unless a dust free chamber or a face mask is used. Most air borne allergens are eliminated if the asthmatics are allowed to reside in an altitude of 4,000 feet above sea-level.

In cases where avoidance is not at all possible, as for

example, where sensitization to multiple foods exists or where it is impracticable to change the occupation, the treatment lies in trying to desensitize the patient against the allergen. In order to desensitize the patient against the allergen, there are two routes which can be selected: (a) Desensitization with gradually increasing doses of the extract of the substance given subcutaneously; (b) In the case of articles of diet oral administration of minute but gradually increasing doses of the food in question, together with dilute hydrochloric acid.

In addition to avoidance or desensitization any obvious endocrine defect or any infected or pathological condition of the respiratory or gastro-intestinal or genito-urinary tracts should be treated.

In cases where no specific cause is detected, the treatment may be adopted along the following lines:—Any infection of the gut *e.g.*, *Entamoeba histolytica*, hookworm, should receive adequate treatment and an autovaccine from the 'stools' to confer immunity against pathogenic organisms isolated from the stools, may be given.

An acid pepsin mixture is of immense help when there is evidence of hypochlorhydria. This is very useful specially in cases of children as allergy as this is very often of alimentary origin.

Special attention should be drawn towards the liver. Bowels should be opened by minute doses of calomel followed by a saline purge. In order to improve the proteopexic function of liver which depends on its glycogen reserve, Oriel recommends 2 to 4 ounces of glucose to be taken daily in divided doses. Glucose may be taken with orange or lemon juice, it can be taken morning and evening on an empty stomach.

A very thorough search should be undertaken for any focus of infection in the teeth, tonsil, sinuses, bronchi, etc. Infected foci which can be removed should be dealt with by surgical means. When the source of infection, cannot be dealt with surgically, an auto-vaccine should be prepared from it and be used.

Some asthmatics who suffer from nervousness or loss of sleep should be prescribed some sedatives *e.g.*, bromides, luminal, medinal, etc. Irritating nocturnal cough is very troublesome. Linctus paregoric or a linctus containing one drachm each of syrupus virgini pruni and syrupus codeine phosphatus and fifteen minims of tincture of stramonium should be used. In cases with excessive expectoration, creosote inhalation in a Burney-Yeo inhaler and a stimulant expectorant mixture should be given.

Endocrine dysfunction should be treated by adequate means. In cases of thyroid deficiency, dried thyroid gland can be given by mouth. Ephedrine hydrochloride may be given by mouth for adrenal insufficiency.

Non-specific Protein therapy.—The object of this form of treatment is to exhaust the sensitivity of the patient. Cecil (1935) thinks the most important function of the foreign protein is the mobilization of immune bodies in the circulating blood. Hektoen (1935) believes that in the reaction to non-specific protein therapy important processes take place in the capillary walls and in the reticulo-endothelial system. Mackenzie and Fruhbaner (1927) have shown that in rabbits, which were previously injected with horse-serum but in whom the antibody to horse-serum had disappeared, subsequent injections of chicken serum caused antibodies to horse-serum to reappear. Peterson and others (1923) have shown that very small doses of peptone caused a lessened permeability of the endothelium.

Protein therapy should not be undertaken in cases who are subjects of active or quiescent pulmonary tuberculosis, cardiac or renal diseases. Nor it should be used in pregnancy, in cases of exhaustion and in chronic alcoholics.

There are a number of substances which have been used for the purpose of non-specific therapy.

Peptone:—Auld (1918, 1920, 1925 and 1928) has introduced the use of peptone and serum peptone. Peptone is usually given intramuscularly in 7% solution. The intravenous route is not considered safe by some. The initial dose is 0.3 c.c. and subsequent doses are gradually increased till a dose of 1.5 c.c. is reached and this dose is repeated about half a dozen times. Injections are given every third day to begin with, then the interval is gradually increased to seven days. In resistant cases, Auld advises the use of serum peptone which is prepared by incubating the serum of the patient with agar and peptone.

Schiff introduced injections of whole or skimmed sterilised milk. The milk is sterilized in a rubber-capped bottle by boiling for one hour. Injections are given 3 times a week, starting with 0.5 c.c. and increasing 0.5 c.c. each till a dose of 3 c.c. is reached. Larger doses, 5 to 10 c.c. have been recommended by others.

Auto-hæmotherapy:—Kah and Emsheimer (1916) introduced the use of autogenous defibrinated blood for the treatment of asthma. Later, whole blood and serum have been successfully used for the same purpose. The initial dose is 2 c.c. the dose is

gradually increased to 10 c.c. The interval is 2 days to begin with and it is gradually increased to 7 days with the increase in the amount of the blood.

Vaccines.—Many bacteria may produce a specific immunity to the particular varieties employed when injected as vaccines, but in asthma, since autogenous and stock vaccines appear to work just as well, the effect must be a non-specific one due to the protein content.

Proteose.—Johnston (1934) advises the injection of filtered urine with the addition of a preservative, giving doses every three to four days until 9 c.c. have been injected.

Histamine.—Injections of histamine have been suggested by Thiberge (1935) and Dzinich (1935) and good results in some cases of asthma reported.

Sulphur.—One to two c.c. of a 1% suspension of sulphur in olive oil has been recommended by Van Leeuwen (1932) for intramuscular injection, the injection gives rise to a local painful reaction and constitutional symptoms in the way of fever, malaise and headache. When the reaction has passed off, a reduced dose may be given. It is better to start with 0.5 c.c. and gradually to increase the dose according to the severity of the reaction and constitutional symptoms, the interval may be between 5 to 7 days.

Gold salts have been recently advocated in the treatment of asthma. Banszky (1935) attributes the benefits derived from these salts to their general tonic effects and specific tonic effects on the vegetative nervous systems.

Various other substances such as cobra venom, parasitic extracts, mixed coliform vaccine, influenza vaccine and turpentine have been used for the purpose of non-specific therapy.

Moll (1932) has obtained good results in the treatment of asthma by the intramuscular injection of liver extract. He looks upon it as a form of non-specific desensitisation.

Physical therapy.—Many physio-therapeutic methods such as Electro-therapy, Actino-therapy, X-ray therapy, Pyrogenic therapy in recent years in the treatment of the asthmatic sufferer have been introduced. During an attack, physical agents are said to (a) lessen the excitability of the vagus (b) induce peripheral vasodilatation and cause reflex lessening of bronchial spasm, and (c) excite the sympathetic nervous system. In the free interval they are said to (a) improve states of passive

congestion or oedematous infiltration, or factors causing pressure, (b) induce chemical changes in the acidbase equilibrium, and (c) lead to glandular stimulation of the liver, spleen and endocrine glands.

Remedial Exercises.—The patient is in the habit of using the upper part of his chest only for respiration and the purpose of the exercise is to tract him to use the lower part of the chest the diaphragm. Livingstone and Gillespie (1935) have reported good results with breathing exercises. The patient is instructed to take a short inspiration through the nose and then make a long expiration through the mouth, with a whistling or hissing noise; this concentrates the attention on the expiratory phase. During expiration the epigastrium must sink in to ensure that the diaphragm rises in the chest. The exercise should be undertaken for 10 to 20 minutes twice daily. It is reported that these exercises sometimes prevent an on-coming mild attack.

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Hepatic insufficiency may be demonstrated by the hippuric acid test; after taking six grammes of sodium benzoate a normal functioning liver excretes in four hours three grammes of benzoic acids in the form of hippuric acid. The test is usually normal in extrahepatic conditions such as cholecystitis, cholelithiasis, and common duct obstruction of short duration.—*Medical World*.

Treatment of Carbuncles

BY

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IN managing a case of Carbuncle, the practitioner should anxiously consider the following five important pivots in the treatment:

- I. Treatment of the basic condition which has predisposed to the occurrence of the carbuncle.
- II. Palliative and conservative treatment.
- III. Operative treatment—indications, contra-indications and scope of the operation.
- IV. Question of anaesthesia.
- V. Post-operative care.

I shall discuss these five points in the course of this article.

I. Treatment of the basic conditions.—Majority of carbuncle patients are diabetic. Even with insulin the prognosis is decidedly better with non-diabetic carbuncle patients. But in diabetic patients with carbuncle, insulin has emphatically revolutionized the prognosis for good. And with proper medical care of the diabetic condition on the usual lines, there is no reason why the ultimate outlook should not be nearly equal to the non-diabetic patients. It must be realized that sepsis in any form, particularly the non-draining pent up pus collections in the numerous subcutaneous rat-hole labyrinth constituting a carbuncle, has a decidedly adverse effect on the basic diabetic condition. Diabetes predisposes to carbuncle and carbuncle increases the virulence of the diabetes. This vicious circle must be broken at two points. Any amount of insulin in a patient with an undrained carbuncle, cannot influence the outlook to a decided extent. And failure to combat the diabetes and acidemia by insulin and other appropriate measures, will discredit the best surgery attempted for the condition.

At present, there is a tendency even in responsible quarters to swear by one or the other, either masterly inactivity by giving insulin *ad lib* with hypertonic saline fomentations locally, or proceed to surgery in any stage with inadequate efforts to control the diabetes. I should personally steer a middle course and

place my faith in both complementary methods, judiciously choosing the most favourable time for the operative intervention. No hard and fast rules can be propounded which can deal with all the combinations of circumstances. Each case must be decided on its own merits and die-hard views must not be allowed to prevail. I am not a little surprised at statements like these: "In a leading hospital at London, no carbuncle case is subjected to the knife." It was my misfortune to see this dictum put into practice by some Surgeons at the Madras General Hospital and elsewhere, with some lamentable consequences. True, some carbuncles can be cured without the knife. But slavish imitation of a method to deal with massive carbuncles one meets with in India, under dissimilar conditions, is a teaching, which must be combated on fundamental surgical principles. I shall deal with this question of masterly inactivity later on. On the other hand, to style an operation for a carbuncle "an emergency operation," ignoring the general and basic condition of the patient or paying only a lip sympathy to it, is the slogan of the worshipper of the knife. After all, operation is only a means to an end and the material on which we operate must be in a reasonable general state so as to stand the shock of the operation and stand the anaesthetic also. There is no harm in postponing an operation for a few days, if only to bring the general condition to a satisfactory level of surgical risk.

The basic conditions of diabetes and acidemia are treated with insulin, alkalies, fluids, glucose and liberal food, etc. and I need not go into details. When after such treatment, the patient has a good pulse, his dehydration is reduced and otherwise a good surgical risk comparatively, there should be no hesitation to operate to afford external drainage to the toxins.

II. Palliative and conservative treatment.—In carbuncles of the size less than a rupee in diameter, I strongly advocate dry cupping. It is an old forgotten art and the results are marvellous if properly applied. The amount of negative pressure created in the cup, is enough to squeeze out little by little the contents of the tiny carbuncle, till, after a few cuppings, the core comes out and the hole left closes in a day or two, with little or no scarring. Cupping is indeed admirable for the few early small dimensional carbuncles.

Except for this cupping, I have no good word for other methods of palliation as the sole treatments. How long are we to allow a patient to suffer from pain, toxæmia, sleeplessness, etc., by

the glycerine and magnesium sulphate fomentations alone? I can understand the assiduous application of glycerine and magnesium sulphate fomentations in the waiting period for making the patient safe for the operation. I cannot understand the *tutera* "only glycerine and magnesium sulphate fomentations" and no operation, for all sorts of conditions. After all what is our aim in treating a case of carbuncle? What is the pathology of a carbuncle? A carbuncle consists of suppurative necrosed tissue, under a thick skin with a few inadequate openings to drain the sponge-like pus tissue. What are the consequences of this undrained mass of suppurating tissue? The consequences are: (1) tension and consequent pain (2) absorption of toxins into the general circulation causing pyrexia, dehydration, increased diabetes and acidæmia and (3) extension of carbuncle. So pathological sense demands (1) relief of tension (2) draining of the toxins outside instead of into the general circulation and (3) cutting short the process of extension. Can glycerine and magnesium sulphas fomentations alone be trusted to give all this relief? It may, to some extent, but it cannot for all time and under all conditions. So, operation becomes inevitable in the majority of cases.

Then there is the method of auto-hæmotherapy. Provided all the conditions are fulfilled, it is a successful method. But what are the conditions to be fulfilled in a big carbuncle? The patient, already in extreme pain, must be able to stand 12 to 30 needle pokes in and around the carbuncle. Any surgeon with common humanity must be prepared to deaden the senses of the unfortunate patient by some anæsthetic. But I ask, if you are prepared to give an anæsthetic for the so called palliative auto-hæmotherapy, why not operate and be finished with the affair? So, it must be admitted that the scope for auto-hæmotherapy, in big carbuncles, is very limited and in small carbuncles, not necessary at all.

Palliative treatment must be an adjunct to the operative treatment and should not compete with it to the disadvantage of the patient.

III. Operative treatment.—1. Indications.—Every carbuncle, not amenable to cupping, must, at some stage or other, be submitted to operation. The stage, amongst other things, depends on the fitness of the patient to undergo the risks of anæsthesia and operation.

2. Contra-indications.—When the basic and general conditions are unsatisfactory, operation must be postponed till a

tolerable condition is attained. In manifestly moribund patients, it is useless even to think of an operation. In carbuncles of the face, especially when a streptococcal infection is suspected, it is best to be ultra-conservative and rely on fomentations, rest and sulphanilamide administration.

3. Scope of operative treatment.—The time-honoured crucial incisions, the incisions extending into the normal healthy tissues, undermining of the skin flaps and complete excision of the slough in one piece is, of course, the ideal operation. In this operation there is no necessity to sacrifice the slightest amount of skin, unless, of course, some portion of the skin has actually sloughed away. As regards excision of the slough, I consider it is uncalled for in doubtful risks. Attempt at excision of the sloughs, lengthens the operation, increases hæmorrhage, the control of which is unsatisfactory, and adds to the shock. In some cases, where I deliberately did not attempt to remove the sloughs at the operation, because of the doubtful risk, I was gratified to find that, in a few days, the wound was as clean as one in which the slough was deliberately excised. I do come to believe that even in good risks it is quite justifiable to leave the sloughs in situ after a thorough undermining of the skin and packing under the skin. I do not want to go into greater details, as I am more concerned with the principles of treatment. I also consider that chemical cauterization of the sloughs, is quite unnecessary. Effective relief of the sub-cutaneous tension must be the main object of the operation, other things will take care of themselves, if this fundamental factor is conceded.

IV. Anæsthesia.—Nitrous oxide and oxygen is the best anæsthetic. India is still backward in anæsthese and anæsthetists. So far as Madras is concerned, the number of hospitals which have facilities for nitrous oxide anæsthesia, are regrettably few. It must be possible, in the immediate future, to supply nitrous oxide and oxygen to every hospital and every private practitioner whether in the cities or villages. In a few select cases intravenous anæsthesia by sodium evipan may be considered. Local anæsthesia must be emphatically favoured. In the absence of nitrous oxide and oxygen, many of us have to reluctantly use chloroform and ether.

V. Post-operative care.—No relaxation should be allowed in the treatment of the basic condition. On the other hand greater vigilance must be exercised to anticipate and treat

acidemia as a result of chloroform and ether narcosis. When the patient settles down after a few days of the operation, it will be noted that the basic condition is markedly ameliorated necessitating smaller quantities of insulin. The diet should be liberal and nourishing.

Dressing may normally be changed after 48 or 72 hours. It is best to allow not less than 48 hours. Till the wound is clean and devoid of sloughs the best dressing is absorbent gauze soaked in glycerine and magnesium sulphate mixture. To be effective, the gauze pieces must be literally dripping with the solution. When the sloughs have separated, eusol dressings may be started. But until the wound is perfectly clean, the skin flaps should not be allowed to come in contact with the granulating base. When the wound and the flaps are perfectly clean, the flaps must be allowed to come in contact with the wound base. Afterwards epithelization may be encouraged by dressing with the scarlet red ointment.

Most of the cases develop satellite boils and even minute carbuncles around the wound due to discharges. Judicious cupping may be done. The important point is not to use adhesive plaster at any stage and to keep the surroundings dry by application of spirit and some talcum powder.

Any points of focal sepsis such as septic teeth, sinusitis, etc., must receive attention when the patient is on the road to convalescence.

Conclusion.—In this essay, the principles of the treatment of carbuncles are discussed and particularly the present day tendency in some quarters to place undue emphasis on the so-called palliative treatment, is deprecated. An operation, at the appropriate moment, is strongly urged in the majority of cases.

Experimental and Clinical Examination of the Activity of Protamin Zinc Insulin.—L. A. Hulst and E. H. Vogelenzang, *Nederl. tijdschr. v. geneesk.* 81: 3425 (July 17) 1937.

Protamin zinc insulin in the authors' experience on 13 patients, has a different action from that of insulin and protamin insulin. In their opinion, the zinc is the main cause of this alteration in action, the outstanding feature of which is the delay of effect. Besides, it became clear to them why the final result can be judged only after protamin zinc insulin has been administered for several days. It is easily understood why in some patients—as recorded in the literature, the action is unstable; the protamin zinc insulin treatment makes necessary a regulating action of the diabetic organism lest unfavourable results should ensue by summation of actions. This implies limitations in the application of this insulin; for each patient it should be tested carefully. —A.J.D.C.

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3rd week	—	2 ccs	2 ccs	—
4th week	5 ccs	—	—	—
5th week	—	2 ccs	2 ccs	2 ccs
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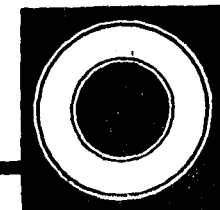
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The After-Care of Cataract Operated Cases

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Dr. E. V. Srinivasan, M.B. & C.M.,

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IN private practice, both eyes are bandaged even if only one eye is operated. About 24 hours after, I inspect the operated eye releasing the un-operated one. By just pulling down the lower lid and asking the patient to look down, a great deal of information can be gained in a few seconds without trying to pull up the upper lid. In fact, it is dangerous to raise the upper lid, especially in prominent bulging eyes, though it does not matter in eyes which are placed deep in the socket.

If the section is smooth without any entanglement, the patient finds it easy to look down. If the patient does not easily look down, it means that the lips of the section are not *tete-a-tete*, of course, excluding the cases of patients who cannot and will not look down.

In a clean case, the next dressing can be done after four or five days according to the instinctive dictates acquired by confidence and experience. Inspection of the eye 24 hours after operation is in my opinion, necessary as a threatening sepsis can be averted by timely measures. The rarity of sepsis can be made still rarer by this timely intervention.

In hospital practice, I bandage only the operated eye, as I find the nursing staff insufficient to attend to the needs of the patient, with both eyes bandaged. It is far better to allow them to move about with the unoperated eye with any sight in it than to bandage both eyes with inadequate help and consequent trauma to the operated eye in their blind attempts to move about for food and calls of nature etc. Besides, I find the consensual reflex during waking hours effectively prevents the iris from prolapsing into the wound.

Post operative throes.—The surgical complications are few and far between and never remain in the memory of the patient. It is the distress during the first 24 hours, rigorous imprisonment as some patients call it, that give them such a bad time as, for some of them, to never think of getting the 2nd eye operated to avoid a repetition of this trying experience. Very severe

pain in the back and awful cramps due to prolonged immobility can easily be avoided by the liberal use of soft pillows under the knees and back, by permitting them to draw up their knees and turn on the un-operated side after three or four hours, and by even propping them up after six hours. A bed with adjustment for raising the head and knees will equally serve the purpose of keeping the patient comfortable without any distress. The same freedom will alleviate to a great extent the usual abdominal discomfort due to gas pain, distension and vomiting, the result of swallowing air during feeding while lying flat and aerophagy due to anxiety and diminished peristalsis due to prolonged supine stillness.

"Everything is finished well and will go on well and so be cheerful", should be the final talk of the surgeon to the patient, while the eye is being bandaged after the operation.

Never ask a patient to count fingers immediately after the operation, in cases where you may yourself be doubtful of the result, as a failure to count fingers will upset the system altogether which cannot be kept too calm after operation. $\frac{1}{2}$ gr. of Codeia after the operation and Luminal at night is a distinct benefit.

Vomiting.—Vomiting after the cataract operation may be put down to the same causes namely, too much restriction of movement. A light meal, a few hours before the operation keeps the patient less apprehensive and more passive and obedient at the time of the operation. Vomiting is, after all, far less serious than is usually supposed and there is nothing to gain by rigid restriction, as I was always pleasantly surprised to find no prolapse in patients who strained by vomiting and taken aback to see the prolapse mostly in patients that were quiet and never vomited.

In Morgagnian cataracts with small nuclei, determined by the amount of fluid that escapes on needling, I make a very small section and in these cases, I remove the bandage as early as the 3rd or the 4th day and provide them with Kirkpatrick's goggles. Again I take advantage of the bridge flap or a conjunctival flap and the early smoothness it affords for the play of the upper lid on the section by releasing the bandage as early as the 4th or the 5th day. The goggles are advised to be worn for a fortnight or a little less and I insist on their wearing the goggles even during the sleep as these goggles afford efficient protection even against unconscious trauma during sleep.

Hæmorrhage in the Anterior Chamber.—This is easily absorbed if it had occurred during operation by atropine, rest and bandage with or without anti-hæmorrhagic remedies. The other annoying hæmorrhage is due to hurt during sleep or inadvertance during waking hours on any day before a week after the operation and before the bandage is removed. The chamber is full of fresh blood and one may be tempted to open the section with a spud leading to no end. We have to depend on rest, calcium chloride, normal horse serum, infra-red ray, and the pressure of the escaped blood on the bleeding point, atropine and bandage. In fact, the anterior chamber, which will be nearly free of blood when the bandage is removed, rapidly fills up again before retying the bandage. Sub-conjunctival injections of normal Saline, somehow is useful in the eventual stoppage of bleeding though not at the commencement but certainly after a few days. Diabetics who are prone to a greater degree to this diathesis must receive the usual anti-hæmorrhagic treatment. One certain sequelæ is an after-cataract which will have to be needled in time. The needling must be preceded by intense anti-hæmorrhagic measures. Recently, in a corpulent male of 55, there was hæmorrhage after five or six days when all measures failed to secure a bloodless anterior chamber. It was manifest that fresh bleeding was constantly occurring. After 15 days of patient waiting, I emptied the chamber of all blood by introducing an iris repositor into the wound which remains always weak. On careful watching, the pupil did not fill up again though I bandaged the eye just for a few days longer. So, it strikes me that paracentesis and that once, if done last or late, is very effectual indeed, the only indication for an early interference of such sort being a rise in tension.

Eversion of Cornea.—I must say that this occurs only in sections without conjunctival flap and certainly not in cases with a bridge flap, for obvious reasons. The cornea is thrown down, doubled up on itself exposing the upper third or a half of the anterior chamber; or the everted cornea is caught between the two lids. This is seen at the first inspection after operation only in hospital practice and I have never seen it in my private practice. In patients who try to move by self help and by raising the bandage and looking down the lower lip of the wound is caught between the lids and complete eversion follows consequently. This may even occur rarely in a patient who tries to move the eye up and down after operation, inside the bandage in a

partially closed eye or in an eye under facial block. It is always necessary in blocked cases to bring down the upper lid and keep it in apposition with the lower which can be easily achieved by covering the lids with a wet vaseline-smearied lint. Once the eversion of the cornea has occurred, it is most advisable to block the facial nerve again and under local anaesthesia the edges of the incision are brought into apposition by using a single stitch with a very fine needle. It is marvellous how such eyes go back to normal again. The cornea must be held with Webster Fox Suture forceps, while suturing.

Prolapse of Iris :—Prolapse of Iris, if seen on the first inspection, may go with eserine and firm bandage. One is extraordinarily lucky if the iris springs back with this simple treatment. It must be said that peripheral iridectomy has practically killed the chance of iris prolapsing. In practice, one finds it impossible to drive back the iris into the anterior chamber, once the prolapse occurs. What I do is to touch the prolapse with a sharp probe well coated with pure silver nitrate at the same time helping to empty the chamber by rubbing the prolapse with the sharp probe point. I smear cornea with yellow ointment previously to prevent the silver damaging the corneal epithelium. Two such applications, done at intervals of two or three days cause the prolapsed iris to slough away leaving the section quite smooth with perhaps just a hardly visible brown stain. The eye has to be under bandage for a week longer. These eyes regain quite as good sight as any other eye with uneventful convalescence.

The prolapse which is more common in expression can easily be avoided by depending only on adrenalin and cocaine for the pre-operative mydriasis and by free dropping of sterile eserine after conclusion of operation and before removal of lid hook.

A case of prolapse of the ciliary body in the wound due to severe hurt with a walking stick while getting out of the car was cured with repeated thermo-cautery and firm bandage leaving just a little permanent striped keratitis with a vision of 6/12. Electro-coagulation is perhaps the most efficient.

Cortical Remains :—Cortical remains after extraction, especially occupying the centre is so great a disappointment to the patient that I start away on daily Saline subconjunctival injections, even on the 3rd day. Case has to be cocainised well before the injection, as the section may burst if the patient squeezes the eye with pain. Of course the pupil will have to be

kept dilated with the aid of adrenalin, cocaine and atropine. When the cortical matter shows signs of disintegration by becoming brittle and dropping into the bottom of the anterior chamber, the saline injections may be few and far between depending on dionin powder for the clearing of the pupil.

After-cataract : After-cataract, the ever green of the Daviel operator has to be needled depending upon the requirements of the patient. A Presidency-Port Officer will thank you very much indeed for a 6/6 vision and he has to be needled if the vision is even 6/12 which is far above the average. Above all, do not think of needling by any chance, simply because the after-cataract is very dense, for, I have known very dense after-cataracts with 6/6 visions. Refraction must be done carefully as appearances are very deceptive indeed.

Calcareous cortico capsular remains :—There is no meaning in trying to make a hole in this mass. I always remove them *en masse* after a small incision with the aid of an iris forceps, the pupil becoming immediately black.

Astigmatism against the rule :—In my experience this is rare in Sclero-corneal or Corneal sections, but common in sections with a bridge or a conjunctival flap. The raw surface of the loose conjunctiva is sticky and sticks soon to its counter part at a lower level, being loose and flabby soon after the separation like a dead leech. In consequence, the upper cornea falls down increasing the convexity horizontally. This is more or less permanent unlike the usual two or three dioptic astigmatism which passes off in three months time. Astigmatism of 6 to 12 D is not uncommon. If one loses sight of this fact, and does a needling of very thin after-cataract, one does not help the patient or himself but only the neighbouring ophthalmologist who prescribes a high compound glass taking the credit to himself after a thorough test of post-operative refraction and astigmatism.

Late or no formation of Anterior Chamber, in an eye with normal tension and not much serious iritis is certainly the result of the iris sticking to posterior cornea, cured easily with a needle puncture at the sclero-cornea and filling up Anterior Chamber with saline by a hypodermic syringe through the puncture.

Post Operative Pain.—This occurs occasionally with nothing obvious to account for it. There may be no iritis, no capsule

Treatment of Cerebro-Spinal Fever

BY

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THE mortality from this disease, if untreated, is very high, about 70% of the cases going on to a fatal termination in many epidemics. The results of treatment to a large extent depend upon the virulence of the infection and the age of the person attacked, the mortality being very high at the extremes of age. In the acute fulminant types, where lumbar puncture reveals only a few drops of blood-stained fluid, treatment is generally unsuccessful, the case going on to a fatal termination. In cases where the fluid is frankly purulent, careful and prolonged treatment is necessary, and recovery in about 50% of the cases may be expected. Where the Cerebro-spinal fluid is only turbid, the results of treatment are encouraging and attended with success. Exceptions to the above occur and a case where the fluid is only slightly turbid, may go on to a fatal termination, and where it has been thick and purulent, end in recovery.

The treatment may be considered under the following principal heads:

- I. General Nursing.
- II. Relief of symptoms such as pain.
- III. Early and repeated relief of pressure by Lumbar Puncture.
- IV. Early and repeated administration of Serum—intravenous and intrathecal.
- V. Drugs and other miscellaneous measures.

I. General Nursing.—The patient should be kept quiet in a darkened room. As bed-sores are likely to form with great rapidity, the nurse must be vigilant in keeping the skin free from being inflamed. The skin of the back should be hardened by the daily application of Boric Acid and Rectified spirits. Air or water beds and pillows are preferable to ordinary mattresses. The elbows, knees and ankles which are the parts frequently chafed by contact with the bed, should be wrapped in cotton wool and lightly bandaged. Attention to oral hygiene is necessary. The lips get cracked and the ordinary Glycerinum Boracio

is of use in this condition. The Bowels are invariably constipated, and purgatives do not act well. Soap and water enemata in adults, and the 1, 2, 3 enema in children (Glycerine 1 ounce, magnesium sulphate 2 ounces, water 3 ounces) are measures suggested. The sheets and linen must be kept clean and removed whenever soiled by the discharges. As there is emaciation, the patient should take in a sufficient quantity of nourishment—milk as such or in any of its modified forms *i.e.*, Buttermilk, Peptonised milk etc., and the addition of fresh fruit juices to the dietary needs no emphasis. Milk sugar may with advantage be added to the food, as it spares the body tissues during the febrile stages. Provided they do not tax the digestion, any extras that the patient fancies, may be given.

II. Relief of symptoms such as pain etc.—The pains in the neck and back are very severe, and it is from these that the patient clamours for relief. Bromides, with Chloral Hydras and Tr.Hyoseyamus act in some cases. The phenacetin group of drugs, including Amidopyrin and Novalgin, as well as Aspirin do not appear to afford much relief. In very severe cases, Morphia or Heroin or Eukadol (a derivative of codeine prepared by Merck) have to be used, and they afford relief. These drugs may be used freely, provided there are no respiratory complications, and ill effects from their administration have not been noticed. They cannot be used for children, and the possibility of drug habit, in certain types of patients should not be lost sight of. Hot packs afford relief from pain and restlessness and should always be given a trial.

III. Early and repeated relief of pressure by Lumbar Puncture.—This procedure alone is of considerable value and if done regularly at 24 hour intervals, appears to effect a considerable reduction in the mortality. In the absence of serum, this daily relief of pressure is the most valuable method of treatment, and has to be continued till the C.S.F. ceases to be secreted under pressure and returns to normal. Some authorities wash out the thecal cavity with sterile normal saline at 100° F. but the value of this measure is doubtful, and a sudden slowing and stopping of the pulse has been known to occur during the lavage, and as such is not unattended with risk.

The median puncture in children, and the lateral one in adults are the methods of choice. The operation can be performed under local anæsthesia, 2 c.c. of a 2% solution of Novocaine being used. One or two drops of the solution are injected, just

underneath the skin at the site of puncture, so as to raise a bleb, by entering the needle horizontally. It is then withdrawn and inserted vertically, and the solution, along with needle pushed in to a depth varying with the size and build of the patient. The lumbar puncture is then done, after allowing for time for the anaesthetic to act. The amount of fluid withdrawn varies with each individual case. The C.S.F. should be allowed to flow out of the needle—the flow reaches normal (*i.e.*) one drop per respiration. A careful watch should be kept on the pulse when the theca is being drained, and the stillete replaced for a short while, if the pulse suffers. After the operation the foot of the bed is kept raised, so as to avoid contact of the soft central tissues with the bony base of the skull, in case the removal of C.S.F. has been overdone. In some cases there is retention of urine after lumbar puncture, and regular catheterisation is needed. This sequel should not be overlooked.

IV. Administration of serum.—In as much as cerebro-spinal fever is always in the first instance a general blood infection, with localisation, later on in the meninges, the serum should be given intravenously if the case is seen early and suspected. Later injections are intrathecal. The dose for the intravenous is 30 c.c.—40 c.c. for an adult, and 15 c.c.—25 c.c. for children. In intrathecal administration, it is preferable to give a general anaesthetic, in the absence of respiratory complications. These patients take chloroform well, or the C.E. mixture may be used instead. Some authorities do not advise a general anaesthesia but in suitable cases, it appears to be harmless. It has the following advantages: (1) The quantity of fluid withdrawn is considerably increased. (2) The pain when the serum is being run in is agonising, and the patient is saved this ordeal. (3) Better flexion of the parts is obtained, especially that of the back and neck, which, owing to the pain in these parts characterising the disease, is not possible without a general anaesthetic. (4) The correct performance of the puncture is facilitated, and the medical attendant is not troubled with a restless, fidgety and a screaming patient.

A sterile glass funnel with a rubber tubing about 2 feet long is used for holding the serum. The tubing has a glass tube attached at its centre, which serves as a window, during the progress of the intrathecal injection. The other end of the rubber tubing is attached to an adapter which fits into the lumbar puncture needle. A clip to open and shut the flow is also

necessary. The head of pressure used for the injection, should in no case exceed $1\frac{1}{2}$ feet. The serum is slightly warmed to body temperature, before being put into the funnel. The amount of C.S.F. to be withdrawn has been stated under heading III and the amount of serum given depends on the C.S.F. withdrawn. A quantity of serum about half of the C.S.F. drawn out, is put in, subject to a maximum of 30 c.c. This quantity should not be exceeded. While the serum is being run in, a careful watch should be kept on the pulse, and the injection stopped if there is any slowing, and a shorter head of gravity pressure used for the injection. The foot of the bed is kept raised, after the operation. These injections are done every 24 hours till the C.S.F. returns to normal and the patient exhibits clinical recovery. The ideal way of using serum in this condition, is to use a polyvalent one, as soon as the diagnosis is made, *i.e.* type of the organism from the C.S.F. withdrawn, and use the corresponding type sera for further treatment, but type sera are not available in the local market. Foreign reports regarding the success of serum treatment are very favourable, and two factors are emphasised upon, namely the early administration of a sufficient dosage, and the therapeutic potency of the serum itself.

The Lister Institute Polyvalent Serum and the univalent sera for Type I and Type III of the Medical Research Council, have been commended for the good results obtained by their use. Messrs. Parke, Davis & Co., have marketed an Anti-Toxic Serum, and claim therapeutic potency for their preparation. It was desired to try this at the Hospital, but the local dealers had no supply, and the trial could not be made. Local experience with the usual polyvalent sera available in the market, has not borne out the claims held up for serum therapy. Any benefit resulting appears to be due to the Lumbar Puncture and drainage, rather than the specific action of the serum. Perhaps this discrepancy is due to local variations in the strains of the infecting organisms and the absence of sera prepared from them, as opposed to foreign strains.

V. Drugs etc.—Hexamine has been used largely as it is supposed to liberate formaldehyde in the C.S.F. It is given combined with alkalis, to prevent irritation of the urogenital tract. Its value is questionable, and the results disappointing. Other drugs with a similar action such as Iodo-septine, and Septicaemine given perorally have not influenced the course of

the disease. Acriflavine solution, intra-venous, spoken highly of by some authorities, is equally unsatisfactory. The use of Sulphanamide P either by the intra-venous route or orally, or by both is being tried, and it is too early for any generalisation. Further experience is necessary before a conclusion could be drawn.

In those cases that have a tendency to go on to a subacute condition the use of auto-vaccines, is well worth a trial. They tend to accelerate recovery. They do not save the patient going down-hill, and although they produce no spectacular cure, they very favourably influence recovery. The vaccine is administered after the second week. The usual dose is from 100—200 millions organisms, gradually increased every 5th to the 7th day by 150—200 millions. If facilities for the preparation of auto-vaccines are lacking, the C.S.F. withdrawn should be collected aseptically, thoroughly shaken and $\frac{1}{2}$ to 1 c.c. of this given subcutaneously. Further repetition and dosage will depend on the reaction produced and the clinical progress of the case.

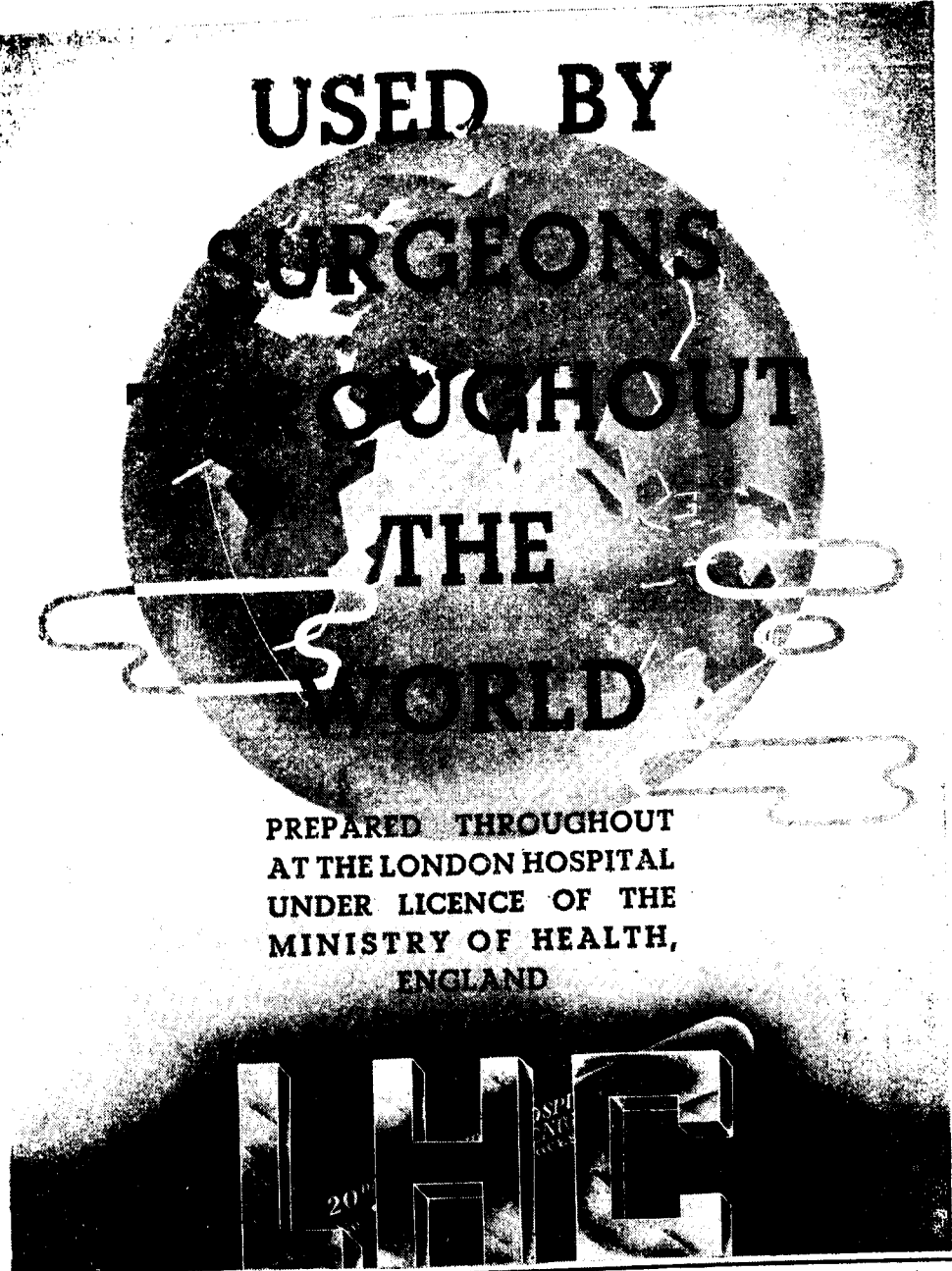
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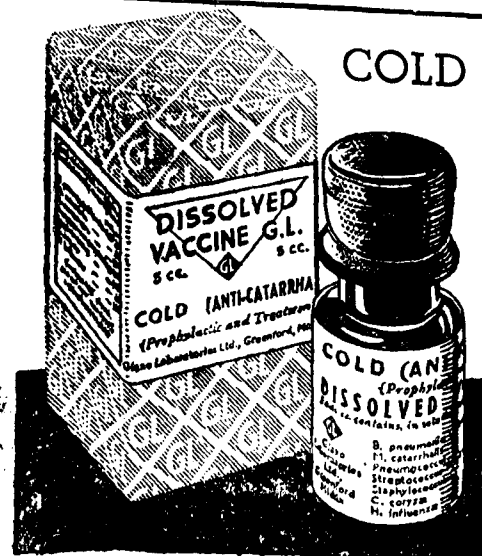


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Treatment of Bacillus Coli Infection of the Urinary Tract

BY

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AMONG all the infections the kidney is subject to, that caused by the colon bacilli group is by far the commonest. When the infective process is limited to the pelvis of the kidney, it is Pyelitis; when it affects the kidney parenchyma, it is Pyelo-Nephritis; when the kidney is almost destroyed, it is Pyo-Nephrosis. There is accompanying inflammation of the ureter and the bladder. This infection is more common in the females than in the males, and the infection is usually either blood-borne or lymph-borne.

Three clinical types are evidenced. (1) Acute fulminating, with high fever accompanied by little localising signs; (2) Acute cases with or without localising signs; (3) Chronic with or without localising signs. Lumbar pain is common and severe.

Treatment.—*Rest.*—Patient must be confined to bed in all acute cases till the temperature and toxæmia subside. When the temperature comes down, patient is allowed slight freedom of movement.

Clothing.—Warm clothing is essential; chill must be avoided; and a flannel binder covering the loins and back serves a very useful purpose in preventing chill from exposure.

Diet.—Barley water with glucose, soda water and Imperial drink are allowed. Milk, about a pint a day, can be given either plain or mixed with coffee, tea or ovaltine. When fever subsides, solid food as bread and butter, biscuits, eggs and boiled rice are allowed. Buttermilk is given in fairly good quantities.

General Medicinal Measures.—Open the bowels by an enema. Give castor oil, 6 drms. In severe cases of constipation, olive oil enema must be given. After the opening dose, regularity of action of the bowels must be maintained by giving either infusion Senna or Cascara evacuants. A diaphoretic mixture keeps the temperature down. Tepid sponging is useful. Veramon is necessary to alleviate the loin pain. Bladder

irritation is set right by Tr. Belladonna m. 5, Tr. Hyoscyamus, m. 10, Aqua add oz. 1, a dose every six hours.

Special Remedies.—1. *Alkaline diuretic treatment.* Fluid is given in large quantities, about 4 to 6 pints a day. Sodium citrate is given to alkalinise the urine to the extent of about 300 grains. When the urine is made alkaline, sodium citrate is given in doses of 2 drms. a day, only. This line of treatment is suitable only in acute cases.

2. *Urinary Antiseptics:*—(a) Hexamine acts by its action of forming formaldehyde in the presence of acid. Hexamine, 1 drm., acid Soda Phos. grs. 30, aqua chlor. add oz. 3; ounce one t. d. s. is the usual prescription. Plenty of fluid must be given to prevent irritation of the kidneys. Injection of Cylotropin, either intravenous or intramuscular, once a day, is a very useful adjunct to the treatment. Some give heroic doses of hexamine, about 4 to 5 drms. a day, as also three to four injections of Cylotropin daily in their attempts at sterilisation of the urine; but my experience is against such a practice, as strangury and hæmaturia will surely result under such a drastic treatment. Where a dram fails, a ton of Hexamine is helpless.

(b) Pyrridine and Hexyl-resorcinol group of drugs act by the elimination of the dye in the urine. Pyrridium (Menley and James) and Neotropin (Schering) are preparations of the kind. They act both in acid as well as in alkaline urine. These drugs are said to be more effective in coccal than in coli infections. There are clinicians who attribute toxicity to these preparations but, given carefully, they do not cause any toxic symptoms. The usefulness of these drugs vary according to different authorities.

(c) Sulphanilamide preparations are boomed up as urinary antiseptics. They must be given in five grain tablets, about 100 tablets in ten days, in diminishing quantities, beginning from 12 tablets a day. The results and reports are conflicting.

(d) *Mandelic Acid:*—Clark and Helmholtz introduced ketogenic diet treatment of B. Coli infections of the urinary tract. If ketosis is produced by giving a high fat diet, the urine is rendered free of pus and organisms by the beta-hydroxy-butyric acid so produced. Since beta-hydroxy-butyric acid is oxidised in the upper part of the alimentary canal, it cannot be of any use orally. Hence an effective substitute like Mandelic acid is being administered.

The urine must be acid, if Mandelic acid is to be given. The pH of the urine must be below 5.5. Ammonium Chloride grs. 60 is given daily to render the urine acid. The urine can be tested by adding 5 drops of a methyl red solution to 5 c.c. of urine. A bright pink colour develops if it is acid, while a yellow colour forms if the urine is alkaline. It is better to administer Ammonium Mandelate than Mandelic Acid and Ammonium Chloride separately, for the nausea and vomiting associated with the administration of ammonium chloride is absent in cases tried on Ammonium Mandelate. Fluid must be restricted to only two pints a day. The normal dose of Mandelic acid is 45 grs. four times a day.

Contra-indications to Mandelic Acid.—(1) *Alkaline urine.*—Some say that the pH of the urine is immaterial and that mandelic acid can be administered in any case. But the action of the drug is nullified in an alkaline medium and failures are often attributed to the drug when they must be attributed to the method of administration. (2) *Acute cases.* (3) When renal irritation sets in, the drug must also be stopped.

The urine is sterile in a week's time. In view of relapses a second course of treatment is instituted after a few days' freedom from treatment.

3. *Vaccines and Bacteriophages:*—Vaccines are useful only in chronic cases and even there, their efficacy is not much pronounced; so also, are bacteriophages.

4. *Local treatment:*—(a) Bladder washes with silver nitrate 1 : 5000 or Acriflavine 1 : 5000 have only a limited use where the infection is solely confined to the bladder.

(b) Renal pelvis drainage. Ureteral catheterisation and washing with 1 in 5000 silver nitrate or Acriflavine 1 in 5000 brings the temperature down to normal. This method is very useful in pyelitis of pregnancy. The method requires special skill and must not be lightly attempted.

Comparison of the methods.—In acute cases, the method of choice is still alkalinisation of the urine. Drainage of the renal pelvis has its sphere of usefulness in expert hands. Hexyl-resorcinol, Hexamine and Pyrridine are certainly inferior to Mandelic acid which has a wide and effective sphere of activity in renal infections. Sulphanilamide preparations deserve further trials before their efficacy can be vouchsafed.

Treatment of Chronic Constipation in Infancy

BY

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CHRONIC constipation is a common complaint in infants. Whereas, in case of occasional constipation, administration of a laxative or purgative will correct the condition, in this, the treatment is more elaborate and administration of drugs is only of secondary importance. Because this complaint is not fatal nor does it cause severe symptoms, enough attention has not been paid to this subject and the treatment often consists in changing from one purgative to another. These infants, though not severely ill, often suffer from colicky pains in the abdomen. Sometimes they are restless and take their food with reluctance. There is straining at stools resulting in umbilical hernia and prolapse of rectum. A proper study of the aetiology of the condition is necessary to formulate a rational method of treatment. This consists in regulating the regime and diet of the infant so that it gets a normal motion without permanently relying on aperient remedies.

Constipation may be caused by insufficient food. It is not uncommon to find a child entirely breast-fed during its 5th or 6th month, which does not put on weight and which is always constipated. On examination, it is found that the child hardly gets sufficient nourishment from the mother and what little it gets, is rapidly absorbed leaving insufficient residue. Normal motions contain about 80 per cent of water. Insufficiency of fluid intake, associated with excessive loss in the form of perspiration in warm weather, may be conducive towards this habit. In infants, the large intestines, particularly the sigmoid, is relatively longer and therefore greater amount of fluid absorption takes place in infancy than in later years. There are some cases where the food passes normally down the bowels up to the rectum but due to over-action of anal sphincter, the child after a good deal of straining and pain passes once in two to three days soft, yellow stools. Evacuation of bowels is much influenced by

regular habits. The urge or desire for evacuation will come at accustomed intervals and if this is unattended or neglected, the bowels become sluggish and chronic constipation results. Lack of tone of the intestines, lack of tone of the abdominal muscles, as in malnutrition or rickets, may be a factor in bringing about constipation. Sluggish nerve stimuli is another factor as in hypothyroidism. Constipation may also be brought about by want of balance in the constituents of the food. Proteins tend towards alkaline constipated stools and carbohydrates towards acid, watery stools. Fats cause loose, soapy motions. Want of cellulose in the diet in older infants may cause insufficient residue of food and be a cause of constipation. Organic causes like pyloric stenosis or achalasia of large bowels are among the rarer causes of this condition.

TREATMENT.—Before considering the treatment, a detailed enquiry must be made about food, its nature, its amount and the time and method of its administration. The nature of the stools must be examined in all cases to see whether the stools are really constipated and also to have an idea whether there is any undigested food or any abnormal constituents. In breast-fed infants, test feeding is necessary to know if the child is getting enough nourishment. Enquiry must be made if the constipation as such is leading to any discomfort or inconvenience or whether in spite of the constipation, the child is healthy and gaining in weight. The amount of breast milk at each feed must be ascertained. If this is insufficient, steps must be taken to increase the amount of breast milk and if this is not successful, supplementary feeding must be given to give the child the necessary amount of nourishment. In the infants, it may be worthwhile to remember that the child requires about 2 to 2½ oz. of human milk or its equivalent per pound of body weight in 24 hours. In warm weather, in between feeds, addition of water with little sugar will help relaxation of the bowels. It is very necessary that the infant should be taught to regular habits of evacuation right from the earliest months. If the child is held after each feed with its legs drawn up over the commode, it may be trained to pass motions at regular intervals.

In case of the artificially-fed infant, the exact amount of food the child gets, must be ascertained. Very often in these infants, it is noticed that the milk given to the child is very dilute, the addition of water being so excessive that there is not enough residue left for regular evacuation of the bowels.

Proportionate amount of milk must be present in the feeds. A rough guide will be that at about three months, the child should receive equal parts of milk and water and at about six months, the child should receive about two parts of milk to one of water. Addition of cereals, particularly of barley water, tends to overcome constipation in very mild cases. Since carbohydrates added to the milk bring about easier evacuation, the addition of suitable carbo-hydrates alone to the milk is often sufficient to overcome the constipation. The carbo-hydrate may be either glucose or plain sugar or dextromaltose. The last is the best, but in ordinary practice, common sugar will be quite sufficient.

In case of infants after the seventh month, addition of starchy food in the form of barley flour or rice flour will tend to overcome constipation. Massage of the abdomen commencing from the right iliac fossa and working in clockwise direction along the colon will be helpful. The custom of massage with oil—oil bath—that is prevalent in the Hindu families, is valuable for toning up the muscles and overcoming constipation.

The child during the second year of infancy, should be given a certain amount of green vegetables, well boiled and mashed. Fruits are particularly valuable such as grapes, prunes, apples, or bananas well stewed and taken with cream and sugar. Malt is a valuable addition in the infants' dietary. Besides its promoting digestion and its nutritive value, it also tends to overcome constipation. Honey is particularly valuable as a nutritive food for infants, and more so, in these cases as it acts as a mild laxative and deserves greater notice from physicians. In the few cases of over-action of the sphincter Ani, where the stools are at intervals of 2 to 3 days and the child suffers from colic, and vomiting, until the motion is passed, the effective treatment is dilatation of the sphincter either by means of Bougies or by the little finger well lubricated. Dilatation of the anal orifice once or twice brings about a cure and all other methods like purgatives and enemas are of no use.

I will now come to the question of drugs. I am taking it last because drugs play only a very secondary part in the treatment and it must be our aim to discontinue them at the earliest possible moment. Drastic purgatives should be avoided. A popular remedy is castor oil or any of its attractive preparations in the market. Few remember that castor oil after its purgative action has after-constipating effect. It is easy to understand that regular use of castor oil makes chronic constipation worse. In short, there is no drug so unsuitable as castor oil or its preparation

in the treatment of chronic constipation. Liquid paraffin is particularly suitable. If it is given as a suspension in warm water it acts even better. With Agar Agar it also forms an agreeable combination. Senna is another drug useful in the treatment of chronic constipation. The leaves are not suitable because the decoction is bitter to the taste and the action is rather of a drastic type. The pods should be used as an infusion. Syrup Senna is the agreeable form to use. Rhubarb or calomel, though useful for occasional use, are not advisable in these cases. Of the saline purgatives, none is so suitable as Magnesium carbonate. It is a mild laxative and also has antacid properties and therefore suitable for infants.

Rectal suppositories may occasionally be used but excepting temporarily relieving the condition, in no way do they help to bring about a permanent cure. Hygienic measures, regular exercise, proper diet with periodic training of the bowels will go a long way to re-establish proper evacuations rather than the use of drugs indiscriminately used in the treatment of this condition.

Ketonemia in Infancy. C.H. Gray, *Lancet* 2:1017 (Oct. 30) 1937.

In determining ketonemia in infants Gray used the colorimetric method of Behre and Benedict. Ketonemia develops much less readily in infants under 3 months of age than in those above that age. Autopsy in 108 cases of fatal vomiting with and without diarrhea indicated that in infants over 3 months of age with this disease the liver tends to become fatty, while in those under this age it is far less liable to this change. The explanation of the curious difference with respect to age must remain at present a subject for conjecture.

The ketone values for the blood of healthy infants were found to vary from 1.4 to 2 mg. per hundred cubic centimeters of whole blood. Vomiting infants under 3 months showed considerably higher values (from 2 to 19 mg., with 70 per cent over 4.5 mg.).—*American Journal of Diseases of Children*.

Treatment of Ulcer Cornea

BY

T. C. Basu Chowdhary,

Agra.

ONE of the most important causes of blindness is "Ulcer Cornea" and, therefore, its treatment requires careful attention. As far as possible, an early diagnosis should be made as it sometimes extends very rapidly, if neglected, and then there is every possibility of having extensive leucoma which means "blindness". To avoid all these, an early diagnosis should be instituted by instilling a drop of "Fluorescein" lotion 2% after thoroughly washing the eye concerned with sterilized normal saline lotion. If any portion of the cornea is stained green, it indicates the presence of ulcer which should be properly and carefully treated. If the same is neglected, it is sure to end in disaster.

Now coming to the principles of treatment, two things must strictly be observed; *viz.* :—

- (1) The treatment should be based on ætiological factor.
- (2) Everything should be done most aseptically, that is, with all possible surgical cleanliness.

If the above mentioned principles are followed, the prognosis is always hopeful.

It is known to every one of us that ulcer of the cornea is caused by infection of various micro-organisms (Pneumococci, Staphylococci, Streptococci, gonococci, etc.) frequently introduced by the secretion of chronic conjunctivitis and specially by that of dacryocystitis. But the exciting causes are Traumatism (foreign bodies, injuries, chemicals, etc.—this is the most common cause); conjunctival inflammations (caused by gonorrhœal ophthalmia, ophthalmia neonatorum, trachoma and diphtheritic conjunctivitis etc.); phlyctenular keratitis; disturbances in the nutrition of the cornea (paralysis of trigeminus, keratomalacia); infection during operations; variola; and herpes etc. As has already been said, the treatment of the ulcer cornea always depends on its ætiological factor, and hence, in every case the first duty of the Surgeon should always be to find out the cause and then start the treatment, as, for example, a patient suffering from ulcer cornea due to gonococci can never be cured unless

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proper diagnosis for gonococci is made and antigonococcal treatment is accorded.

Atropine. In all cases of ulcer cornea, atropine lotion 1% should be used but in cases of aged patients, try to avoid atropine as far as possible and in its place, Homatropine 2% should be used. Atropine is so frequently used in these cases simply for the following reasons :—

- (1) It keeps the iris and ciliary body at rest.
- (2) It diminishes Irido-ciliary hyperæmia.
- (3) It brings down the inflammation of iris and ciliary bodies if it has actually set in.
- (4) It breaks down posterior synechiæ and prevents the formation of fresh ones. In short, it anæsthetizes the sensory nerve-endings in the floor of the ulcer and thus allows the natural process of repair to proceed undisturbed by even convulsive twitchings of the lids.

Atropine ointment should always be preferred as far as possible for the following reasons :—

- (1) Its action is more continuous.
- (2) It is easier to apply since it can be applied by the patients themselves and it usually works into the eye even if only rubbed along the lashes.
- (3) It rarely causes symptoms of poisoning, but with drop, poisoning is no uncommon thing specially in cases of children and females.

Eserine.—In certain types of ulcers, specially in marginal ones, when there is a chance of perforation, Eserine 1% has been advocated simply to avoid prolapse of iris but, now-a-days, this practice has been discarded. It has been practically observed that when perforation occurs in cases where the pupil is fully dilated, immediate contraction of the pupil takes place due to the escape of aqueous humour.

Eserine should not be used for the following reasons :—

- (1) It does not give rest to Iris and ciliary muscles as it keeps them in a state of tonic contraction.
- (2) It irritates Iris and tends to set up Iritis.
- (3) As a result of Iritis posterior synechiæ may develop.
- (4) It causes discomfort or even pain in the eye.

In cases of superficial ulcers, it should never be used but in cases of special chronic type it may be used but very judiciously.

Treatment.—For the convenience of treatment, the ulcers are divided into two categories *viz.* :—

1. Uncomplicated ulcers ;
2. Complicated ulcers.

1. **Uncomplicated ulcers.**—Cleanliness, heat, rest, protection, fresh air and light nourishing diet with some tonics specially in cases where general health has been pulled down, are the fundamental principles of the treatment of corneal ulcers. It is generally done in the following way :—

Irrigation:—The conjunctival sac is washed out as carefully and gently as possible three or four times a day with a considerable quantity of a mild antiseptic lotion which should be as hot as can be borne comfortably. The reason for washing the sac is to remove the secretions and necrotic material with which many of the organisms and their toxins are also washed away. This is probably the only way to get rid of the organisms and their toxins as it is not possible, rather it is impossible to apply in the eye antiseptics sufficiently strong to kill the organisms. Therefore, it is of very little importance whether Hydrargyri Perchloride lotion (1 in 8000) or simple Boric or Saline lotions are used.

Collyria:—After each irrigation a drop of 1% atropine or 2% Homatropine as the case may be and some antiseptic lotions such as Mercurochrome (1 in 1,000—in severe cases, it may be used 1 in 500) or acriflavine lotion (1 in 500) is instilled. Surgical cleanliness is the principle which should regulate the use of lotions. At bed time, 1% atropine or $\frac{1}{2}$ to 1% yellow ointment may be used to avoid sticking of lashes as well as to produce its own medicinal effect.

Hot Compresses:—Fomentation is done atleast thrice daily in ordinary cases but in severe cases, it should be done every two or three hours. It is employed to prevent stasis and encourage repairs.

Rest and Bandage:—Rest to the eye as well as to mind and body is one of the most important things in the treatment. Patient should be kept as far as possible in a dark and well ventilated room and only restricted visitors should be allowed. After fomentation a protective bandage is applied. This consists of a pad of sterilized cotton wool covered with a piece of cyanide gauze. The bandage is used simply to give perfect rest to the

eye, to avoid the movement of lids and to protect the eye from deleterious external agencies. In certain cases, it should not be put as it does more harm than good. As for example, there is a case of ulcer cornea due to severe granular lids and the treatment of lid is also going on with the treatment of the ulcer—the lids are being painted daily with Silver Nitrate and there is much discharge—in such cases, bandage should not be used—if possible, protective goggles may be used.

This kind of local treatment is quite sufficient for mild and uncomplicated cases but, in cases of severe and complicated type, more drastic methods should be adopted. In all cases, some general treatment has to be accorded according to the leading signs and symptoms. This will be dealt with afterwards.

2. **Complicated Type.**—**Irrigation:**—It should be done every two or three hours with Boric or Hydrargyri Perchloride or Normal Saline solutions. Lotions should be sterilized (1 in 8,000) and should be as hot as can be easily borne by the patient. When there is comparatively more discharge, eyes should be washed as frequently as possible.

Hot Compresses:—Should be applied for half an hour at a time, several times a day.

Collyria:—After irrigation and application of hot compresses the following drops may be instilled whichever suits the condition :—

- (1) Atropine lotion 1% or Homatropine lotion 2%.
- (2) Acryplasin lotion (1 in 500) or mercurochrome lotion (1 in 1,000).

OTHER MEASURES.—Sometimes, apart from dropping the above lotions—Iodoform or Zeroform is sprinkled upon the cornea or applied in the form of ointment.

Protection:—It should be very judiciously prescribed. It is either afforded by smoked glasses or by bandage or by green-shade. In cases of superficial ulcers with profuse discharge, bandage is always contraindicated but in cases of perforation or threatened perforation, always a firm (pressure) bandage should be applied. It should be removed and replaced everytime the eye is opened for a washing and local applications. Yellow oxide of mercury ointment $\frac{1}{2}$ —1% is always used before bandaging so that no sticking of eyelashes takes place. In cases of children who generally disturb their bandages, a straight splint should be

applied to the front of the arm reaching a little beyond the elbow to avoid touching the bandage.

To check the spreading of the ulcer: If the above treatment is done faithfully, in the majority of cases prognosis is always favourable but in any case if it spreads infective focus should be destroyed either by scraping the floor and margins of the ulcer with a small sharp spoon or curette or cauterisation of that area either by chemicals or thermal cautery.

Scraping or curetting:—Of the floor and margins of the ulcer. It is done as follows:—

- (1) Wash the eye with properly sterilised saline solution.
- (2) Anaesthetise the eye with either Novocaine or Cocaine solution.
- (3) Curette or scrape with a small sharp spoon or a curette.
- (4) Again wash the eye with properly sterilised saline solution.
- (5) Drop Atropine lotion 1% and Acriflavine lotion 1/500.
- (6) Pad and bandage.

Cauterisation:—If scraping or curetting is not advisable due to deepening of the ulcers or thinning of the cornea or for any other reasons, cauterisation may be done. It is effected by Tr. Iodine, pure carbolic acid liquid, Silver Nitrate stick, platinum cautery or Galvano-cautery.

Tincture of Iodine or pure carbolic acid liquid offers a very efficient mode of disinfecting and cauterising the corneal ulcers.

How to apply Tincture of Iodine:—

- (1) Wash the eye with properly sterilised Mercury Perchloride solution 1/8,000.
- (2) Anaesthetise the eye properly with Novocaine or Cocaine but preferably by the former.
- (3) Put the speculum and hold the eye with a fixation forceps.
- (4) A sterilised swabstick is dipped into Tr. Iodine which is exposed to the air for a few seconds so that there is no excess of liquid.
- (5) It is now brushed upon the ulcer and its infiltrated margins.
- (6) After swabbing properly pad and bandage.

In cases of carbolic acid liquid, everything is done as above but in addition to them, after touching the ulcer and its margins

with carbolic lotion, it is similarly touched by a swab of rectified spirit so that the acid may be neutralised immediately. Thereafter apply pad and bandage. It is usually necessary to repeat the cauterisation a number of times on successive days.

Cautery.—In the case of actually touching the ulcer with red hot cautery, all the above steps are to be followed with due modifications. After usual preparation and fixation of the part, the cautery is made red hot by putting into the flame of a spirit lamp and is then rapidly touched to the ulcer for a very very short period so as to avoid perforation and the conduction of heat to deeper parts. Thereafter, atropine and acriflavine lotions are dropped—pad and bandage. This can be attained by a bulb-shaped platinum cautery which is a better instrument and affords easy handling. In cases where galvano-cautery is used, the steps of operation are further modified:—

- (1) After careful and proper preparation of the part, it is thoroughly anaesthetised.
- (2) Stain the ulcer with Fluoresceine 2%.
- (3) Apply the cold electrode upon the part to be cauterised and then the connection is made so that burner becomes a deep red colour.
- (4) After this, quickly break the connection, but if it is not done—the electrode already heated may be rapidly applied to the parts like a platinum cautery. Margins of the ulcer particularly are cauterised in this manner taking all precautions to prevent perforation and the conduction of heat to the deeper tissues.

Paracentesis.—This is another very important and valuable measure in our armamentarium for the treatment of ulcer cornea especially when other measures have failed. It is generally indicated in cases of threatened perforation and hypopyon. It is very beneficial even in cases where there is no danger of spontaneous perforation. The flushing out of lymphatic spaces due to the temporary lowering of pressure after paracentesis often starts the healing process in most intractable ulcers. This operation is generally done with a paracentesis trocar which is provided with a thick shoulder to prevent the instrument from penetrating too far or with a keratome or if nothing is available with a cataract knife. After thorough washing and proper anaesthetisation of the eye, the speculum is applied and the eye ball is fixed with a fixation forceps. The instrument is passed perpendicularly through the cornea near its lower margin unless the situation of

the ulcer requires another site. As soon as its point is in the anterior chamber the handle of the instrument is depressed and the knife or trocar whatever it may be pushed on horizontally avoiding injury to the Iris or lens until the incision is about 3 m.m. long. Thereafter, it is slowly withdrawn giving pressure on the posterior lips of the wound so that the contents of the A.C. may be evacuated gradually. Sometimes, it is necessary to repeat the operation or to reopen the wound with a probe daily until the ulcer cleanses itself.

Sarnisch's operation:—This is practically out of date now as in majority of cases, either paracentesis or cauterisation has been found quite sufficient but, in some cases of severe forms of serpiginous ulcers, it has been of much use. It is a very easy operation. Its chief idea is to split open the ulcer. It is done with a cataract knife which is thrust through clear corneal tissue 1 or 2 m.m. to the outside of the ulcer, made to traverse the anterior chamber, and brought out 1 to 2 m.m. to the inner side of the ulcer. The edge of the knife is directed forward and the ulcer is split through its centre and hypopion removed.

In all cases of operation etc., surgical cleanliness should always be strictly observed. After main operation Atropine and Acriflavine lotions are dropped—pad and bandage. Perfect rest on bed is the key note.

In cases of spontaneous perforation of an ulcer, 1% atropine is instilled after properly cleaning it—pad and a pressure bandage is applied. The patient is confined to bed to have perfect rest.

If there is a recent prolapse of the Iris, the latter is freed from adhesion to the margins of the opening and then excised. In no circumstances the prolapsed Iris should be replaced. In cases of prolapsed Iris which has existed for some days—must either be allowed to remain in that very position or very carefully cauterised with a cautery. In either case, Atropine drop and pressure bandage should be done.

After-treatment.—As soon as regeneration has started i.e., healing process has become fairly initiated—some mild irritants must be used to have stimulating effect. These are Dionine lotion (in the beginning 1% should be used; later on the strength may be increased to 3 or 4% gradually.) Yellow oxide of Mercury ointment. In cases of superficial ulcers, which are sometimes very intractable to heal, sub-conjunctival injections of saline or Dionine may be of great help. To remove opacity, Dionine and Fibrolysin mixture (drop) with yellow oxide of Mercury ointment

at bed time is the time-honoured method. Sub-conjunctival injection of saline may be of great help in removing the opacities.

A note on special treatment of special ulcers—Marginal ulcers:—They are better treated with zinc sulphate solution (0.25—1%), which should be used every hour or two. In cases of recurrent attacks, it should be touched with Silver Nitrate solution. As it has gouty origin the patient should therefore be properly treated for gout.

Keratomalacia:—As it is a disease of defective nutrition both of cornea as well as of general body, treatment should be so devised as to improve the tone of both. Codliver oil massage to the skin and sub-conjunctival injections of saline are some of the hopeful methods. Eserine drop or ointment may sometimes improve the nutrition of the cornea locally.

General Treatment.—As soon as the condition is diagnosed, the patient should give perfect rest to his body and mind as well as to his eyes—refrain from doing any work which requires even a bit of straining on the eyes. Fresh air and no glare of light are the two most important things for such patients. It is an admitted fact that persons suffering from ulcer cornea have their general condition below par in majority of cases; therefore, it is necessary to improve the tone of different systems by diet, fresh air, hygienic surroundings and in the end, by purgatives and tonics.

Medicines:—Purgatives: Seidlitz powder as often as necessary for those only who cannot take calomel and Magnesium Sulphate; otherwise calomel gr. iv, Soda Bicarb gr. x at bed time followed by Magnesium Sulphate oz. iv—oz. vi in the morning every other day is the best. These purgatives depend mostly on the general condition of the patients. In cases of children, castor oil oz. ii—oz. iv or castophine tablets may be given.

Tonics: For children—Haliverol with vit. D 2–5 minims with milk twice daily after meals; for adults—Haliverol with vit. D 10 minims with milk twice daily after meals.

Ferradol may also be given. A cheap but very useful mixture which in my cases have been very successful is the following:—

R	Ferri et Quin. Citras	...	gr. iv
	Acid N. M. dil	...	℥ x
	Liqr. Cascara Sagradæ	...	℥ i
	Liqr. Arsenicalis Hydrochlor	...	℥ iii
	Tr. Nucis Vomicae	...	℥ viii
	Aqua Mentha pip ad	...	℥ i
	Mft. mist. Such 4 doses.	Sig. B.D., P.C.	

℞ Makaradhwaja with cream of milk has also been found successful.

2. *Diet*:—Light, easily digestible nourishing and devoid of condiments such as chillies, pepper, etc., should be the ideal food of eye patients. No definite food can be prescribed for all patients as the taste and varieties vary with persons of different provinces. Therefore, it is very essential to prescribe for all such eye patients non-irritating and easily digestible food. Fruits are very useful especially sweet mozambics, apples, oranges, pineapples, etc.

3. *Rest*:—It should always be emphasised that patients should have perfect rest in ideal sense so that healing must take place as early as possible. Fresh air with no glare of sun or light should be the best place for such patients. Patients must have sober habits. No drink etc. should be permitted.

4. *Injections*—Of sterilised milk have proved very useful especially in cases where the discharge has been excessive or hypopion has developed. Its dose is 1–10 c.c. according to the gravity of the case, condition of the patient, age, and sex, etc. It should be repeated on alternate days, or every third day or every six days as the case may be. Chemotherapy may also be tried. Solusepticine, Prontosil, Urea-sulphazide, Bacteriomide are a few medicines of sulphanomide group which have got good name in the market as far as staphylo—and strepto-coccal infections are concerned. But in cases of Gonococcal infection, antigonorrhœal measures may be prescribed. Non-specific protein therapy must be one of the items of treatment in Gonococcal cases also. Among the antigonorrhœal measures, gonorrhœal vaccines must be prescribed.

Treatment of exciting causes.—In all cases of ulcers, first find out the cause of ulcer and its treatment should be accorded as early as possible because, it is an admitted fact that if the cause is removed, automatically the result will disappear, so is the case here also. In cases of foreign body, it should be removed at once and the ulcer begins to heal; where trachoma or granular lids are the leading causes, immediate treatment of these two conditions must be started together with the treatment of ulcer cornea. Dacryo-cystitis, Herpes and other infective conditions, should at once be attended to. In cases of ophthalmia Neonatorum and gonorrhœal ophthalmia, treatment of gonorrhœa or its complications should be started immediately to avoid disaster.

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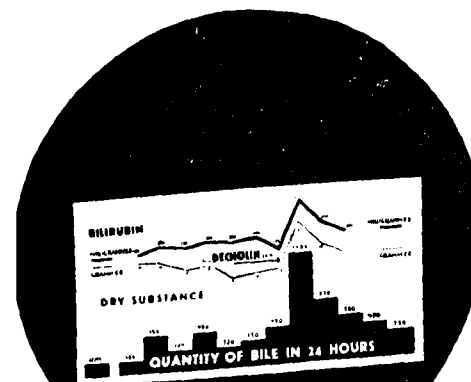
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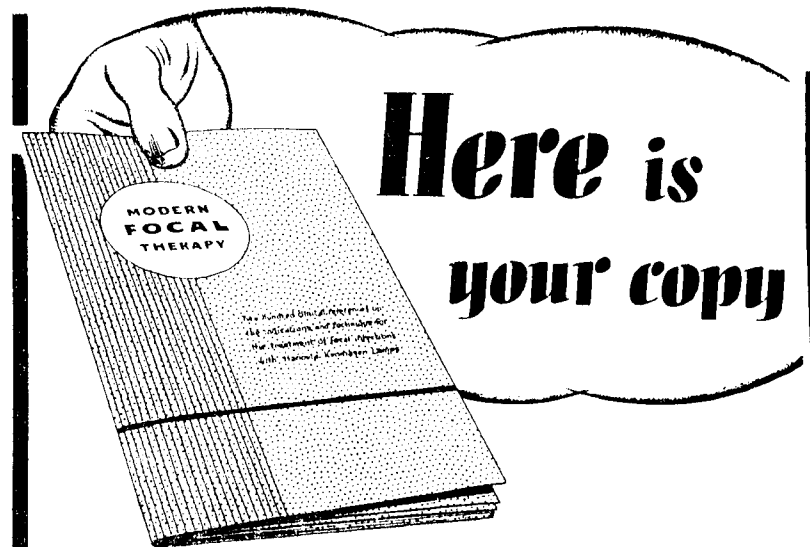


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Introductory.—Before one could proceed with the treatment of a condition, it is necessary to exactly appreciate the modern conception of the possible aetiological factors, and the pathological findings and if possible, also to assess the amount of damage.

Diabetes is a condition where there is clear evidence in the metabolism, primarily of the carbohydrates and secondarily of the fats and proteins also. There is persistent hyper-glycaemia and also glycosuria. Normally, there is always some amount of hyper-glycaemia after the carbo-hydrate meals but the concentration of sugar in the blood is not enough to be thrown out in the kidney filtrate. But, if the percentage goes beyond 0.15 to 0.18% all the sugar in the kidney filtrate is not re-absorbed and there is glycosuria. In conditions of hyper-glycaemia, in order to dilute and to bring down the concentration, nature creates a craving for more water and there is set up a polyuria. There is re-absorption of sugar along with other soluble substances needed for the economy of life and it is quite possible that some amount of sugar is excreted. The absorbed sugar being more in quantity than normal lends to prolong the hyper-glycaemic condition. Sugar is not an excretable product and its leakage, if permitted to go on for any length of time, is surely a menace to the system, even in the very rare condition of 'Renal Glycosuria'; there is, almost invariably, a chronic renal damage becoming evident in the long run. Sir Langdon-Brown's statement that 'Hyper-glycaemia without glycosuria has no damaging effect' (Medical Annual, 1937), is only true up to a point. If the hyperglycaemia is only a temporary condition, as after meals and is not beyond the threshold of the kidney, it is only a normal affair but in the advanced diabetes with definitely increasing albuminuria there is persistent hyper-glycaemia much beyond the normal threshold and there may be no glycosuria. The normal physiology of glucose metabolism is its constant utilisation by the tissues producing heat-energy and the supply is kept up by the circulating blood, carrying glucose principally from the storage in the liver and rarely from muscle glycogen.

Need of glucose in the system is essential and practically all varieties of food, particularly in times of need, contribute to its production. For the proper utilisation of glucose the internal secretions of the pancreas and the pituitary have been proved to be essential factors. Insulin, the pancreatic hormone, induces storage of sugar in the liver, a ferment glycogenase polymerising it to glycogen and metabolism of the sugar by the tissues is carried on also by insulin being activated in the liver—"the insulin-kinase" (Hindworth, *Clinic. Sc.* 11, 1933), utilising glucose in the muscle work converting it to lactic acid to H_2O & CO_2 , liberating heat energy. Insulin stimulates glycogenesis and an anterior pituitary hormone induces glycogenolysis—"the sugar-raising hormone" (Jensen and Evans, *Phys. Rev.*, 14, 185, 1934). The anterior pituitary and the adrenal cortex play a great part in the general metabolism of the tissues (Joslin's *Diabetes*, pp. 94, 1937).

Macleod in his *Hexter Lectures* (Bull. Johns. Hopkins. Hosp., 1934, 79) stated that there was a diabetogenic centre in the anterior portion of the pons, which acted through the parasympathetic pathway, stimulating glycogenolysis and inhibiting the secretion of insulin, both tending to produce hyperglycæmia. Hyperglycæmia stimulates secretion of insulin but the quantity of insulin is controlled by the pituitary and possibly by the adrenals through the sympathetic pathway.

Deficiency of insulin is the primary factor in the occasion of the condition of the diabetes mellitus and it may be due either to a congenital insufficiency of the insular tissues in the pancreas or to a damage in the pancreas by some diseased process. There is no evidence in the postmortem findings about any marked changes in the diabetic centre or in the pituitary but injury to the brain, like the Claude Bernard's puncture in the fourth ventricle, does produce glycosuria. Hyperpituitarism or hyperthyroidism have been attended with glycosuria. Then again, the question of exhaustion of the pancreas by persistent over-use, specially in those who have lived on very high carbohydrate diets and had consumed a lot of sweets, is a factor to be thought of, as the condition is more prevalent amongst the eastern people, the Americans, specially the Jews. The factor of nervous strain, anxiety, worry, producing a definite depression in the entire nervous system has been responsible for precipitating glycosuria.

The experimental observations on the "Houssay dogs" (dogs deprived of both the pancreas and pituitary) have proved this fact that a depancreatized diabetic dog may be able to utilise

some glucose and may be made to like a normal one with proper doses of Insulin, so long as his adrenals and pituitary are intact, but removal of either or both would stop all carbohydrate metabolism. In fact the glycogenesis under insulin and glycogenolysis under pituitary being both absent, the blood sugar gradually goes down and may occasion hypoglycæmia. Even with glucose and insulin such doubly-operated animals could not metabolise sugar in the tissues. (Joslin's *Diabetes*, pp. 94; Cruickshank: *Am. Jr. Phys.*, 90, 332, 1920). Another striking observation made in the depancreatized dog was the evidence of fatty infiltration and fatty degeneration of the liver (Allen, Bowie, Macleod and Robinson, *Brit. Jr. of Exp. Path.*, 5, 75, 1924) but it could be prevented by the supply of raw pancreas or lecithin or even cholin or betaine (Best, *Ann. Ins. Med.*, 7, 145, 1933) showing that the pancreas or more properly the insulin plays an important part in the metabolism of the fats also.

Normally, only the carbohydrates are converted into sugar and also the glycerol of the fats, if not utilised otherwise but the proteins are not usually called upon. If, however, sufficient amount of carbohydrates are not taken, as so often happens in starvation or in diseased conditions, certain amino-acids, capable of being converted, are metabolised as sugar for the needs of life. In diabetes, however, in spite of a high blood sugar, there is this abnormal process evident that nearly 50% of the amino-acids are regularly converted into sugar and add to the burden. (Lusk, *Nutrition*, pp. 652, 1930. Grafe: *Metabol. Dis. & Trt.*, pp. 294, 303, 1934.)

TREATMENT.—Once a patient comes with a history of sugar in the urine, it is desirable to confirm the diagnosis by estimating his blood sugar. It is also necessary to assess his tolerance. In order to do this, the patient should be put on a particular diet, the total glucose yield of which is known. After at least three days on such a diet the patient should be instructed to collect his twenty-four hours' urine and to get a record of the total quantity passed and the percentage of sugar estimated. This will enable us to estimate his carbohydrate tolerance. Once the diagnosis is confirmed the treatment would primarily depend upon the individual merit of the case, the duration of the condition, family history, his glucose tolerance, presence of obesity or otherwise, and any other possible ætiological factors. (Of these, obesity would demand special attention regarding both diet and exercise. A history of syphilis, acquired or hereditary, would of

course have to be adequately treated. The principal deficiency is in the output of insulin and this deficiency may be congenital or induced by disease, degeneration or decay in the pancreas. It is no use wasting time and money by the use of drugs. After assessing the tolerance, one could easily find out if a diet, with sufficient energy to meet his individual requirements, could be given within the range of his tolerance. "The degree of success which a permanently watchful dieting ensures largely depends on the mentality of the patient as also on the severity of the disease." The patient should be taught the general nature of the metabolic disturbances in the disease and the principles underlying its treatment. Any intelligent person could soon pick up the principles in dieting for himself from any of the books on diet and it really does not require an expert dietician to help him at every step. An 'Exchange' list could easily be prepared to help in altering and modifying his diet, thereby allowing considerable variety of diets, so essentially necessary for inducing healthy appetite and a real craving particularly for those who have to be rather on a restricted list for probably all time to come.

Nixon (*Practitioner*, 195, Jan. '25, 1934), one of the early advocates of a higher carbohydrate diet for diabetics, believed that before long they would be dieted just like anybody else. They could eat the ordinary food of the family, but the quantities must be more exactly measured. Only a decade ago people used to advocate diets of low carbohydrates and higher fats and proteins. Since then a lot of work and experience have so far established the fact that excess of fats is positively injurious for the diabetics, as not only the efficiency of the pancreas will be over-strained but will also lead to arteriosclerosis and fatty-infiltration in the liver, thereby markedly reducing the efficiency of the main organs of the metabolism, pancreas and liver.

1. Naunyn Era (1898-1914)—Fat was practically unlimited in the diet and carbohydrates kept very low—the result being that 60% of the patients died of coma. The average expectation of life amongst the rest was, however, higher than before.

2. Allen Era (1914-22)—Total calories low, carbohydrates less and fats high. Death from coma came down to 40%. The average expectation of life was higher still.

3. The Banting and Best Era (1922-38)—Use of insulin has led to higher intake of carbohydrates as also the total calories and the fats definitely cut down to the average normal. Death from coma has come down to 6-7%. Complications are less and possibly the expectation of life definitely advanced.

It is now the general consensus of opinion that in fixing up a diet for a diabetic it should not be the sole aim to cut down the carbohydrates to any great extent. We would rather give him more carbohydrates, even with insulin, than a lot of fats and proteins, both of which not only cost more and involve more work for digestion and assimilation but at the same time, would produce many a product in their intermediate metabolism, some of which, unless carried to the final stage of digestion and utilisation, would cause definite harm to the tissues. Some of the amino-acids and nucleotides and the aceto-acetic, and hydro-xi-butyric acids are all toxic bodies, the latter two being mainly responsible for the occasion of diabetic acidosis or coma. Glucose is unquestionably the best of the food products to deal with and economically too it should be the principal item of food.

Dietetic therapy.—In the earlier stage of the condition simple dietetic control proves quite sufficient and a diabetic with a little attention and personal sacrifice should be capable of keeping himself aglycosuric throughout. It should be the aim to provide him with an adequate and palatable diet and at the same time to keep his blood sugar within normal limits, that is 90-100 mgms. per 100 c.c. of blood during fasting and up to 150-160 mgms. after his principal meals. A diabetic should learn to test his own urine for sugar and acetone bodies and should also possess a list of diets, providing the carbohydrate contents of the commoner food-stuffs, so that he could make variations with suitable exchanges. It is apparent that the number of calories required for individuals will vary according to the age, sex, weight, height and particularly the activities of each in his daily routine work. A hard working lean person would naturally require more calories than a stout short person of sedentary work. The diet should not only be sufficient to maintain his weight but also contain the essential proteins and the vitamins as well. For obese persons it were best to cut down the calories by at least 20-30% and a more strict restriction to fats in the diet.

As already stated, it has now been accepted that our diabetics do better if their diet is not quite so rigorously restricted (Gray & Sansum, *Jr. of Am. Medl. Assn.*, 1933, May '20, 1580; Dunlop & Pybus, *Ed. Medl. Jr.* Vol. XLV., p. 418, 1938). It is a fact that after a period of low carbohydrate diet, injection of glucose leads to a much higher and more prolonged rise in the blood

sugar than is the case when the subject had been taking a higher carbohydrate diet (Macleod, Bull. Johns Hopkins Hosp. 1934, 79). Glucose is indeed a stimulus to the pancreas and the rise of sugar level after a meal induces more insulin secretion leading to storage and utilisation. As a general rule, a diabetic diet should have the minimum of 100 grms. of carbohydrates per day, the more, the better, where possible. We know that in a diabetic, where the glucose in the blood is not being utilised, there is curiously an abnormal metabolism of about 50% of the amino-acids capable of being converted into glucose, which contribute to form an extra amount of glucose. The intake of proteins must be enough to maintain the nitrogenous equilibrium, i. e., the quantity should at least be $6.5 \times$ the average daily excretion of N—the daily tissue wear and tear. Taking 10 grms. as the average output of N of an Indian, the minimum quantity of proteins would be 10×6.5 or 65 grms. Thus the diet to yield 2000 Calories should be :

100 grms. of C + 65 grms. of P + X grms. of F = 2000 cal.

Therefore $X = \frac{2000 - (100 \times 4.1 + 65 \times 4.1)}{9.3} = 145$ grms.

For 1500 Cals: $\frac{1500 - (100 \times 4.1 + 65 \times 4.1)}{9.3} = 95$ grms.

The patient is usually put on a diet of 1500 calories, the average basal need and it is to be observed how he behaves. (The weight of the patient multiplied by a factor 11.3 gives roughly his basal requirements). This diet of 1500 Calories would, according to the above calculation, consist of 100 grms. of C, 65 grms. of P and 95 grms. of F, the total glucose content of which in a diabetic would be according to Woodyatt's formula,

$G = 100\% \text{ of C} + 58\% \text{ of P} + 10\% \text{ of F}$ which comes to $100 + 36.5 + 9.5 = 145$ grms.

The twenty four hours sample of urine should be collected and measured as also the glucose content, if present, is to be estimated. If there is no sugar, the patient should be kept on this diet for a few days and then gradually some calories added daily according to the 'ladder diet' of the Edinburgh Royal Infirmary or of Graham, until sufficient calories could be given with no sugar in urine and at the same time maintaining his weight under his daily work. While going up the ladder, it is possible that his tolerance is being exceeded and then it would be necessary to add some Oralin (B. I.) or Insulin to bring him up

to the limit of his requirements. But if on a diet of 1500 calories, he is passing sugar, it would be useless wasting time to make him sugar-free by any other low calorie diet, as it would only lead to weakness, loss of weight and increasing ketosis. For one, who had no tolerance to a basal diet, it were best to give him Insulin and Oralin in such doses as would ensure complete utilisation of the excreted quota. Oralin is a phosphotungstate of Insulin to be administered by mouth, having the potency of one dram being equivalent to 5 units of Insulin. It is a non-toxic compound and is not broken down in the stomach by the hydrochloric acid of the gastric juice. In the intestines with the alkalies there, it is split up at a pH 7-8 and the liberated insulin is absorbed, at least a part of it, if not the whole of it. In the alimentary tract, owing to the frequent variations of the pH and due to the presence of a variety of foodstuffs and the secretions of the various digestive juices, the chemistry of this oral preparation may at times be interfered with and the action hindered. It should therefore be always administered on an empty stomach. Insulin, however, would act with dramatic quickness, having been injected into the tissues. The dose of insulin should be calculated on the basis of one unit being sufficient to burn 2—3 grms. of glucose and this dose to be administered half an hour before his principal meals. If, however, the newer product, protamine-insulin or protamine-zinc-insulin, is used the patient should be given the entire dose in a single injection. With such a dose the patient will at first be free from ketosis and then from glycosuria. Carrying on this diet and the same dose of insulin for some days, would invariably enable us to increase his diet little by little, without increasing the dose of insulin. But to come to a working diet it may be necessary to increase the dose of insulin to maintain him sugar-free. The hyperglycæmia, that was putting a great strain on the pancreatic islets to put in increasing doses of endogenous insulin having disappeared under insulin therapy, would naturally lend some relief to the over-worked cells to recoup or to reconstruct, if possible. "It is then often found that the pancreas, having been rested, has reacquired a good deal of its functional capacity and the dose can sometimes be reduced and occasionally dispensed with altogether. It is a common fallacy to suppose that insulin once started will invariably be permanently required" (Dunlop and Pybus, Edin. Med. Jnl., Vol. XLV, p. 419, 1938).

For the benefit of the patients, a few specimens of diets are given below :

A Basal Diet of 1500 Cals :—

Carbohydrates	110 grms.	440	Cals.
Proteins	65 "	266.5	"
Fats	88 "	818.5	"
Total		1525	Cals.

The above diet may be distributed as follows :—

Articles of food.	Quantity.	Grm.	per.	oz.	Cals.
		C.	P.	F.	
Bread	4 oz.	18	3	0	300
Eggs	2	0	3.9	3.3	90
Meat	4 oz.	0	6	2	114
Butter	2 oz.	0	0	24	446
Milk	20 oz.	1.2	1.3	1	380
Vegetables & Fruits	1 oz.	2	0	0	64
Oatmeal	1 oz.	19	3.6	1.7	86
Total Cals.					1480

Acidosis Diet of about 1500 Cals :—

Indian :	Quantity.	Cals.
Rice or Atta	4 oz.	416
Fish	2 oz.	80
Eggs	2 oz.	90
Vegetables 5%	8 oz.	160
Fruits 10%	5 oz.	200
Milk	16 oz.	304
Ghee	$\frac{1}{2}$ oz.	130
Oil	$\frac{1}{2}$ oz.	130

Total Cals. 1510

European :	Quantity.	Cals.
Oatmeal	2 oz.	138
Bread	8 oz.	488
Butter	1 oz.	225
Fish, boiled	4 oz.	80
Chicken stewed	4 oz.	196
Boiled Vegetables 5%	4 oz.	84
Raw Vegetables 5%	2 oz.	44
Milk	12 oz.	228

Total Cals. 1483

A Working Diet of about 2700 Cals :—

Indian :	Quantity.	Cals.
Bread from Atta	4 oz.	400
Rice	2 oz.	208
Egg	2 oz.	90
Goat Meat or Fish	2-4 oz.	80
Vegetables 5—10%	8 oz.	244
Fruits 10—15%	2 oz.	100
Milk and its preparations, as		
Dahi, Chhana, Khir etc.	40 oz.	760
Ghee and Gil	3 oz.	690

Total Cals. 2572

European :	Quantity.	Cals.
Articles of food.		
Eggs 2—3	4 oz.	180
Oatmeal	4 oz.	276
Bread	6 oz.	360
Butter	2 oz.	325
Bacon	2 oz.	310
Meat	4 oz.	204
Fish	2 oz.	40
5% Vegetables, boiled	5 oz.	104
2-5% Vegetables, raw	4 oz.	50
Milk	20 oz.	380
Oil Olive	2 oz.	540

Total Cals. 2769

Vegetarian Diet or V. Diet of 2000-2500 Calories :—The following diet is recommended for vegetarians :

Milk—1-1 $\frac{1}{2}$ seer, cocoanut kernel— $\frac{1}{2}$ chhatak, vegetables— $\frac{3}{4}$ seer, chapati of atta or soojee—1 chhatak, or 2 oz., dal— $\frac{1}{2}$ chhatak, chhanna—1-2 chhatak, ghee or butter—1 chhatak.

Vegetables and Fruits yielding only small quantities of sugar, 2.5% :—Cabbage, cauli-flower, jhinga, ucchey, lettuce, cucumber, asparagus, marrow, gourd, country beans, all kinds of greens, as tomatoes, pesto, almond, blackberry, jamrool, green papaya, cocoanut milk.

Vegetables and Fruits having higher sugar contents, 5.10% :—Carrots, turnips, beet, green plantain, onion, fresh beans, oranges.

rose-berry, peaches, lichies, apples, maspati, cocoanut, pomegranates green, jackfruit.

Vegetables and Fruits yielding still higher amount of sugar, 10.20%:—Peas, pears, potatoes 20%, bananas, mangoes, jack fruits, grapes, dates, raisins.

The following list will enable one to modify his diet by choosing suitable "exchanges":—

The quantity in each item would yield 5 grms. of sugar.

Biscuit (plain)	$\frac{1}{4}$ Ounce.	Milk	$3\frac{1}{2}$ Ounces.
Bread	$\frac{1}{2}$ "	Oatmeal	$\frac{1}{4}$ "
Force	$\frac{1}{4}$ "	Rice or	$\frac{3}{4}$ "
		Tapioca (dry)	$\frac{1}{4}$ "

Vegetables:

Beetroot	2 Ounces.	Parsnips	$1\frac{1}{2}$ Ounces.
Carrots	4 "	Peas (green)	2 "
Haricot Beans	1 "	Peas (Dried)	1 "
Leeks	4 "	Potatoes	1 "
Onions	6 "	Tomatoes	6 "
		Turnips	7 "

Fruits:

Apple (Raw)	$1\frac{1}{4}$ Ounces.	Grape	$1\frac{1}{2}$ Ounces.
Apple (stewed)	4 "	Greengage	$1\frac{1}{2}$ "
Apricot (fresh)	3 "	Melon	$3\frac{1}{2}$ "
Banana	1 "	Orange	2 "
Blackberries	3 "	Peaches	2 "
Cherries	$1\frac{1}{2}$ "	Pears	2 "
Currants	$3\frac{1}{2}$ "	Prunes	1 "
Gooseberries	2 "	Plums	2 "
Grape Fruit	$3\frac{1}{2}$ "	Raspberries	3 "
		Strawberries	3 "
		Chestnuts	$\frac{1}{2}$ "

The following contain little or no carbohydrates:

Asparagus	Gooseberries	Spinach	Soda Water
Cabbage	Marrow	Rhubarb	Meat Extract
Cauliflower	Lettuce	Water cress	Clear Meat or
Celery	Mustard and cress	Tea and Coffee	Chicken Soup
Cucumber	Radishes	Lemon Juice	Saccharin
Salt	Pepper	Mustard	Vinegar

The following portions contain about 7 grms. proteins and 7 grms. fats and may be exchanged one for the other without causing any real difference in food values:

Meats:

Beef	1 Ounce.
Lamb	1 "
Mutton	1 "
Pork	1 "
Veal	1 "
Tripe	$1\frac{1}{2}$ "
Ham	$\frac{3}{4}$ "
Goat	1 "
Pigeon	$1\frac{1}{4}$ "

Fish:

Rohi	$1\frac{1}{2}$ Ounce.	} + $\frac{1}{4}$ oz. of Butter.
Hilsha	$1\frac{1}{2}$ "	
Chingree	$1\frac{1}{2}$ "	
Vetki	$1\frac{1}{2}$ "	
Salmon	$1\frac{1}{2}$ "	
Sardines	$1\frac{1}{2}$ "	
Mackerel	$1\frac{1}{2}$ "	
Mangur	$1\frac{1}{2}$ "	

The following portions of Fats contain about 5 grms:

Cream	$\frac{1}{2}$ oz.	Butter	$\frac{1}{5}$ oz.
Mustard oil	$\frac{1}{4}$ oz.	Ghee	$\frac{1}{6}$ oz.
Olive oil	$\frac{1}{6}$ oz.		

Insulin Therapy:—Early cases of glycosuria or the senile glycosuria would require only a little restriction of diet. They will replace their sweets by saccharin and restrict their carbohydrates a little. With the rice-eating Indians rice is digested very soon and wholly, the sugar is also absorbed very quickly and the sudden rise of blood-sugar after a rice-meal may at times exceed the kidney-threshold. It is better for such subjects to avoid rice for some time and take 'atta' or flour bread, *chappati* or *luchi* instead and after a time it is possible that they would be able to have a mixed carbohydrate dish of rice and bread. Most of the advanced cases would require Oralin or Insulin or both in order to have a working diet and to be free from sugar. I have found that a combined treatment of both Oralin and Insulin is of distinct advantage. The soluble Insulin would bring down the hyperglycæmia within half to two hours and then Oralin, if simultaneously exhibited, would carry on the work and keep the blood sugar level within a reasonable range. A patient requiring 25 units of Insulin (for those passing out 50 to 60 grms. of sugar in 24 hours) may receive two teaspoonfuls of Oralin early in the morning and an injection of 20 units of Insulin half an hour before his lunch or 20 units of protamin-zinc insulin half an hour before his breakfast. In the evening he should get another two teaspoonfuls of Oralin half to one hour before his dinner. In such a regime there is little or no risk of the occurrence of hypoglycæmia. For cases with acidosis or infection, some amount of soluble Insulin should always be

administered along with the insoluble new product. Soluble Insulin acts more quickly and the action may be continued by the slowly absorbed protamin-zinc insulin.

The relative merits of the Insulins are given below:

Types of Insulin.	Duration of activity.	Advantages.	Disadvantages.
Soluble Insulin.	½ hr. to 3 hrs.	Constant in effect, invaluable in Coma, available in many strengths.	Effect transient, multiple doses often needed, liable to produce hypoglycaemia more frequently.
Protamine Insulin or Insulin retard.	1 to 8 hrs.	More prolonged effects, less number of doses required. Risk of hypoglycaemia more.	Effect sometimes erratic, occasional severe hypoglycaemia. Large doses are often very bulky.
Protamine Zinc-Insulin.	8 to 20 hrs.	Still more prolonged effect, a good dose will often control even a severe case with one injection.	Effect at times erratic, at times sudden absorption produces unexpected and very prolonged hypoglycaemia. Large doses are bulky.

We have been using the newer stuff, Insulin-retard and prot-zinc-Insulin for some time and it is our experience that the newer stuffs do not seem to be producing any marked effect within a short time and the patients are not at all impressed and feel encouraged to continue. In one of my cases there was hypoglycaemia of a mild type about 11 hours after the injection. We would still stick to the old soluble insulin, if necessary with Oralin.

Treatment of Diabetic Coma and Sepsis.—A diabetic if left untreated or half treated by erratic courses of treatment with or without Insulin becomes liable to the risks of sepsis or coma more frequently than those under control by treatment. Persistent hyperglycaemia, deferred metabolism of sugar in the tissues, the abnormal metabolism of proteins and the consequent loss of tissue-repairing materials and above all the acidosis occasioned by the presence of the incompletely oxidised acetone bodies make the tissue vulnerable to the attacks of pathogenic organisms and at times may precipitate coma.

When coma sets in the condition is more than mere acidosis, and the success depends on how early after the onset, the patient comes under the treatment. There is usually a condition of paresis of the nervous control, failure of tone and vitality of the entire systemic units, vascular, nutritional and metabolic. For such a crisis it has been found necessary not only to administer insulin but to use it in regular short intervals and sometimes in incredibly large doses and at the same time giving plenty of glucose intravenously, intramuscularly and with rectal saline. It has been pointed out by repeated postmortem examinations that patients dying of diabetic coma have plenty of insulin in their system. It is then evident that this insulin proved useless and one could infer that either the acidotic condition or else the toxæmia of sepsis somehow altered the character or the potency of this insulin or else the insulin activator was inhibited. The administration of insulin in such a condition as coma or sepsis is not only to burn up the excess of sugar in the blood and mopping up of the acidotic condition but also to act as a sharp whip to the sympathetic system in order to stimulate the drowsy cells to wake up from the slumber. The simultaneous administration of glucose is demanded to get it metabolised in tissues by the insulin and specially so, as it may be quite possible that in such a state the circulating glucose might not be in the proper chemical configuration for utilisation. The increased and repeated stimulus of such a magnitude is really called for and failure to realise the gravity of the situation and boldly meeting the crisis will mean disaster and has been responsible for many a fatality and many a loss of useful limb. The condition of collapse and vasomotor paresis have to be dealt with by the administration of saline transfusion with adrenalin and atropine. Camphor, grs. 2-5 and strychnine, gr. 1-50 given alternately would materially help. Hot air-bath and friction of the skin, gently carried out, are useful adjuncts. Usually there is scanty urination and to stimulate the kidney function, pituitrin 1 c.c. along with the saline is effective in raising the pressure-head of the kidney circulation and inducing diuresis. If possible, the blood should be examined not only for sugar or acetone bodies but also for the alkali reserve or the CO₂ combining power and although insulin should be found sufficient to meet the acidosis of diabetes, the administration of sodi-bicarb along with the saline transfusion (dr. 1 to a pint) is sometimes of distinct advantage in neutralising some of the abnormal acids in a condition like this as also to serve as an alkaline diuretic and to restore the alkaline reserve as well.

The Treatment of Diarrhoeas in Infancy and Childhood

BY

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CONFRONTING a case of diarrhoea, before chalking out any line of treatment, one has to decide whether it is due to a feeding defect or to an infection. Diarrhoea may be one of the manifestations of a malady, the seat of which lies outside the alimentary canal *e.g.*, otitis media, pyelitis or measles. The primary malady then should receive adequate attention. Amoebic and bacillary cases should be treated with their specific remedies. The treatment of typhoid or tubercular diarrhoea is in most cases the treatment of the disease itself except when the symptom assumes serious proportions.

Infective Diarrhoea.—It comes as a bolt from the blue and is characterised by intense dehydration, collapse, toxæmia and fever.

Objects in treatment :—

- I. Prevention.
- II. General Hygienic Measures.
- III. Specific *e.g.* phage.
- IV. Symptomatic :
 - (1) Treatment of vomiting.
 - (2) Reduction of the frequency of stool.
 - (3) Supplying the fluid loss.
 - (4) Treatment of toxæmia.
 - (5) Treatment of collapse.

V. Dietetic.

I. **Prevention.**—In spite of the fact that food and water-borne diseases are the easiest to control, it is unfortunate that the greatest toll on infant life is taken by these diseases. The reasons are not far to seek. They are the Socio-economic condition of the people, their ignorance of the general laws of health and cleanliness and, last but not least, the apathy of the State and Municipal Corporations. It should be borne in mind that the greatest incidence and mortality of infantile diarrhoea is in infants under 1 year and the worst subjects are the artificially

fed, premature and ill-nourished ones. Special care is, therefore, needed in their management. The Obstetrician and the pediatrician must join hands and greater attention must be paid to nursery hygiene. Milk should never be given unboiled to the infant and weaning should be done gradually and better not in hot weather. In fact, the establishment of child health and welfare centres in cities and villages with propagation of the knowledge of infant feeding will do a great deal in minimising this scourge. The modern tendency of the fashionable women not to nurse their child should be highly condemned and breast feeding should be encouraged on all hands as by far the superior method unless grossly contra-indicated.

II. **General Hygienic Measures.**—Here again cleanliness and aseptic nursing are essentials to success. The nurse must be conscientious and should have an insight into the needs of the child. The child should be kept warm, napkins should be changed frequently to prevent excoriation of the buttocks and care should be taken of the mouth and skin. Regularity in feeding and perfect cleanliness of the utensils are to be observed.

III. **Specific.** Really speaking, there is no treatment which can be called specific. The result of phage treatment, in gastrointestinal disorders is not convincing. It is not uniform and sometimes of doubtful utility. In different epidemics of Infantile diarrhoea, different organisms have been found to be predominating. In the absence of specific antitoxic sera, Bacteriophage seems worth a trial. In order to be effective, the phage should be lytic against all organisms which have their habitate in the intestines or are likely to gain entrance and flourish in the intestines.

IV. **Symptomatic.**—1. Vomiting prohibits the supply of fluid by mouth and is very exhausting. Success sometimes attends the simple procedure of giving frequent small feeds. Gastric lavage is, of course, the method of choice if the above technique fails, but in collapsed patients this cannot be undertaken. Drugs are of no help but small repeated doses of Calomel or Hydrarg cum creta have been recommended. Gastric sedatives and application of mustard plaster over the epigastrium sometimes do good.

2. This is sometimes indicated when the dietetic measures fail to bring about the desired improvement, when the condition itself is very exhausting and the stools are nothing but serous exudations. Eldoform is quite good for the purpose

since it contains tannic acid and yeast. Its good effects are partly due to the Vitamin B, which is contained in yeast. Similarly $\frac{1}{2}\%$ tannic acid may be given as enema or some other astringent silver preparation may be used if at all necessary.

Opium has a very limited application in the therapeutics of children excepting when straining or colic is a factor and in lenteric diarrhoea. The use of other known astringents *etc.*, Bismuth, Chalk etc. is rarely, if ever, called for.

3. About 70% of the infant at birth is constituted by water. This shows how important it is to maintain the supply of fluid. The loss of fluid brings in its train stagnation or slowing of circulation due to increased viscosity of blood, diminished renal activity and accumulation of waste products in the tissue and when the volume is so diminished that the blood pressure falls below the critical level glomeruli fail to act and anuria sets in.

Enough fluid cannot be given by mouth or per rectum for obvious reasons. The subcutaneous route is the one easily employed and 5% glucose in normal saline is used in amounts 100—120 c.c., every 6 hours if thought necessary. The other routes are intramuscular, intraperitoneal and intravenous. Tympanites precludes the intraperitoneal method.

The fact that the anterior fontanelle is open in infants is taken advantage of and large amount of fluid can be pushed through this side directly into the sinus. Continuous intravenous therapy (Venoclysis) is the best means at hand to supply the fluid. The method is elaborate and requires trained staff to carry it out. About 130 c.c. of fluid per kilogram of body weight is supplied in 24 hours and this is continued until the intoxication is relieved, diuresis starts and the child can take and retain $\frac{2}{3}$ — $\frac{3}{4}$ of its fluid requirements by mouth. Hypertonic saline may be introduced just as in the case of cholera in adults. The fluid is thereby retained for a longer time and the blood volume maintained.

4. The treatment should be directed towards promoting diuresis:—Dehydration is not the only factor since cases receiving the required amount of fluid also show signs of toxicosis. There is no means known at present to combat this. Bowel wash with normal saline also helps in the elimination of toxins. Adsorbents are useful in this connection. Colloidally precipitated Kaolin is perhaps the best since its fineness offers the greatest

surface area for the adsorption of the toxin. Apple pectin is also known to be beneficial as adsorbent. Acidosis should be treated by glucose and sodi-bicarb.

5. This consists in keeping the patient warm and the supply of diffusible stimulants, *e.g.* Rum, Cardiazol, Caffeine, Sodi-Benzoes, Adrenalin are given as injection as often as is necessary. In urgent cases, mustard bath may be necessary.

V. Dietetic.—The dietetic regime alone is sufficient in most cases to bring about the desired result. In designing any diet, several points must be kept in mind. We must, on no account, forget that we are dealing with growing infants in whom it is always a danger to curtail the Caloric requirements for a long time. This has been fixed as 110 C. per Kgm. in the first quarter, 100 C. per Kgm. in the second quarter and 90 C. per Kgm. in the second 6 months. The protein requirement of 2 grammes per Kgm. of body weight must be supplied to replenish the tissue waste and to supply the building stones. The food should leave no solid residue and it should not ferment. Infants stand dehydration very badly and even if they are kept on starvation, the fluid requirement of 2—2½ oz. per pound of body weight must be supplied by all means and they must be kept warm to prevent radiation of heat from their relatively large body surface.

It is important to note the effect of the constituents of the diet on the alimentary tract. An increase of protein makes the stool firm and alkaline. An excessive intake of carbohydrate produces loose stool whereas a high fat diet tends to aggravate the persisting condition.

1. FOUR PHASE DIET:

1st Stage:—Starvation.

2nd Stage:—Cereal diet.

3rd Stage:—Modified milk diet.

4th Stage:—Maintenance diet.

1st Stage:—Starvation is not absolute. The required fluid intake is to be maintained as calculated from body weight. Sterile water, sweetened water or weak tea is supplied. The upward limit of duration of this stage is 12 to 24 hours. The patient is kept warm to prevent heat loss and the sweetened water, if given, supplies to some extent the Caloric requirement. The idea is to stop the source of infection or noxious exciting element in the diet. The offending organism is thus deprived of its pabulum for favourable growth.

2nd Stage :—Barley water, rice water or oat water is given with added Carbohydrates in the form of 3-5% sugar. For all practical purposes, cane sugar is the best. The value of this diet lies in the fact that it is easily digested, supplies the energy requirements and what is more, spares the protein. The percentage of sugar can be increased to more than 10 per cent as infants have a greater tolerance for carbohydrate. The water-retaining property of carbohydrate helps in the gaining of weight. This diet ferments less. The duration of this stage is variable and depends upon the clinical improvement of the patient as manifested by change in facial expression, character of the stool, gain in weight and interest taken in the surroundings. The worse the nutritional condition to start with, the more severe the infection, the longer is the duration. Long continued feeding on excess of starch leads to a condition of malnutritions exhibited by atrophy, Hypertonia or hydraemia (hunger oedema or nutritional oedema).

3rd Stage :—Butter milk, Lactic Acid milk or Protein milk forms the basis of diet in this stage. The step ladder scheme of Finkelstein is followed since it takes into consideration the gradual return of function to the intestine after the acute catastrophe caused by the storm of infection. All the feeds of the second stage are gradually replaced by one of the three modifications mentioned above. The value of acid milk lies in the fact that it lessens the buffer value of milk: in other words, the neutralisation of the acid in the gastric juice is less. The acid antiseptic barrier of the stomach is raised and more acid is available to act on the protein of the milk. Indeed, it actually stimulates gastric secretion. Lactic acid forms fine precipitate and lactic acid milk can be given without dilution so that large amount of nutrition can be supplied without increasing the volume of the feed. Moreover, a greater percentage of sugar is tolerated in an acid medium. It can also be given skimmed or half cream. The special value of buttermilk is its low fat content. As to protein milk, its high protein content tends to make the stool formed. Peptonised or alkaline milks have no special advantage.

4th Stage :—The feeds of the former stage are progressively replaced by the diet used for the age. This may be breast milk or simple or skimmed, some milk mixture—full cream or half-cream or dried milk. One disadvantage of $\frac{1}{2}$ milk is that the proportion of lactalbumin so essential for growth, which is already very low in cow's milk, is still more diluted.

Clinical experience is the only guide when to begin or when to replace the feed. The stages are not like water-tight compartments and variation or skipping is always permissible.

Whey is usually added in the second stage. It is well tolerated and provides lact-albumin in an uncoagulated state and the salts, vitamins and enzymes are preserved. Salts help to retain fluid in the tissues.

2. **APPLE DIET** :—The apple used may be raw in the form of scraping. This is useful in the early stage of the disease. Mixture of pectin and Agar-agar is used in chronic cases or where the raw apple diet fails.

3. **BANANA DIET** :—Banana powder or fully ripe fruit is used. It favourably influences the frequency of the stool and changes the flora of the intestine from gram-negative to gram-positive. This diet is helpful in Coeliac disease.

Feeding Defect in Diarrhoea.—This may be quantitative or qualitative. Both over-feeding and under-feeding may lead to diarrhoea and should be avoided. The total amount of feeds in 24 hours is calculated and the feeds are distributed equally at regular intervals in 5 or 6 meals.

The stool gives the indication as to which particular constituent of the diet is disagreeing and the principle is to modify it in one way or the other.

The treatment of fermentative diarrhoea consists in cutting off the excess of starch from the diet. Fruits and vegetables are better avoided. Diastase can act upon the starch in intact vegetable cells and may be usefully supplied.

Putrefactive diarrhoea is controlled by giving a high Carbohydrate diet. Milk is modified in such a way that the protein forms a fine flocculent precipitate and rendered easily digestible. The buffer value of milk is diminished by acidification. When bacteria are responsible for excessive putrefaction, change in the reaction of the medium should be aimed at so that alkali forming and protein splitting germs may not flourish.

Skimmed or fat-free milk and other fat-free diets control fatty and chylous diarrhoea. Some normal infants cannot tolerate the normal amount of fat in the milk and frail infants tolerate fat badly. In them, half-cream milk should be used as routine feeding.

Goat's milk has no special advantage over cow's milk except where there is hypersensitiveness to the latter and the value of ass's milk lies in its low fat content.

Chronic Diarrhoea.—The picture generally is one of malnutrition with a puffy face and oedematous legs and feet (Nutritional oedema). Most cases have been kept in prolonged periods on barley water alone. They should never be starved. The nutritional level must be raised by careful graduated progressive feeding. Astringents such as chalk, catechu, bismuth etc. are indicated. Liquid extract of Bael is beneficial. Rice-gruel, soft rice, mashed potato, boiled plantain, fish are gradually added to the diet. Vitamin therapy is useful and B₁ is specially indicated. When the diarrhoea proves intractable, blood transfusion sometimes does marvel.

Celiac Disease.—A high protein, low fat and carbohydrate diet with a supply of all the vitamins is all that is needed.

Flagellate Diarrhoea.—The only one with some pathogenicity is *Giardia Lamblia*. Stovarsol and Sulphur are the drugs used.

Enteric Diarrhoea.—Belladonna and Bromide stop the abnormally active gastro-colic reflex. Opium or Codein may be needed in some cases.

Accessory Treatment.—Accessory treatment consists in Remineralisation, Vitamin Therapy and Supply of Digestive adjuvants:—

1. *Re-mineralisation.*—Elimination of fluid is always accompanied by depletion of salts from the blood and tissues. The absorption is moreover defective due to Catarrhal condition of the bowel and the supply is apt to be cut off owing to the restricted nature of the diet during the illness. The well-known association of tetany (due to calcium deprivation) with gastric dilatation and Coeliac disease should also be kept in mind. Many of the symptoms of alimentary toxicosis may be due to a disturbance in the permeability of the intestinal mucosa caused by depletion of salts—this helping the absorption of toxins from the intestine. The important minerals are Calcium, Phosphorus, Iron, Sodium and Potassium. Their functions are too well-known to be enumerated except that phosphorus, in addition to forming bone, helps also in the metabolism of carbohydrates and fats and also in Enzyme action and the osmotic pressure in blood and tissue fluids is regulated by sodium and potassium. It is, therefore, desirable that there should be a liberal supply of the chief minerals to prevent demineralisation.

2. *Vitamin Therapy.*—The importance of vitamins in infants and growing children cannot be exaggerated. This

demand is greatly increased in gastro-intestinal disturbances and infectious diseases. The water-soluble vitamins B and C are washed out with the stool in diarrhoea and the impaired absorption and utilisation together with suspension of the usual diet leads to a poly-hypo-vitaminosis or avitaminosis. All the vitamins except D are concerned in maintaining the health of the gastro-intestinal tract and the deficiency is manifested by diminished resistance to infection through the mucous membrane, digestive disturbances and diarrhoea. It is probable that deficiency of vitamin B in mother's milk predisposes their offsprings to attacks of diarrhoea and it may be possible to diminish its incidence by a liberal supply of this vitamin in diet of nursing mothers. Defects in the secretory mechanism *e. g.* hypochlorhydria, atony etc. have been observed to be due to deficiency of vitamin B₁ in the diet. Moreover, this vitamin has been shown to have some relation with carbohydrate metabolism. This naturally leads us to think of the advisability of increasing the intake of vitamin B₁ in the diet of the rice eating population like ourselves. Infants and children should therefore have as a routine prophylactic supply of high-potency concentrated vitamin and in diseases of the gastro-intestinal tract it should be given in more than the minimal requirements. It should also be remembered that milk has a low antiscorbutic value and infants from the age of three months should receive vitamin C, equivalent to 10 c.c. of orange juice daily. Vitamin D should also be supplied if we only have in view remineralisation apart from its other effects.

3. *Supply of Digestive adjuvants.*—It is natural to suppose that an acute attack of gastro-intestinal disturbance will cause an impairment of physiological activity of the glands of the intestine as well as the adjoining glands of the digestive tube leading to defective digestion, absorption and utilisation of food-stuff. It may be advisable, in some cases at least, to use a combined extract of the glands of the intestine containing the Amylolytic, proteolytic and Lipolytic enzymes. But their use should not be continued for a prolonged period for such a procedure may lead to an atrophy of the glands due to inactivity.

Convalescence.—During convalescence, Iron, Liver and Vitamin B₁ should be used.

Treatment of Diphtheria

BY

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THE most important fact to remember in the treatment of Diphtheria is that we have to deal with one of the most powerful neuromuscular toxins known (though of course there is a very wide range of variation in the toxicity), and therefore no time should be wasted after a clinical diagnosis is established. In a suspected case, to affirm that the patient is *not suffering* from Diphtheria is to take a serious responsibility on oneself, and therefore should not be lightly done unless one has the necessary equipment and training, required for a thorough visual and bacteriological examination of the respiratory tract; casual examination with a tongue depressor, as is too often done, revealing only the mouth and oropharynx is not enough for a negative finding, because the site though the most frequent is not the only site for diphtheritic infection. Laboratory findings should be only confirmatory findings and negative findings should never be allowed to outweigh an experienced clinical diagnosis.

The essentials of the treatment are :—

- I Prophylactic.
- II Curative.

I. Prophylaxis :—

- (1) Compulsory notification of every case of diphtheria, with isolation and treatment of the patient in Special Hospitals with skilled staff.
- (2) Detection and treatment of carriers.
- (3) Immunization.

1. These are the ideals aimed at. But there are numerous difficulties in the practical working of ideals in India. Compulsory notification is apt to make the practitioner unpopular, but the Government can certainly help by making the sale of serum by the chemists, registrable, so that the address of every patient for whom serum has been bought, is available to the authorities irrespective of the medical attendant's notification. Secondly, Government ought to be able to stock and supply serum from as many centres as possible, either at much cheaper rates than

those prevailing at present, or on a graded scale depending on the income of the patient. The high cost of serum treatment for curative and prophylactic purposes, even to an average middle class family, tends to the use of a lower and insufficient dosage with dire result.

2. Convalescent and contact carriers, and their effective treatment is another difficulty which is responsible for failure of prophylactic measures. Convalescents with unhealthy septic tonsils or adenoids or abnormalities in mucosa of the nose and nasopharynx, may be carriers for a long time after their clinical cure. The standard of cure to be insisted upon for these carriers before release from isolation, is that at least two consecutive cultures obtained at weekly intervals from their nose and throat should have proved negative for diphtheria. Unhealthy tonsils and adenoids should be removed and other abnormalities treated appropriately.

The problem of healthy or contact carriers is much more difficult: segregation of this class of carriers, merely on the strength of morphological diagnosis, without virulence tests, is unjustifiable.

3. *Immunization*.—In view of the practical difficulties encountered in the treatment of carriers, we have to rely more and more on methods of artificial immunization, which, though it cannot prevent infection, can with high degree of success prevent the development of the clinical disease in the community.

The Schick test for the detection of susceptibles (those with less than a minimal amount of circulating anti-toxin in their system) is done as follows: 0.1 M.L.D. (Guinea-Pig) of the toxin, diluted with 0.2 c.c. of sterile borate buffered physiological saline, is injected intradermally, say, into the left forearm to raise a button-like wheal, and in the other control forearm, a similar wheal is raised by using the same amount of the same batch of toxin similarly diluted, but inactivated by heat. The readings of the test should be made after 24 to 48 hours by noting the changes at and round the site of the wheals. The interpretation of the four possible results of Schick test are :—

- (1) Negative.—If nothing but needle puncture is seen in either forearm, there is sufficient circulating antitoxin and the individual is immune.
- (2) Positive.—While the control arm shows only needle puncture, the test arm shows a circular or oval area

of erythema, not fading on pressure, but showing on the 7th or 8th day pigmentation, desquamation and fine linear striae. This reading is taken as insufficiency of circulating antitoxin and therefore susceptibility to diphtheria.

- (3) *Pseudo-negative*.—In 24 hours identical areas of erythema appear on both forearms and disappear after another 24 to 30 hours. These reactions are merely due to bacterial protein, and the reading is equivalent to negative.
- (4) *Pseudo-positive*.—On the control arm there appears an area of erythema, while on the test arm there appears a larger area comprised of two zones. The outer zone together with the area of the control arm disappears as in (3). The inner darker zone remains, and goes through the changes described in (2) and the reading is equivalent to positive reaction.

Immunity either passive or active may be conferred upon the positive reactors. Injection of a few thousand units of diphtheria antitoxin affords some immediate immunity from the disease, but cannot be counted upon for more than two or three weeks. For active immunity, which takes a longer time to develop it is necessary to inject some potent yet harmless form of toxoid, either, $\frac{1}{2}$ c.c., 1 c.c. and $1\frac{1}{2}$ c.c. doses, or three 1 c.c. doses at weekly or fortnightly intervals. The immunity they confer may last for life, but is usually at least 5 years. It is advisable to check up results by periodic Schick tests. Toxoid-Anti-toxin is an efficient prophylactic for general use. It is very necessary to immunise children, especially of school going and pre-school going age, on account of its being most fatal at that age. Infants up to 1 year are said to be usually Schick negative reactors due to transmitted maternal immunity, but this can never be relied upon, as I have come across infants of 8 and 10 months suffering from undoubted diphtheria.

II. Curative Measures.—1. Administration of anti-toxin.

Anti-toxin, prepared by a reliable firm, preserved in cold storage, and as fresh as possible is desirable. Sera of maximum concentration with low protein content should be used, as this means smaller bulk for a given dose of the serum, and consequently less of immediate pain and less chances of serum reaction. Sera concentrated up to 2500 units per c.c. are easily

obtainable. The most important thing to remember is the dose. Diphtheria anti-toxin is not a drug like quinine or aspirin and therefore the dose does not diminish with age. The dose depends entirely on the site and extent of the membrane and the degree of toxæmia. If at all, the toxæmia is greater in children than in adults and the dose must be proportionately higher in children. The Anti-toxin directly neutralises the toxin, both in circulation and in loose combination and helps the early separation of the membrane—destroying this potential source of toxins—but has no effect on the toxins already fixed by the tissues. Therefore, the administration of larger doses simply to cover up delay in instituting specific treatment has no effect. The following table may be taken as a rough guide in assessing the dose though in individual cases, considerable latitude is permissible depending on the toxæmia :—

INTRAMUSCULAR ROUTE.	DOSE.
1. Site: Suspicious patch not more than 3 mm. in diameter.	... 5000 units.
2. One tonsil involved	... 10,000 units morning and evening.
3. Both tonsils involved	... 20,000 units morning and evening.
4. Both tonsils with spread to palate, pharynx or larynx	... 30,000 units morning and evening.

In the large majority of cases and especially in private practice, it is advisable to inject intramuscularly on account of the considerably greater risk of serum shock by the intravenous route. Even by intramuscular route, it is advisable (1) to elicit the history regarding hypersensitivity *e. g.*, asthma, spasmodic rhinorrhoea, wheals, transient oedema, helminthic infections, Eosinophilia, pseudo-Schick positive cases etc. (2) to inject the serum warmed, and slowly and gently massage the part: and (3) to have adrenalin ready for injection if necessary.

In patients with a history of hypersensitivity, inject a small dose, say a drop of antitoxin in $\frac{1}{2}$ c.c. saline first, and if after half to one hour there is no reaction, the full dose may be injected. If sensitive, the fractional doses are repeated hourly till the patient is desensitised, and then the full dose may be injected.

For very grave cases, a quarter of the dose can be injected intravenously, warmed to body temperature and injected very slowly.

General Treatment.—1. *Absolute rest in bed with good sleep.* This is absolutely essential in view of the grave risks of cardiac involvement and risks of various forms of post diphtheritic paralysis. In every case of diphtheria, it is wise to presume cardiac involvement, for, some of the subtler changes in the neuromuscular mechanism, are not clinically manifest, very difficult to detect and may be missed even by an experienced physician. A day to day examination is absolutely necessary and convalescence should never be hurried. In graver cases, talking, reading or sitting up, should not be allowed even in the convalescent stage, and anything more than the slightest respiratory embarrassment should always be relieved—to prevent various forms of post-diphtheritic sequelæ such as palatal, laryngeal, pharyngeal, ciliary, diaphragmatic or peripheral paralysis. Good sleep is very essential to give rest to the heart and musculature generally, and treatment must always be aimed at procuring plenty of undisturbed sleep, using sedatives, if necessary, if there are no obvious causes for sleeplessness.

Feeding.—Distension should be avoided and feeds therefore have to be regulated accordingly, by giving small quantities of easily digestible nourishment with plenty of glucose slowly and at intervals. Nasal or rectal feeding may have to be resorted to if there is pharyngeal paralysis or if retching and vomiting are too severe, for fear of cardiac failure.

Occurrence of ketosis must be constantly watched for and combated with glucose and alkalies.

Bowels.—Glycerine enemata should be used if necessary, but aperients are contra-indicated.

Circulatory failure.—Raise the foot of the bed and bandage the limbs over cotton wool. Præ-cordial pain and restlessness must be controlled by sedatives, and adrenalin given, to slowly and steadily raise and maintain blood pressure and increase blood-sugar. Intravenous injection of glucose 50 c.c. of (30 to 50%) should be given every few hours. Few other drugs are of any value.

Pharyngeal paralysis.—Foot of the bed is raised to prevent risks of aspiration pneumonia and atropine to check secretions. Feeding can be done by the nasal route.

Diaphragmatic paralysis.—Oxygen inhalations with artificial respiration should be tried.

Other forms of post diphtheritic paralysis.—In the majority of cases the prognosis is good; assisted by massage, tonics and faradism, they invariably recover.

Laryngeal Diphtheria.—A *very careful watch* on the condition of the patient is quite necessary in every case of Laryngeal involvement. If the case is mild, the pulse and colour should be satisfactory, respiratory embarrassment should only be slight, with intervals of sleep and there should be steady improvement after anti-toxin administration. On the other hand, if the respiratory embarrassment is even a little more pronounced, rendering the patient sleepless or pulse and colour are not satisfactory, immediate tracheotomy to maintain an adequate airway is necessary. Tracheotomy should certainly not be reserved as a last resort, when the case has become well-nigh hopeless. It should not be an “*emergency operation*” as is often described, but a *deliberate one and well-timed*.

Procedure.—Patient lies flat on the back with a folded towel or small sand bag under the shoulders to slightly extend the neck, and chin should be held strictly in the midline without allowing any rotation. Remember that over-extension of the neck should be avoided especially when there is laryngeal obstruction as it may prove to be the last straw, stopping respiration completely. Skin of this front of the neck is prepared in the usual way and the midline of the neck from the Pomum Adami to the episternal notch is infiltrated with usual novocaine-adrenalin. Infiltration of the line of incision is quite enough in the first instance as massive infiltration renders subsequent identification of layers more difficult. The incision should run in the midline, from just below the Pomum Adami, to the episternal notch sinking gradually deeper after the cricoid is passed. A much shorter incision, I know, is often advised, but is certainly not advisable, for nothing is so disgusting as seeing an attempt at tracheotomy in the depths of a short deep wound, rendered shorter by retraction of edges, pouting with dark blood (which is sure to happen when there is cyanosis with respiratory obstruction), with little chances of efficient hæmostasis and much less chance of “stabbing the trachea in the dark”. After the preliminary incision, bleeding points are secured, cricoid cartilage is lightly grasped and steadied in the midline between thumb and midfinger of the left hand, while the left index finger locates the upper end of the trachea. The fascial layer stretching across the prelaryngeal muscles is opened, vessels in the way cut between

ligatures or retracted. The pretracheal fascia is similarly incised and cleared to expose clearly the front of the trachea and the thyroid isthmus is then retracted upwards, or even cut between ligatures if necessary. In children, the thymus may be seen at the lower part of the wound but its identity should not be confused and should be pushed downwards. The tracheal rings should be clearly seen, and tracheotomy performed anywhere below the level of the first tracheal ring the lower the better. The confusing terms high, median, and low tracheotomy should be conveniently forgotten. If the tracheal incision extends higher than the 2nd tracheal ring, the risks of setting up laryngeal stenosis is real and considerable. The site having been selected, a circular hole is made in the front wall of the trachea of the required size after a preliminary midline stab across its diameter. The face of the operator and assistants should be well protected, and after the breathing is regular, the taped tracheotomy tube is inserted in the usual way, and the wound stitched and dressed. Decannulation should be done as soon as the patient is able to breathe well through the normal airway, as evidenced by the patient being able to breathe and sleep normally for 24 hours with the tube plugged. It is also well to bear in mind that a lingering temperature may be due to the prolonged presence of the tracheotomy tube, the temperature dropping to normal after its removal. This actually happened in one of my cases, where the wearing of the tube was necessitated by laryngeal paralysis. After decannulation, the wound heals uneventfully by granulation with very little scarring.

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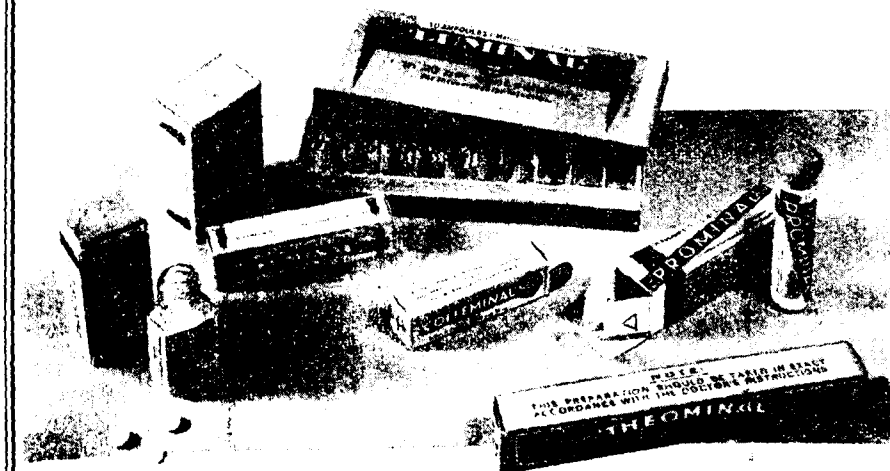
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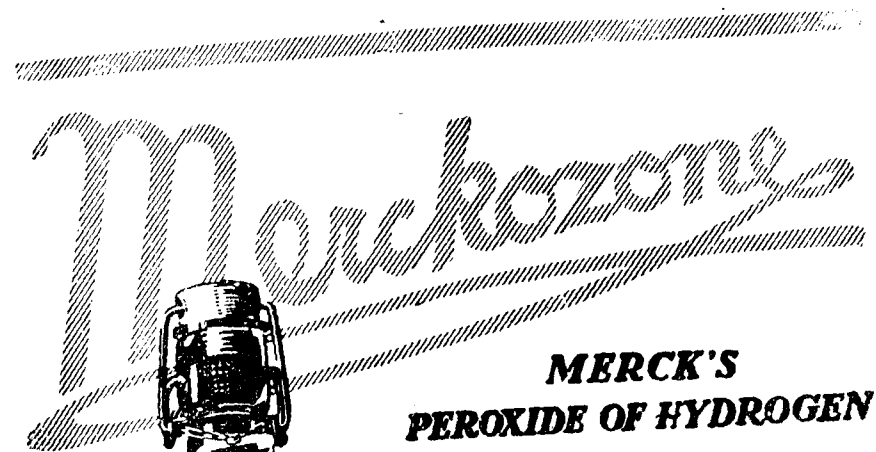
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BMK 22

Dysentery In Infancy and Childhood and Its Treatment

BY

Jyoti Dhar, B.Sc., M.B.,

Calcutta.

DYSENTERY is not an uncommon disease in infancy and early childhood. It is met with in both the breast-fed and the artificially-fed infants, though the latter are affected in comparatively larger numbers. It is present throughout the year, but its incidence is greatest during the summer and the rainy seasons.

Clinically, these cases are divided into two well-defined groups, namely, (1) the simple (non-toxic) and (2) the toxic groups. The former (*simple*) is characterised by local symptoms, e.g. the characteristic stool, abdominal pain and tenesmus and sometimes vomiting; but the general condition of the patient is not affected to any great extent. This group forms about 75 to 80 per cent of cases which are met with in pediatric practice and are caused by amœbic infection or bacillary infection of the milder type. The *toxic* group, on the other hand, is characterised by marked dehydration, pyrexia, toxæmia and nervous symptoms (coma and convulsions) etc. in addition to the characteristic stool, abdominal pain and other symptoms of dysentery. These cases are all due to severe bacillary infections and form about 15 to 20 per cent of all cases.

With regard to diagnosis, a microscopic examination, including its bacteriology, is essential. Sigmoidoscopic examination is practised as a routine in the more advanced clinics now-a-days, and is regarded as affording rapid and accurate means of diagnosis of dysentery. It is extremely useful in following up the progress of a case under treatment. When practised as a routine, this examination is not difficult even in little infants.

Dysentery is a self-limited disease. It generally lasts from three days to a week, or in some cases, becomes chronic. Mortality is highest amongst infants who are already debilitated or ill from some other complaints.

It should be remembered that bacillary dysentery is infectious. Whether in a hospital or in a home, the little patient

should be isolated and all excretions should be thoroughly disinfected before being disposed of. The classical treatment of bacillary dysentery is either by means of repeated doses of saline aperients (magnesium sulphate- gr. 10 to 30, hourly for three doses) or of sedatives (*e.g.* bismuth and opium) after an initial dose of castor oil. The author, however, prefers the treatment outlined below.

The treatment is started with a preliminary period of complete starvation for from six to twelve hours. During this period, sweetened (with saccharin) boiled water or weak infusions of tea are given. This is followed by a period (which lasts from 24 to 72 hours) of milk-free diet when rice-water (10 per cent) sweetened with 5 per cent sugar or dextrimaltose, is given, every three or four hours, from 7 a.m. to 10 p.m. Nothing except sweetened water is given between intervals or between 10 p.m. and 7 a.m. Fluids should be supplied in sufficient quantities between the feeds. During the next period of treatment, milk or milk-preparations (mentioned below) are gradually introduced, until the final stage, when the patient returns to normal diet.

Experience has shown that high carbohydrate diets are rather disappointing. Human milk, though not contraindicated, is not recommended. Buttermilk (prepared from Beurlac, Eledon, or Horlick's) and protein milk (prepared from Prolac or Mead's) give the best results. Apple diet (prepared from raw apple or Aploma powder) gives very satisfactory results.

Regarding medicinal treatment, specific drugs *e.g.* emetine or refined preparations of kurchi for amoebic cases and anti-dysenteric sera for *B. dys. Shiga* infection (which is rare in infancy) are indicated. Bacillary dysentery due to infection with organisms other than *B. dys. Shiga* does not respond well to the anti-sera. For dysentery due to mixed infections of the bowels combined bacteriophage (*e.g.* Enterofagos or Bacte-intesti-phage etc.) may be given a trial. Osmo-kaolin, Kao pectate and other preparations are also useful adjuncts to the above treatment.

Treatment of Eczema

BY

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ECZEMA is a prominent skin-disease, yet its aetiology has always been very vague. As far as our present knowledge goes, eczema is considered to be due to allergy—hypersensibility of the cells of the skin to foreign proteins. These foreign irritants may be external, internal or both.

In eczema, the cutis vera is the main field of operation of these irritants. The reaction consists of vasodilatation and sero-exudation. The exudates invade the stratum mucosum of the epidermis and interfere with the process of cornification. From vasodilatation, erythema results. Hypertrophy of papillae and cell accumulation produce a papule, while collection of exudates in lymph spaces results in a vesicle. The vesicle may rupture, causing 'weeping', or it may become a pustule, if secondary infection takes place. When the condition becomes chronic, hyperkeratosis occurs, causing scalliness of the area. According to the eruption, eczema is divided into erythematous, papular, vesicular, pustular and scaly types.

While considering treatment of eczema, thorough investigation must be made of the causative factors, presence of septic foci, functions of the digestive tract, food, occupation and urine.

Indications for treatment are :—

- (1) Removal of the cause.
- (2) To desensitise the sensitised skin.
- (3) To take care of the predisposing causes.
- (4) To give local and general treatment to bring the skin back to normal.

Removal of the cause.—If the person's occupation gives any suspicion, he should be asked to remain away from work for some time. All food must be stopped for a day and then one by one different articles must be given to eat to find out, if possible, the article which makes the condition worse. All septic foci constipation, indigestion, diabetes, gout, hyperidrosis and neuroses must be attended to.

Desensitisation.—The best way of desensitisation is to inject intradermally the specific antigen, if it can be ascertained. As

an alternative, injections of milk, peptone or patient's own blood can be tried. At least six injections of each should be given before tangible results could be discovered.

A good many proprietary preparations, like anaphylactine, peptamine, are available for oral use for this purpose, but their value is still doubtful.

General Treatment:—Itching is the only troublesome symptom in eczema. In many cases, it may lessen or subside with local treatment: in some, it may be unbearable. In such cases, injections of magnobrol or emge may be tried. Bromides and other sedatives may have to be employed. For acute vesicular or weeping type, injections of calcium with vitamin D or calcium thiosulphate prove beneficial. For pustular variety, injections of eczema vaccine, milk or colloid stannio-manganese have given good results. For chronic eczema, oral use of arsenic is recommended, but it must be used with caution.

Local treatment:—*For erythematous type:* Use of plain water and ointments is bad. Soothing, astringent and antipruritic drugs, in powder or lotion form, are indicated, as—

R	Acid Carbolic	...	℥ xxx
	Glycerine	...	℥ i
	Menthol	...	gr. i
	Camphor	...	gr. i
	Bismuth Subnitrates	...	℥ i
	Zinc oxide	...	℥ i
	Calamine	...	℥ i
	Aqua Calcis ad	...	℥ iv

Make lotion. Apply with cottonwool thrice a day.

For papular type: In the early stages, the above lotion should be used. Later on, the following ointment should be applied twice a day—

R	Acid Carbolic	...	℥ iii
	Acid Salicylic	...	gr. x
	Menthol	...	gr. i
	Camphor	...	gr. i
	Liq. Carbonis deterg	...	℥ xx
	Lanolin	...	℥ i

Make ointment.

For vesicular type:—During the night, pastes are used and during the day, lotions.

Paste—

R	Menthol	...	gr. ½
	Comphor	...	gr. ½
	Resorcin	...	gr. xxx
	Hydrag Amm.	...	gr. x
	Acid Boric	...	℥ p
	Zinc Oxide	...	℥ ii
	Pulv. Amyli	...	℥ ii
	Acid Carbolic	...	℥ iii
	Vaseline	...	℥ i

Apply, cover with linen and bandage.

Lotion—

R	Menthol	...	gr. ii
	Lead acetate	...	gr. xx
	Alum	...	gr. xx
	Resorcin	...	℥ ii
	Bismuth subnitrates	...	℥ ii
	Acid boric	...	℥ iii

Make one powder. Dissolve in six glasses of boiled, cooled water and apply several times during the day.

After the acute stage has passed, the following ointment should be used—

R	Acid carbolic	...	℥ v
	Acid salicylic	...	gr. x
	Zinc oxide	...	℥ ii
	Pulv. amyli	...	℥ ii
	Vaseline	...	℥ i

Apply two or three times a day.

For Pustular type:—Here, the main indication is to overcome sepsis. The following ointment combines antiseptic, soothing and antipruritic remedies—

R	Acid carbolic	...	℥ iii
	Hydrarg chloride mitis	...	gr. xx
	Resorcin	...	gr. xxx
	Acid boric	...	℥ i
	Vaseline	...	℥ i

For scaly type:—Indications for this type are to remove the abnormal cell increase and to relieve itching. Salicylic acid and

tar preparations in big doses in penetrating base are the best, such as,

R Acid salicylic	...	3 p
Liq. Carbonis deterg	...	3 p
Menthol	...	gr. i
Camphor	...	gr. i
Acid carbolic	...	m iii
Lanolin	...	3 i

This ointment should be rubbed on the part three times a day. For this type of eczema, ultra-violet rays are also beneficial.

Infantile Eczema.—Eczema in infants needs special mention. It begins within two months of the infant's life. The cheeks, scalp, ears and napkin areas are mostly affected. Acute erythema or vesiculo-pustules are the prominent lesions.

Before the local treatment is given, all the crusts must be removed by starch poultice or olive or sesame oil. The patient's hands must be tied, so that he may not scratch the parts. Scalp must be thoroughly cleansed.

The following ointment gives good result—

R Crude tar	...	3 i
Zinc oxide	...	3 i
Starch	...	3 i
Vaseline	...	3 i

First mix tar and zinc oxide separately and starch and vaseline separately and then mix them together.

This ointment should not be left on the parts for more than 12 hours.

For weeping type of infantile eczema, the following ointment deserves a trial—

R Naftalan	...	3 iv
Amylum	...	3 ii
Zinc oxide	...	3 ii
Vaseline	...	3 i

This is applied twice a day on muslin and the part is bandaged.

For those who object to the colour of coal tar, it may be mentioned that colourless coaltar is available under the name of *anthrasol*.

Treatment of Eczema

BY

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TREATMENT of Eczema depends on the type and stage it is met with :—(1) Erythematous, (2) Papular, (3) Vesicular or (4) Pustular. It depends also according to the cause :—(1) Bacterial or mycotic (2) Irritative from frequent contact with occupational foreign substances, *e.g.* Surgeons (with antiseptics), Chemists (with drugs), Washermen (wet with alkaline water), Children (wet with urine) (3) Allergic-susceptibility to foreign substances giving rise to attack of Asthma with which, better it alternates, that is to say, sensitive asthmatics get attacks of eczema when they are free from asthma and vice versa.

Treatment.—*General* :—Dietetic—Plenty of vegetables with less ghee or oil and less spices, spinach, fresh fruits and dry fruits, germinating grams or mug are given to all cases, fish and meat are given in moderation.

Shell fishes, oysters, crabs etc. are not allowed, milk and its preparations are given with extreme care. The allergic cases which are susceptible to them should omit it in their dietary altogether. Plenty of water and liquids should be taken in between meals. A glass of water at the time of going to bed and a glass just before getting up from bed is helpful to relieve constipation.

Hygienic :—Regular exercise, sun bath in the morning and afternoon for 15 to 30 minutes, exposing the affected parts to the rays of the sun.

The irritant cases should avoid causes of irritation and the allergic cases should take care to avoid anything to which they are susceptible.

Tonics :—In all cases, Cod-liver-oil dr. i with syrup Ferri Iodide dr. $\frac{1}{2}$ to i and Calcium Hypophas and Glycerophosphate aa gr. v is given thrice daily. Some cases are given Easton Syrup dr. i thrice daily. Dose is regulated in case of children. The bowels are kept regular by regular diet with coarse remnants. If not moved, occasional dose of saturated sol. of Magnesium Sulph oz. ii is given to adults or Oil Ricini to children according to age.

External Treatment.--1. Erythematous and papular stage:

- (1) Dusting powders consisting of Calamina dr. i. Zinc Oxide dr. i. Tale Powder dr. iv, and Camphor dr. $\frac{1}{2}$ are given.
- (2) Liq. Carbon Detergens is painted if there be much irritation and itching.

2. Vesicular and pustular stage:

- (1) 2% solution of acriflavine is painted on the affected parts once or twice daily.
- (2) In some cases especially those of the leg, 5% solution Gentian Violet in 20% of Alcohol is applied for some days with good results.
- (3) Ointments used are:

(a) R	Zinc Oxide	...	3 i.
	Calamina	...	3 i.
	Glycerine	...	3 i.
	Liq. Carbon Detergens	...	3 i.
	Acid Salicylic	...	3 $\frac{1}{2}$
	Vaseline	...	3 i.

This is used in cases with scrotum affected or in cases with thickening of the skin.

- (b) In the affection of the face, simple Zinc Ointment with a little Liquor Carbon Detergen is used.
- (c) Ointment containing Zinc Oxide 1 part, coal tar (Liq. Carbon detergens) 3 parts, Powdered charcoal 1 part, Lanolin and vaseline-6 parts each, is used in many cases with good results especially in those of the scalp and face.
- (d) Water is avoided and the discharge is cleaned with 2% solution of acriflavine and the above ointments are applied so as to form a thick coating.

Injections:--

- (1) Sterilised skimmed milk--5 to 8 c.c. intramuscular, twice or thrice a week, according to the severity the of infection.
- (2) Sodium Thiosulphate gr. zv. in 10 c. c. of sterile distilled water is given intravenous twice a week up to six injections. Sodium Bromide gr. x is added to the above solution if there be much itching. This gives

excellent results in the majority of the cases. In some cases gr. 7 $\frac{1}{2}$ to 15 of Sodi Thiosulphate is given intramuscular up to six injections.

- (3) Stock Vaccines, a course of six Hypo, were used in some cases with fair amount of success. We had not the opportunity to have autovaccines for any of our patients treated in the out-patient department.
- (4) In some cases with severe infection with strepto or staphylococcus we had given one or two injection of 1% Solution Mereurochrome 5 to 10 c.c. intravenous as required. This also gave good results.
- (5) Gouty and Rheumatic or Diabetic patients prone to attacks of eczema should be treated so as to deal with those by cinchophan, salicylates or Pancrepatin and Synthilin respectively in addition to the above treatment of eczema. Their diet should also be regulated accordingly.

Summary and Conclusion.--It is a very intractable disease running a chronic course with variations in intensity. Sometimes the external signs disappear altogether. In some cases, lunar variation takes place. Treatment is done according to the probable causation and type of disease. Injections of Sodium Thiosulphate with Sodi Bromide combined with tonic and regulation of diet avoiding source of irritation and local applications, were successful in most of our cases. Some cases, after apparently complete cure, are re-affected after some years.

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The Treatment of Early Filariasis

BY

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Introduction.—The treatment of an early case of infection with *Wuchereria bancrofti* has to be considered quite apart from the advanced disease with established elephantiasis. The pathological studies of O'Conner and Hulse (1932), the radiographic studies of O'Conner, Golden and Auchinchloss (1930) and our own studies (Menon and Annamalai, 1932, Menon, 1935) at the Government Royapuram Hospital, have established that in the fully developed disease with elephantiasis changes in the tissues, one has to deal with condition of 'hyperfilariation'. Here many lymphatic channels are obstructed by calcified remains of the dead parasites so that a condition of permanent lymph stasis is established. Day (1936) has shown that in experimental chronic lymphatic obstruction, the persistent lymph oedema is followed by the collagenization of the oedematous fluid, somewhat in the manner of an alteration of a fluid ground substance into a fibrillary tissue. The fibrosis would thus appear to be not a productive reaction from inflammatory cell infiltration, but merely the result of chronic lymph stasis. The problem of treatment in the fully established disease with elephantiasis is complicated by three factors, that there are live parasites round about the dead worms in filariated tissue, that there is a chronic lymphatic obstruction to be overcome and that there is a collagenized tissue which has to be resolved. Whether therapeutic agents can absorb organized fibrous tissue is uncertain, but here again recent work on experimental cirrhosis (Cameron and Karunaratne 1936) tends to show that fibrosis is not a fully established permanent change, but a reversible process, at least, in the earlier stages. The removal of permanent lymphatic obstruction is a surgical problem that has been receiving increasing attention after the work of Homans, Drinker and Field (1936) on the delicate methods of lymphatic cannulation.

While therefore the cure of elephantiasis is still full of difficulties, the outlook with regard to early filarial infection is much more hopeful since there is reason to believe that it is possible to evolve a mode of therapeutic attack on the parasite in the lymphatic vessels. This is all the more important, for

in recent years, the septic complications of filariasis have received so much attention from one school of workers that they have relegated to the parasite itself a second place. They maintain that filarial lymphangitis is essentially a septic process due to infection with a streptococcus (Rose 1915, Acton and Rao 1929, 1930, Grace and Grace 1931). However, McKinley (1931) in his bacteriological studies of 38 cases found a streptococcal lymphangitis in only 11 cases. Similar results are recorded by Giglioli (1933). We have found that if care is taken to get lymph for culture deep in the affected tissues so as not to involve the surface organisms the number of positive cultures are few. Though clinical cases exist where the condition of the skin suggests a complicating secondary infection, most cases of early filariasis present a smooth glossy unbroken skin where there is little reason to believe that a streptococcal factor is present.

Methods of Treatment.—There are three methods of treatment of an early case that deserve consideration since there are three differing schools of thought regarding the mode of action of the parasite. Those who believe in the microbic theory of filariasis hold that the parasite does not give rise to any significant lesion, but that the complicating streptococcal infection is the condition that requires treatment, since they hold that the lymphangitis is essentially microbic. Another therapeutic school aims at the destruction of the microfilaria in the blood and advocates intravenous medication of metallic compounds. On the other hand, on the basis of a parasitic responsibility for the essential lesion we have advocated destruction of the parent worms by the method of local infiltration. The lymphangitis, we regard, as an allergic reaction to disintegrating worms.

Vaccine Treatment.—With the discovery of complicating streptococcal infections in some cases of filariasis, various methods of treatment by vaccines have come into vogue. Thus Rose (1919) recorded good results in Porto Rico with two doses of streptococcal vaccine, a first injection of 100 millions, being followed by a second dose of 200 millions. A special strain of *B. hæmolytic* streptococcus has also been used. These methods were later replaced by repeated weekly doses of a non-specific vaccine such as T. A. B. vaccine. Besides these, various proprietary preparations exist where the vaccine is combined with organic compounds. Thus, the idea of a non-specific

therapy to induce a tissue response to overcome the low grade of inflammation has held the field. Recently vaccine treatment has been advocated in combination with sulphonamide compounds.

Treatment with Metallic Compounds: Organic arsenical and antimony compounds are time-honoured methods where successful results have been recorded. Intravenous injections of neo-salvarsan, tartar emetic, neo-stibosan have all been tried. Injections with the newer gold compounds have also been advocated. All these methods have the disadvantage that the drug can reach the lymphatic vessels only in such low concentrations that any effect on the parent worms is hypothetical. It is possible that the microfilaria disappear from the blood and one can possibly imagine that the parent worm has been rendered sterile, but sooner or later another attack of lymphangitis crops up.

Treatment by Direct Infiltration of Filariated Tissues:—A rational method that is still on trial is to infiltrate the affected lymphatic vessels with some toxic drug which while it is tolerated by the tissues is lethal for the worms. Sulpharsenol in 10%, 5% and 2.5% solution has been used, the stronger solution being used to infiltrate the actual location of the parent worms while the lower strengths are utilised for diffuse infiltration of the area of drainage and for the lymph glands. To diminish pain, the sulpharsenol is dissolved in 1% novocaine. We have used .18 gm. of sulpharsenol in 2 c.c., 4 c.c. and 8 c.c. of 1% novocaine solution.

The following procedure has been adopted for dealing with cases in the Filarial Research Unit in the Government Royapuram Hospital. The history of the case is carefully analysed with regard to the incidence of the first attack of lymphangitis and fever. It is then possible to find out what we have called the 'primary lesion'. This is based on the idea that the worms, if they do not enter the blood stream, generally mature and localise themselves in the larger lymphatics round about their point of entry from the mosquito. In early cases it is possible to locate 'the primary lesion' since the lymphangitis starts near the point of entry. This appears as a weal with a variable area of œdema and a red flare around. In most cases, this 'primary lesion' is not definite, but during an attack of lymphangitis, a point of maximum tenderness can be made out in the deeper tissues where the lymphatic vessels run. This 'deep early lesion' we have regarded as an allergic response to a dead or disintegrating worm. In many cases, the lymphangitis can be seen to spread from this point of maximum tenderness to the surrounding lymphatics. In subacute cases, the lymphatic vessels can be felt as solid cords extending from a point of maximal tenderness. The regional lymph nodes also become

palpable and tender. The purpose of treatment is to infiltrate 'the primary lesion' and 'the early deep lesion' to destroy the worms in the immediate neighbourhood. In cases with established lymph œdema where the acute attack has subsided, radiographic methods have demonstrated the presence of faint shadows appearing like chains of cocci or spots of denser opacity caused by the calcification of the dead worms. Histological studies of excised tissues have demonstrated live worms round about the calcified remains of dead parasites. An X-ray photograph would thus demonstrate the areas of maximal filariation and it has been found possible that by a series of infiltrations the whole of the affected area can be dealt with systematically. In cases with well marked œdema accessory methods of promoting lymph drainage are advised. These include gentle massage, postural treatment and the wearing of an elastic bandage during walking. The patient is further advised to reside in a non-endemic locality to prevent re-infection; and also to report at once for treatment, if there is a subsequent attack of lymphangitis. The results of this method of treatment have been sufficiently encouraging to warrant an extended trial in a large number of cases.

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Fistula-in-Ano

BY

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FISTULA-IN-ANO is a very common condition in India as elsewhere and the type of fistula varies widely, often being a combination of one or more varieties.

Classification.—The usual description is to depict three varieties: The blind external, the blind internal and the complete.

But this is not a satisfactory classification either anatomically or clinically. A better and at the same time a simple one clinically, is as follows:

- (1) Subcutaneous or submucous, either complete or blind: these have no relation to muscles.
- (2) Those which communicate with the anal canal below the ano-rectal ring after passing through the external sphincter.
- (3) Those which extend above the level of the ano-rectal ring and may or may not communicate with the rectum.

There may be several external openings, though usually there is only one internal opening, which as a rule is small.

The fistula may be curved, forming the whole or part of a horse-shoe.

Even if there be only one external opening, there may be several offshoots.

The main track extends from the internal to the external opening, and may take a straight, curved or tortuous course. The exact position of this track is of utmost importance in determining the extent of surgical interference.

Treatment.—Treatment is operation, the underlying principle being to lay open the main track from one end to the other, together with the off-shoots extending from it. But this is not always possible as too much damage to muscles result in incontinence. *Opinions vary very widely as to how much muscle one may divide safely.*

Although the majority of anal fistulae communicate with the interior of the bowel, in only a small percentage of them are the muscles penetrated, and in these the usual position is in the

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interval between the subcutaneous portion of the external sphincter on the one hand and its deeper portion and the internal sphincter on the other.

Division of the superficial portion of the external sphincter does not definitely produce incontinence.—According to some of the most modern teachers division of the muscles below the ano-rectal ring is a safe procedure. But I have never dared to cut so high up, my rule is to cut up to one inch of the anal margin. I have seen quite enough of loss of control in people who had operations done elsewhere.

Technique.—First determine the exact position of the track by palpation with the index finger in the anal canal and the thumb outside, and then with a special probe-director introduced through the primary external opening, which is usually $\frac{1}{2}$ to 1 inch from the anal margin. The orifice is often contracted in which case, it should be enlarged by a small incision. *Do not use force, or a false passage will be made*—it is quite easy to do so in the loose perianal space.

Try to pass the probe-director gently towards the internal opening, which is determined by palpation and inspection with a proctoscope. Determine the relation of the track to muscles and ano-rectal ring.

If the track is curved, a curved director very often goes round the corners. Subsidiary tracks are to be sought for at the time of the operation.

Cutting has often to be done in stages, introduce the probe-director as far as it will go, cut, then re-introduce and cut again, till the other end is reached. Subsidiary tracks are similarly laid open.

When the probe director reaches the inner opening and enters the anal canal, hook it out with the index finger and divide the bridge completely.

A careful search has to be made for offshoots.—All overhanging or undermined skin and some fat and subcutaneous tissues are cut away, and the square area of the linear wound increased by making side cuts and removing the corners.

The wound should be plugged lightly so that it heals from the bottom and does not form bridges. *Tight packing impedes healing* by preventing formation of granulation tissue. This results in a depressed scar, and such a scar in the case of a track through the muscles is a common cause of impaired control.

The operative treatment of a submucous fistula is on entirely different lines.

The inner and upper opening is not easy to find. A probe director may be easily pushed through anywhere, so direct view is essential. In case of a blind fistula an opening has to be made.

Severe hemorrhage may result if the track is opened up by incising the mucous membrane.

The best way to treat these is either to tie one silk ligature and leave it to cut through the mucosa or to tie two ligatures and divide the mucous membrane bridge so formed.

High Anal Fistulae are difficult to treat and results are not always good.

The lower portion of the external sphincter may be cut and the upper part which may be blind is opened up. Attempt is then made to turn the entire wound into a wide funnel or pyramid.

A high anal fistula is often due to a para-rectal abscess which extends into the ischio-rectal fossa and is often complete.

It is not possible to cut the muscles and open up the track. A wide pyramidal opening is made in the ischio-rectal fossa.

Some of these fistulae may be prevented if ischio-rectal abscesses are opened early. Contrary to the general rule of cutting down on an abscess before pus has formed and has come to the surface, as soon as pain and tenderness are complained of and induration appears, a crucial incision should be made and not the time-honoured I-shaped one which does not give enough exposure. The corners of the skin round the cross are cut away and a funnel shaped wound is made and plugged lightly.

The dressings are changed twice daily and the wound allowed to granulate and heal from the bottom. Operative interference may have to be repeated before the wound would heal without a sinus.

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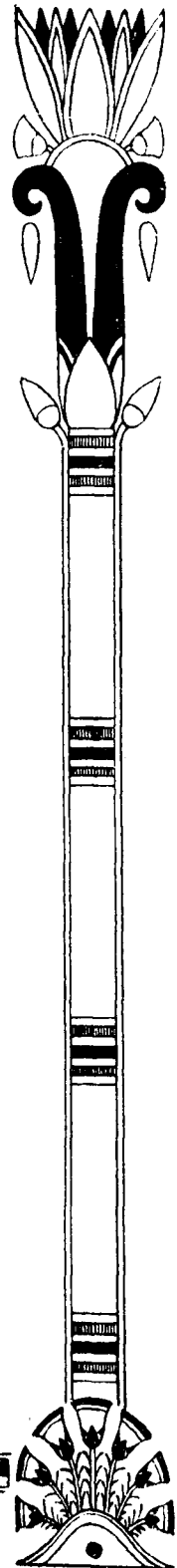
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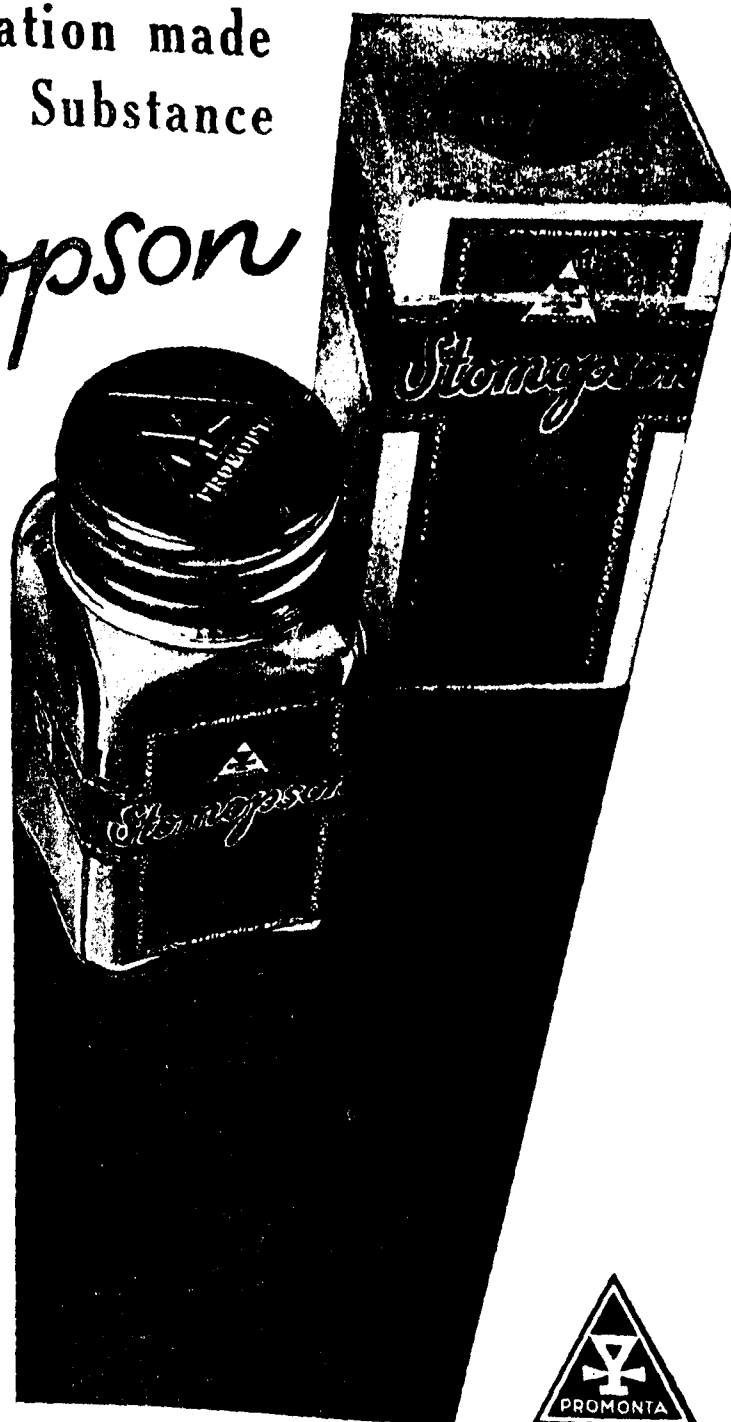
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Modern Treatment of Fractures

BY

Lt. Col. B. G. Mallya, M.D., F.R.C.S.E., I.M.S.,

Superintendent, Campbell Medical School & Hospital, Calcutta.

ROBERT Allan in Volume II of his System of Surgery published in 1821 has written thus on the general treatment of simple fractures:—"The Moderns have arrived at great simplicity in the treatment of fractures and have laid aside the torturing machines of Pare' etc."

In 1886, Lucas Championiere introduced the treatment of fractures by massage and movement and discouraged the use of splints and retentive appliances. This was followed by a routine fixation of fractures by metal plates and screws. Open operation and metallic fixation soon fell into disfavour through poor results and prolonged disability.

In 1935, 'The Fracture Committee' of the British Medical Association published its report. It will thus be seen that the treatment of fractures is not yet quite so satisfactory as it should be.

In those countries where every workman is insured an idea of the enormous cost of disabilities resulting from fractures can be had but no such system exists in this country. There is no doubt that fractures cause total disability for some time and a certain amount of permanent disability.

The advent of the motor vehicles and modern machinery has brought about an enormous increase in the incidence of fracture cases. The aim of modern treatment is to reduce the period of disability to the minimum and produce the best functional result. The wooden splint has no place in the modern treatment of fractures.

The Great War afforded opportunities of comparing the method of skeletal traction with that of adhesive appliances and it was found that skeletal traction was by far the best method. Open operation for the treatment of fractures is now becoming out of fashion except in cases of fractures of the patella and olecranon. Operation is also indicated in cases where there is malposition and nerve involvement.

The organisation of fracture clinics in our teaching institutions is of utmost importance. The Medical Student trained in

a fracture clinic will be a great asset when he takes up practice either in a town or a village. Having thoroughly grasped the principle of treating every case of fracture as an emergency he will see to it that no time is wasted in the accurate reduction of the fracture, and proper retention of the fragments in perfect alignment.

It is useless attempting the reduction of a fracture without perfect relaxation of the muscles and abolition of pain. This can only be done by administering an anæsthetic. Chloroform is the general anæsthetic of choice in this country. Where rigid asepsis can be ensured local anaesthesia can be used in the form of an injection of 20 to 30 c.c., of a 2% Novocaine solution between the fracture ends of the bone.

X-ray examination should be advised in writing in all cases where a fracture is suspected. The duty of the doctor is to advise and it is up to the patient and his relatives and friends to carry out this instruction. In all cases where funds permit antero-posterior and lateral views of the fracture must be obtained before carrying out reduction. After reduction and fixation either by plaster of Paris bandages or skeletal traction the result should be checked by a further X-ray examination. If the reduction has not been satisfactory, further attempts should be made for a perfect result.

A portable X-ray apparatus is indispensable in every hospital in these days when the patients are confined to bed by skeletal traction pins. In cases where funds do not permit of X-ray examination before and after reduction which is very often the case while dealing with the poorer class of patients it is far better to diagnose the fracture clinically and reduce the same under a general or local anaesthetic and then control the result by X-ray examination. This is the practice I have followed in the case of the poor with quite satisfactory results.

Passive movements cause pain and do more harm than good. Forcible passive movements should be condemned. Massage, which was advocated with such enthusiasm in the olden days is now reserved till the plaster bandages are removed or the skeletal traction pins taken off. Splints should not be taken off for the sake of massage lest the bony fragments should be displaced.

In this short note, it is impossible to deal with the modern treatment of all the fractures or even some of them. My aim

is simply this—the treatment of fractures should be put on a sound basis. There is a move in Great Britain for the establishment of fracture clinics all over the country. There is no reason why fracture clinics should not be organised and run in all the hospitals in this country. In some hospitals fracture clinics have been established and their results compare favourably with those of the best in the western countries. In support of this we have the report on the fracture cases from the Quetta earthquake disaster treated at Lahore where it is said that the treatment was the same as that obtained in any of the clinics of Britain or the continent of Europe.

A fracture clinic is best located in two rooms adjoining the X-ray room. One room is set apart for reduction of fractures, application of plaster of Paris bandages, insertion of wires for traction, etc. The other room should be used for keeping the stores and splints as well as for administrative work. Organised fracture clinics reduce the number of cases that need hospitalisation. Considerable economy is thus effected. A fracture clinic provides not only immediate efficient treatment but also subsequent supervision. As more interest is being taken in the improvement of hospitals and their equipment, it is up to us to press for installation of X-ray plants where there are none and provision of an efficient fracture service in every hospital in the country so that cases of fractures are treated according to the most modern methods. Gone are the days of treating fractures with wooden splints and cotton bandages.

Treatment of Gastric and Duodenal Hæmorrhage

BY

Dr. P. P. Halemani, M.R.C.S. (Eng.)

Dharmar.

THE complication of bleeding from a Peptic ulcer has been a problem for treatment in view of its frequency and nature of its symptoms. Controversy in the past has prevailed between the immediate operation and medical treatment, we may put it as the accepted view that medical treatment has been accepted as the line of treatment while the actual bleeding is going on whether it is the acute, severe hæmorrhage or the chronic repeated hæmorrhage.

Classifications.—The most reasonable classification of bleeding from Peptic ulcers is acute, severe hæmorrhage and chronic repeated hæmorrhage.

The Treatment of Acute Severe Hæmorrhage.—An abrupt severe hæmorrhage from an ulcer is shown either by hæmatemesis or Melæna or both together with the general phenomena of collapse from rapid loss of blood often assuming a condition of grave illness and anxiety.

With this picture of the patient before us, we can very easily gather points and say that everything in the condition of the patient goes to suggest the conservative treatment by rest of body, mind and functions of the stomach. The low blood pressure, the increased coagulability of the blood are all points which suggest the arrest of bleeding, whereas the collapsed condition of the patient is strongly against any surgical treatment.

Again there are many conditions which give rise to severe gastric hæmorrhage *e.g.*, Cirrhosis of the Liver, Splenic anæmia, malignant disease of the stomach and neighbouring organs, rupture of an aneurysm in the œsophagus, many toxic conditions with erosion of the stomach, mucous membrane and some primary blood diseases *e.g.*, Pernicious anæmia, Leukemia, Hæmophilia and Purpura Hæmorrhagica.

In some of these cases the ætiology of hæmatemesis is easily found out but in others it is not at all easy. The patient's condition is serious and does not allow any detailed examination

clinically and pathologically with the exception of purpura hæmorrhagica and splenic anæmia: non-ulcer cases of hæmatemesis do not require surgical treatment at all and therefore immediate remedies are medical rather than surgical. Again, it has been shown by Peterson that the mortality rate in those cases where medical treatment has been adopted is only 3·8; on the other hand in the Lindberg series where the treatment was surgical, the mortality was 36 per cent.

Again, it must not be forgotten that due to severe hæmorrhage the operative technique is difficult and sometimes it may be very difficult to find out the existing region.

Thus, we may summarise by saying that the immediate treatment of acute hæmorrhage from Peptic Ulcer is medical rather than surgical.

Medical Treatment.—The underlying principle is complete rest of body, mind and the functions of the stomach. The patient is put to bed, given $\frac{1}{4}$ th grain of Morphia with 1/100th grain of atropine. It may be repeated if found necessary. Some do not think that there is any necessity for injections of Calcium chloride or various types of hæmostatics but I like to use them. No food or drink is given by mouth for 48 hours but frequent washes of the mouth are useful to prevent the development of parotitis. The patient should be given 15 ozs. of normal saline every 6 hours by the rectum and the colon should be made empty by means of a daily enema of plain water.

If there is much dehydration, subcutaneous saline may be given. There is no object in giving ice to suck. If the blood pressure goes below 100 m.m. Hgr. or hæmoglobin percentage below 40, the patient should be transfused.

It may be repeated 3 or 4 times. The slight rise in blood in the stomach acts as food and increases the peristalsis and secretion. Therefore the stomach should be washed with four ounces of ice water till the returning fluid becomes clear. Then a dram of 1 in 1000 adrenalin is put in the stomach which will reach the bleeding point after it is emptied and since it is not absorbed through the mucous membrane of the stomach it will not raise the blood pressure.

After 48 hours the ordinary medical treatment is continued and if there is anæmia it should also be treated.

The treatment of repeated small hæmorrhages from the chronic ulcer is the same while the bleeding is going on.

The medical treatment consists in putting the patient to bed, injection of gr. $\frac{1}{4}$ of morphia with atropine gr. $\frac{1}{200}$ and this may be repeated if necessary. Calcium Chloride, horse serum may also be injected. If the bleeding still continues, the stomach should be washed with 5 ounces of ice cold water till the returning fluid is clear and a dram of 1 in 1,000 adrenalin put in the stomach. There is no sense in transfusing the blood while the bleeding is still going on as this raises the blood pressure and will in no way increase the coagulability of the blood. Meanwhile the mouth should be frequently washed to prevent the parotitis and rectal saline may be administered.

The resulting anaemia should be treated with iron, arsenic and campolon. If the haemoglobin percentage is below 40%, then blood transfusion of 200 c.c. should be carried to raise haemoglobin percentage and operation should be undertaken as soon as the haemoglobin percentage has reached to 60%. The operation of choice is Pyloroduodenectomy, infolding of the ulcer with Posterior Gastro-jejunostomy or Finsterer's operation of partial gastrectomy according to the conditions found and the experience of the Surgeon in the particular operation.

Perforation: Various operations have been suggested. Again, many factors are to be taken into consideration before one can say that this is the best method of treatment in this condition: the condition of the patient, the experience of the Surgeon in gastric surgery and the assistance at hand. It may be said as a general rule that the least is done the better. Simple closure of the perforation is more than sufficient unless it is not going to produce the narrowing of the pyloric outlet in which case the posterior gastro-jejunostomy is to be added.

Pyloric stenosis: Retrocolic, Posterior, Isoperistaltic gastro-jejunostomy is the operation of choice and it has given the most satisfactory results.

III. Treatment of uncomplicated duodenal ulcer which has resisted medical treatment:—It is very unreasonable and unscientific to adopt any particular operation without doing a gastric analysis and an X-ray picture of the stomach and first part of the duodenum. The findings of these two investigations, which will aid the correct line of treatment, can be easily depicted diagrammatically as follows:—

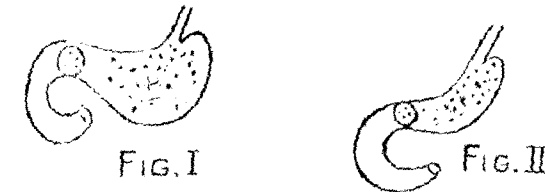


Fig. I. This figure shows that there is not much acidity. The stomach also is not either hypermotile or hypersecreting and therefore in this type of case there is no fear of any high incidence of Post-operative gastro-jejunal ulceration. Therefore, the infolding of the ulcer with posterior gastro-jejunostomy is the operation of choice and gives the most satisfactory result.

Fig. II. This is the type which contains a lot of free hydrochloric acid, the stomach is hypermotile and hypersecretive and is met with a high incidence of the post operative gastro-jejunal ulceration.

It is in this type of patient that there is a great controversy about the incidence of post operative gastro-jejunal ulceration and the various methods of operations to overcome this complication. It may be put as the accepted view that the post operative gastro-jejunal ulceration in this type of case is not more than 4 to 6 per cent. The various operations adopted are:—

1. Infolding of the ulcer with posterior gastro-jejunostomy.
2. Gastro-duodenostomy.
3. Partial gastrectomy.

1. Infolding of the ulcer with posterior gastro-jejunostomy: Mr. A. J. Walton has produced a large series of follow-up cases to show that the incidence of post operative gastro-jejunal ulceration is never more than 3%. Therefore the reason for favouring this operation is as follows:—The mortality rate of gastro-jejunostomy is $\frac{1}{2}$ to 2 per cent. The mortality of partial gastrectomy 3 per cent. Post-operative gastro-jejunal ulceration is 10 per cent and therefore the total mortality of patients treated by this method is much less than the average mortality of partial gastrectomy of 8 per cent.

"But if the operation is necessary it must be made safe and I am perfectly certain that the surgeon who can produce a mortality of 1 per cent in gastro-jejunostomy can show as low a figure for physiological gastrectomy" (Ogilvie, Lancet pp. 419 Feb. 23, 1935). Therefore, we can say that there is an old school which

maintains that it is not possible to be a gastric surgeon to lower mortality of physiological gastrectomy to 1 or 2 per cent for an average general surgeon; but on the other hand there is the new school which maintains that if you want the correct line of treatment you try and perfect the technique.

As there is another school which favours gastro-duodenostomy, the main reasons for doing so are (a) the acid chyme comes into direct contact with the alkaline contents of the duodenum and (b) that the duodenal mucous membrane is more resistant to the acid chyme than the jejunal mucous membrane and therefore there is much less incidence of the gastro-jejunal ulceration. But anyhow this operation is not favoured in British Isles as the separation of the duodenum is difficult, there is much bleeding, and stitching also is more difficult.

Diabetes in Childhood C.J. Bloom, New Orleans, M. & S. J. 90:252 (Nov.) 1937.

This article is introduced by a short but interesting historical review. Congenital diabetes is rare, only 2 cases having been reported. Juvenile diabetes prior to 1900 was rarely recognized or at least rarely reported. It is now estimated to occur in 1 of every 8,000 children. This estimate indicates a total of about 25,000 diabetic or pre-diabetic children. More boys than girls are involved. Cities contribute a far larger percentage of these diabetic children than do rural districts. The racial distribution is still in dispute, but about 8 to 12 per cent of the patients are Jewish. Well-to-do children are more prone to the disease than the ones in moderate circumstances.

Trauma has been demonstrated to have produced both temporary glycosuria and diabetes. No definite relationship to diabetes in childhood has been shown in disturbance of the ductless glands, acute infection, syphilis, dietetic excess or obesity. The hereditary nature of diabetes is strongly supported but not proved. Bone changes occur in diabetes and can be demonstrated in roentgenograms.

The essentials of the treatment of diabetes in children are essentially the same as in adults. The important added factor is that some one and only one person must assume the responsibility for the observance of all rules and regulations. Diets are to be prepared which not only control the diabetes but furnish sufficient food for growth. Most children will exhibit normal growth on a diet which is two-thirds of the normal for the age.

The partitioning of the diet and the use of insulin and protamine-insulin are discussed. With modern methods of dietary control and the use of insulin, the expectancy of life in the diabetic child has been increased from two to between thirty one and thirty two years.—*A. J. D. C.*

The Modern Treatment of Gonorrhœa and its Complications in the Male

BY

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IN this article I do not intend to deal with the clinical and pathological aspects of Gonorrhœa; I am only going to deal with the treatment of the disease with all its complications.

To begin with, there is an idea prevalent among the lay public and also among the older School of Medical men that Gonorrhœa is incurable. But with our modern methods, Gonorrhœa is curable, unless it is left untreated or wrongly treated for years, but even then the gonococci can be removed from the system, although some of the damages already done may not be reparable i.e. Stricture, Chronic Arthritis, Chronic Cystitis, etc.

Treatment.—*Anterior and Posterior Urethritis with Lacunitis:*

This requires daily irrigation with Pot Permanganate 1/8000, then, instillation into the anterior urethra of acriflavine 1/1000; this should be done twice a day morning and night, and along with this a vaccine should be used, to start with, a polyvalent Detoxicated Gono Vaccine, 1st dose, 2000 million; 2nd, 3000 million; 3rd, 4000 million; 4th, 6000 million; 5th, 8000 million; 6th, 10,000 million; and appropriate dose of Strepto-staphylo vaccine should also be added to the above.

Along with this a protein shock in the form of Aolan or Lactolan should be used every 4th day in graduated doses; instead of massive doses of 5 c. c. intramuscular injections, a few drops injected intradermally gives better results.

Some sort of urinary antiseptics should be given by mouth; a good prescription is the following:—

R	Sodium Bicarbonate	...	gr. 15
	Sodium Citrate	...	gr. 15
	Tin Hyoscyamus	...	℥ 5
	Tin Belladonna	...	℥ 3
	Calcium Gluconate	...	gr. 5
	Inf. Buchu. ad	...	℥ 1

Mft. mist. make 12 such. One dose 3 times a day in water between meals.

The above mixture has the property of making the urine Alkali thus making it difficult for the gonococci to live in its presence.

After using the above mixture for 15 days, one may change over to one of the dye products with advantage *i.e.* Neotropine (Schering's), Pyradium (Menley & James), Prontosil (Bayer's); but these should not be continued for more than one week at a time as they may cause Nephritis: a very good method is to give an Alkali mixture for 2 weeks and then follow it up by a dye product for 1 week and then repeat the Alkali mixture for another 2 weeks: by this time the disease is almost under control and one may give a healing mixture at this stage *i.e.*

℞ Oil of Sandalwood	...	3 2
Oil of Pimento	...	3 2
Oil of Cassia	...	3 1
Alcohol (90%)	...	3 6

Mft. mist one tablespoonful in water 3 times day after meals. To be continued for one month.

After all the symptoms have disappeared and no more pus is found in the urine, the massages should be started.

Anterior Urethral Massage.—This is done with the patient lying on his back on the operating table, first the urethra is irrigated with 2 pints of 1/10000 sol of Pot. Permanganate and then the meatus and glans is cleaned with a piece of cotton soaked in 1/100 Ben Iodide of Mercury Sol. and then a straight Urethral Bougie, well lubricated with liquid Paraffin is inserted into the Anterior Urethra and the Urethra is Massaged from down upwards with the thumb of both hands in such a way that the patient feels no pain and yet firm enough to press out the Pus plugs from the Lacunas.

This should not be done more than 2 times a week and only for 10 minutes at one sitting; and then fill up the Urethra with 1/500 Acriflavine Sol. and hold the Meatus for 10 minutes so that the lotion may remain and act within the Urethra, killing the gonococci on contact.

Cystitis, Vesiculitis, Prostatitis.—1. In cases of Cystitis all the general methods of treatment mentioned above should be followed; over and above this the Bladder should be washed 2 times a day with 1/10000 Acriflavine at body temperature and some of the lotion to be left within the Bladder for 2 to 3 hours; along with this Pyradium 2 pills 3 times a day should be given;

locally hot water bag to the lower abdomen should be applied: Bougie made up with the following to be applied per Rectum before going to bed.

℞ Morphine Sulphate	...	gr. 1
Atropine Sulphate	...	gr. 1/50
Oil of Theobroma	...	qs.
Fiat Rectal Bougie	...	make 4 such

One to be applied per Rectum last thing at night.

2. In Vesiculitis and Prostatitis:—Hot Rectal irrigations with a double channel irrigator, the lotion is generally 1% Boric which should be given as hot as the patient can tolerate, along with this a hot bottle or Antiphlogistine should be applied to the Perineum.

Injections of Prontosil Soluble 5 c.c. once a day should be given; Omnadin (Bayers) may be tried in this type of cases; Sterile cows' milk 2½—to 4 c.c. have been known to give good result: some authorities prefer Aolan to milk as it produces less reaction. After all acute symptoms have subsided completely, local treatment of Vesicular and Prostatic Massages with Iodex should be given, once every 4th day for 12 to 15 occasions along with other general treatment as mentioned above.

Epididymitis.—In this the patient should be put to bed and given absolute rest during the acute stage: hot fomentations given to the Scrotum or Antiphlogistine may be used; Massive doses of 5 c.c. 10% solution of Calcium Gluconate given intramuscularly give pleasing results, this may have to be repeated every 3rd day for 6 occasions; Prontosil—Red 2 pills 3 times a day gives good results. The Scrotum must be supported by a suspensory bandage: Surgical interference should be avoided as far as possible, as it may cause Blockage of the Vas Deference. After the acute symptoms have subsided the general treatment as mentioned above should be continued till a cure is obtained.

Gonorrhœal Arthritis.—In this a combined vaccine—Protein is indicated; Gono-Yatren (Bayer's) gives very good results. One c.c. given Intravenously every 4th day in severe cases; and in milder cases Intramuscular injections will suffice.

Graduated doses of Gono-Yatren give best results *i.e.*—

No. 1.	...	50 million.	G.C.
No. 2.	...	100	" "
No. 3.	...	150	" "
No. 4.	...	200	" "
No. 5.	...	300	" "
No. 6.	...	400	" "
No. 7.	...	500	" "
No. 8.	...	600	" "

After all local symptoms have disappeared, the general treatment should be continued till all the Foci of Infection are removed. Hot air baths and Diathermy often help the case to cure local symptoms.

Before I conclude my article I have to mention a few hints about Diet and also about the test of cure.

Diet.—The diet should be as simple as possible *i.e.* Rice, Bread, Green vegetables, Fish and Chicken. No red meat to be taken *i.e.* Beef, Pork, Mutton etc.; no condiments *i.e.* mustard, pepper, chillies, Sauces and Sour fruit. Plenty of Barley water must be taken all along the treatment; tender-cocanut water is very useful whenever obtainable as it makes the urine Alkali; milk mixed with water and sugar is very useful if taken in sufficient quantities all through the treatment.

Test of Cure.—It generally takes 2½ to 4 months to cure a new case; longer, in chronic cases. After all the symptoms have subsided the patient should be given absolute rest from treatment for 15 days and then an injection of Gono-Yatren 100 million Organism should be given, after that the patient is asked to take all sorts of stimulating food *i.e.* Meat, Spices, Alcohol etc. and asked to do physical exercises; the next day the prostate and Seminal Vesicles are massaged and the Smear is examined for gonococci; if on 3 occasions negative results are obtained, then we can safely pass the patient as cured.

Recent Advances in the Treatment of Gonorrhœa

BY

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GONORRHOEA is a very ancient disease. In spite of the numerous methods of treatment for gonorrhœa advocated by specialists, the good old treatment of massive lavage and alkaline diuretics aided by specific vaccine still holds the field. It is proposed here to review the new methods, as anything which will advance to the slightest extent the cure of this social scourge is a gain to that extent. It is well known that the old recognised treatment by lavage, alkalies and vaccine, takes a minimum of 8 to 12 weeks to declare a cure in the best of circumstances for a straightforward, uncomplicated case. So, any method of treatment which will shorten this period, however heroic or drastic, is a step in the right direction. This will be better appreciated if the incapacity, mortality, morbidity, sterility and other complications are taken into consideration, not to speak of the loss in the national wealth by unemployment and wastage in hospital accommodation for the treatment of this dire disease and its complications, immediate and remote.

The new methods of treatment for gonorrhœa may be classified under three headings.

- (1) The pyrexial therapy.
- (2) The dye therapy.
 - (a) The local treatment by dyes and
 - (b) Chemo-therapy by the administration of chemicals particularly of the sulphanilamide group.
- (3) The Antitoxin treatment.

Pyrotherapy.—Pyrexia as a possible method of treatment for gonorrhœa has been attracting the attention of workers in the field for a long time. It has been the experience of many a clinician that the urethral discharge in a gonorrhœal urethritis stops when acute complications as acute prostatitis, epididymitis, or spermato-cystitis occur with the usual accompaniment of high fever ranging from 103° to 105°F. That the development of the

and they think that four or five courses are sufficient for a cure. Their results showed 90 to 95 per cent success.

Hench (1936) reported prompt cure in 80% and relief in 90% of the cases treated and thinks that fever therapy by "Kettering Hypertherm" is the method of choice in acute gonorrhoeal arthritis. Simpson treated 31 patients with acute arthritis and in 29 of them the joint function was completely restored. In 14 patients with chronic arthritis of gonococcal origin, 92.8% showed ultimate improvement. Using the same apparatus, Owens reported 100 cases with 80% cure in two weeks. Trautman, Stroupe and Devlin (1937) treated 420 patients with fever by the "Kettering Hypertherm". Of these, 278 were suffering from gonorrhoea. This group was made up of 105 cases of acute epididymitis, 69 of arthritis, 3 of ophthalmia and 105 of various other gonorrhoeal conditions. In general, their conclusions were that 80% of the cases were apparently cured. Pyrotherapy thus offers immediate symptomatic relief and cure in gonococcal infections. According to Owens, ability to tolerate the hyperpyrexia depends on the condition of the heart, the resistance of the skin to heat and the temperament of the patient. Patients with hypertension and cardio-vascular, kidney and liver diseases and old age are contra-indications for this treatment and when the patient's pulse goes above 160, the temperature must be brought down. In spite of all precautions, complications such as headache, nausea, vomiting, fainting, muscle tetany, fibrillation, Inco-ordination etc. occur. Bierman and Horowitz have obtained brilliant results in female gonorrhoea by supplementing general hyperpyrexia with pelvic diathermy. They treated 41 patients and in 37 of them gonococci were absent in both the cervix and urethra after an average of 2.4 treatments. Horowitz stated at the Dayton Fever Conference that the vaginal electrode was in the shape of a cast of the vagina and that the highest temperature raised and maintained without damage to the vaginal mucous membrane was 111°F.

From a study of eighty seven cases, Parsons, Bowman and Plummer (1937) conclude that fever therapy produces more and quicker cures in the male than does chemotherapy. No untoward effect was noticed, but they are of opinion that patients over 40 years will not generally tolerate fever therapy.

Max Weinkamm (1937) advocates cauterization of the cervix with galvano-cautery in both gonorrhoeal and nonspecific cervicitis. He considers this to be an ideal method of treatment for

gonorrhoeal cervicitis, as a high degree of heat and deep action can both be obtained. For cauterization no anaesthesia is required as the cervix is insensitive and can be done in the consulting room itself. He never had any stenosis of the cervix. The end of postmenstrual period, that is 8 to 10 days after the beginning of the menses, is the best time. He reports twenty cases of acute and chronic gonorrhoeal cervicitis so treated. Of these, sixteen became negative to gonococci with one cauterization and two had to be cauterized twice before becoming negative and two were failures.

Dye Therapy.—Various kinds of dyes have been used in the treatment of gonorrhoea either for local application as irrigations or moist swabbing in females or for oral or parenteral administration. Dyes used for local treatment are :—

1. *Acridine*.—This is an acridine dye and is a powerful antiseptic: for irrigation 1-8000 to 1-4000 solution is used. For moist swabbing, half to one percent solution is used.

2. *Mercurochrome* 220.—This is a powerful antiseptic containing mercury in a nonionised form. It contains about twenty to twentyseven per cent of mercury. For irrigation, 1-2000 to 1-4000 is used and for swabbing and topical application half to two per cent is useful.

3. *Picric acid*.—This is a nitrophenol dye. For purposes of irrigation, a solution of one 1-500 to 1-2000 and for swabbing and for local applications one to two per cent solutions are employed.

4. *Picochrome*.—This is a new water soluble azo dye. Steinmetz recommends 1-1000 solution of the dye for anterior irrigation of the urethra to reinforce its effect when administered orally.

5. *Basic fuchsin*.—This is an aniline dye. Araya considers it to have greater penetrating power than other antiseptics and a special affinity for gonococci. It also possesses bactericidal properties in dilutions which do not injure the living tissues. He recommends a daily vaginal douche of two litres of warm water to which is added a teaspoonful of a solution consisting of basic fuchsin 1 g, Aniline 2.5 g, glycerine 10 g, and distilled water to 100 c.c.

6. *Flavadin*.—This is an acridine derivative and a compound of arsenic with a strong yellow colour. Even in very high dilutions as one in two hundred thousand, it is very active

against gonococci. Gans injects a two per cent solution of flavadin once a day with a special uterine syringe drop by drop into the cervix. Beginning with 0.5 c.c. he slowly increases it to 2 to 3 c.c. at a time. Ten to twelve injections are considered necessary by him, though the gonococci may disappear after the second or third injection.

Dyes used by oral, intramuscular or intravenous injections. The use of dyes as chemotherapeutic agents could be traced to the fact that certain dyes showed the property of selective staining for bacteria outside the body. From this it was conjectured that these dyes if administered internally might still have a special affinity to the bacteria and destroy them at the same time not injuring the body cells. The dyes so used are:—

1. *Methylene blue*:—This aniline dye is a good old remedy for gonorrhoea, and there are many proprietary preparations available with methylene blue as the chief ingredient. Its dose is one and a half to two grains three times a day.

2. *Picrochrome*:—Steinmetz advocates the use of this azo dye in capsules of 0.2 grms. each. Two capsules are given three times a day, half an hour before meals. No gastric or intestinal disturbance was observed. It is claimed that this drug is superior to other oral urinary antiseptics in preventing the incidence or severity of the complications. It is excreted through the kidneys without irritating them and its anti-bacterial properties are not affected by the reaction of the urine.

3. *Mercurochrome*, 220:—One per cent solution of this in five per cent solution of glucose is given intravenously 2 to 5 c.c. per dose for gonorrhoea on alternate days. Ten to twelve injections form a course.

4. *Acriflavine*: Neutral acriflavine, half a grain, three times a day is given by mouth. It is also given intravenously in one or two per cent aqueous solution on alternate days or every three days. Its action is intensified by keeping the urine alkaline. Though Carl Browning in 1921 used acriflavine intravenously in one-in-thousand solution, it did not come into general use. Murray (1930) used it in five per cent solution intravenously in five c.c. doses and found that it produced no better results than other methods. Hughes and Birch (1933) reported fifty cases of gonorrhoea treated with intravenous and deep subcutaneous injections of acriflavine 10 c.c. of one per cent

solution daily. Though the urethral discharge might cease in favourable cases, relapses were equally frequent. The drug also causes damage to the liver and the authors have abandoned the drug. Iswariah and Nair (1937) reported fifty cases of acute gonorrhoea treated with intravenous injections of two per cent acriflavine in distilled water, the dosage being two to five c.c. slowly increasing up to ten c.c. daily or on alternate days. Their conclusions also agreed with those of Hughes and Birch *i.e.*, the urethral discharge ceases after a few injections but relapsed on stopping the medication and in 15 per cent of the cases the discharge recommenced in spite of continued treatment. In their hands, complications to the therapy were practically nil, and there was evidence to credit the drug with preventing the incidence of complications due to gonorrhoea.

Sulphanilamide.—Meitzel and Klarer, working on azo compounds produced a dark red crystalline powder sparingly soluble in water and named it prontosil. Gerhard Domagk (1935) reported its startling effect in the treatment of infections of hæmolytic streptococci. Dees and Colston (1937) of the Johns Hopkins Hospital used prontosil album (Sulphanilamide) in the treatment of gonococcal infections, being struck with the favourable results obtained in the treatment of the meningococcal infections and of the close biological resemblance of gonococci to meningococci. Levaditi and Vaisman (1937) demonstrated the therapeutic success of this drug on experimental animals infected with gonococci. Harrold (1937) after treating seventy-nine patients with genito-urinary infections including gonorrhoea reported that gonorrhoea responded more favourably to this drug than to any other excretory antiseptics so far used. At the meeting of the American Medical Association (1937) in the Atlantic City there was a discussion about the treatment of gonorrhoea with sulphanilamide and the consensus of opinion was in favour of the drug. At that meeting Peterson reported his experience in 90 cases. He obtained satisfactory response only in twenty to thirty per cent. The successful result when it occurs was always in the first and second week. Many of these cases had recurrences. Reuter (1937) reported a group of hundred cases of all degrees and stages. He concluded that the use of sulphanilamide in gonorrhoea gives promise, being the first satisfactory treatment for that disease. Its effect is rapid when effective and in his series there was clinical recovery in 90%. It inhibits complications and is useful in the treatment of complications and sequelæ.

Anwyl-Davies (1937) reported a series of 40 cases of acute gonorrhoea in the male with 8 successes (20%). He came to the conclusion that sulphanilamide administered orally in acute gonorrhoea does not act satisfactorily. Erskine, Johnson and Lloyd (1937) of the Guy's Hospital, treated about 100 cases with prontosil album and were satisfied with the results in acute gonorrhoea and its complications. Hanschell (1937) was convinced that the new drug would be a specific for gonorrhoea. O'Handen treated 21 early acute cases in 14 of which the discharge ceased in forty-eight to seventy-two hours and in another 20 cases with cent per cent cure. Tant (1937) reported 14 cases with cessation of discharge in all of them in less than five days. Crean gave prontosil soluble by injection supplemented by oral administration of sulphanilamide and had 90% success. Colebrook has found that the injections of sulphanilamide are more effective than its oral administration in streptococcal infections. The same may hold good in gonococcal infections also. Cokkins (1937) considers the drug to be an effective remedy for gonorrhoea and most of its complications. Mahony (1937) obtained 84% success in 100 cases of male gonorrhoea he treated with heroic doses of 8 grms. per day, divided into six doses at four hourly intervals. Orr (1937) reported 134 cases of gonococcal infections of the genito-urinary tract with 87.3 % cures. Gans (1938) had 70 % success if acute and chronic cases were included and 80 % if only sub-acute and chronic cases were taken into account. The author (1938) reported 27 cases of gonococcal infections of all kinds with remarkable success. The results were uniformly good in chronic cases but in acute ones there was small percentage of failures. The treatment was found to be effective in infections of all kinds including complications. The drug was given by mouth in equally divided doses four times a day. For the first two days, three to four grms. and for the next two days, two to three grms. and for the 5th and 6th day, two grms. and for the next two days, 1½ grms. The drug was found equally effective in gonorrhoea in women, vulvo-vaginitis of children and gonorrhoeal ophthalmia.

A large variety of toxic byo-effects have been reported, some of them being sulphæmoglobinæmia, methæmoglobinæmia, anæmia, agranulocytosis, skin eruptions of various types, allergic manifestations, optic neuritis, nausea, vomiting, pain in the stomach and extreme prostration. In our series, the toxic effects were few and of a trivial nature.

Uleron, another compound of sulphanilamide, has been tried by Grutz for the first time in gonococcal injections. Grutz and a number of other German authorities consider the drug to be better in gonococcal infections than prontosil album. Though workers outside Germany do not completely agree that uleron is superior to prontosil album in the treatment of gonorrhoea, many admit that it is equally good. We have been using this drug for some time now and we find it to be particularly effective in chronic gonorrhoea and its complications.

The antitoxin treatment.—Serum treatment for gonorrhoea is not new. Work in this line was summed up by Minet and Debains (1923) thus: "unfortunately we know little about gonococcal toxin, and we do not yet know how to prepare an exclusively antitoxic serum. We are only aware of an antimicrobial serum prepared at the Pasteur Institute by Nicolle." Ferry and collaborators evolved a process of preparing a bouillon filtrate of the gonococcus and the properties it exhibited made them consider it to be an extracellular toxin. Repeated subcutaneous injections of increasing doses of the filtrate stimulated the formation of antisera with antitoxic properties. Ferry prepared an unconcentrated soluble toxin from the gonococcus by a method practically identical with the one he used for the preparation of meningococcal toxin. This was later concentrated by the Banzhaf method.

Anwyl-Davies (1937) reported a series of 157 cases of male gonorrhoea treated with specific antitoxin prepared in the Parke Davis research laboratories, by Ferry. He came to the conclusion that acute and chronic cases, complicated or uncomplicated, responded equally well and that the antitoxin possesses specific therapeutic properties. Clinical evidence indicated that active as well as passive immunity was established. Both concentrated and unconcentrated antitoxins were used and suggests a modified dosage for ambulant patients of 1 to 1.5 c.c. daily for 5 days followed by 1 c.c. every other day for an additional 5 to 10 injections. He concluded: "that this experimental gonococcus antitoxin would appear to be the most valuable remedy which has yet been forthcoming since gonorrhoea was subject to scientific investigation". His results were excellent 49.6%; good 26.9%; fair 14.8 % and bad 5.9 %.

Burke and associates (1938) analysed the results of their 129 cases of male gonorrhoea treated with the same specific antitoxin

and came to the opposite conclusions namely, (1) the "gonococcal antitoxin" appears to have no specific anti gonococcal effect; (2) it appears to delay the development of active immunity essential to recovery from gonorrhoea, without substituting any compensatory passive immunity; (3) its use in gonorrhoea is inadvisable on account of its lack of therapeutic value, its serious side effects, its frequent interference with recovery and a possible risk of allergic reactions if the patients require treatment with any antitoxic sera at some future date. Their results of 129 cases were: excellent nil; good nil; fair 13%; bad 87%; besides bad reaction in 41% and complications in 21%.

Vulvo-Vaginitis in children. All demonstrated that the thin vaginal epithelium of the immature animal could be changed to the adult type by the injection of oestrin and Lewis applying this principle introduced in 1933 the new treatment of gonorrhoeal vulvo-vaginitis in children with oestrogenic substances. He claimed greatly superior results for this method. This was also confirmed by many others. Lewis's idea in introducing this treatment was that the organic changes produced in the mucous membrane was the cause of the cure. Most of the authorities think that the gonococci are not able to penetrate the adult vaginal mucous membrane of squamous epithelium. Oestrin, when injected into immature animals, was found to provoke great proliferation of the vaginal mucous membrane and conversion into squamous epithelium of the adult type. Lewis and Wienstein (1936) have also shown that the change in the reaction of the vaginal secretion from neutral to marked acidity is an important additional factor. The reaction of the vagina differs at different ages. It is much more acid during the period of maximum sexual activity than in childhood or old age. The acidity of the vaginal secretion seems to be the best prophylactic against gonococcal infection. Administration of Oestrin to immature children makes the vaginal secretion strongly acid. They have also found Doderlein's bacilli in a few cases and their presence or absence seems to have no relation to the acidity or alkalinity of the vaginal secretion.

Oestrogenic substances are available in the market under a variety of names. Phillips mentions the following names: theelin, progynon, amniotin, menformon, oestrin, and folliculin. Large doses are necessary and failures are due to insufficient dosage. 2500 international units by intramuscular or subcutaneous

injection are necessary. Nabarro and Signy (1935) found that daily injections of 750 units of menformon had no effect. But three cases responded well to 1000 units daily for 6 weeks. These workers tried varying doses and came to the conclusion that the best dose was 1000 to 2000 international units daily by injections. They also tried oestrin orally in ten cases, being convenient, and they recommended 4000 units daily with an initial injection of 10,000 units, besides the oral administration. They described the effect of this treatment as dramatic. Kathleen Brown (1935) reported 9 acute and chronic cases of gonorrhoeal vulvo-vaginitis with daily injections of 200 to 900 units of oestroform combined with the local treatment of swabbing the vulva with saline and powdering it. Three cases responded well but the results in the remaining cases were disappointing. Phillips (1935) treated 13 children with oestrin with little success. Witherspoon (1935) also had no success with amniotin.

Vaginal suppositories were suggested by TeLind and Brawner; and Lewis and Adler consider the suppository to be an improvement on the injection. After a study of 165 cases Adler (1936) came to the conclusion that the suppositories were the most effective method of treating gonococcal vaginitis in children. Each suppository contains 1000 I. U. The suppositories should be applied every night for at least two weeks after the cessation of the discharge and after the smears have become negative. None of their cases showed any stimulation of the mammary glands or bleeding from the uterus, the disadvantages of this method of treatment. Thirty out of 33 cases were cured. Beltramini (1936) used folliculin with unsatisfactory results in the treatment of 30 girls with gonorrhoeal vulvo-vaginitis. Sacher (1937) used glycerinated amniotin suppositories containing 2000 I. U. of oestrin. Though he treated only a few cases he found that epithelial shedding began in 12 days and in 18 days all smears were negative for gonococci. No harmful results were noticed. The vaginal mucosa returned to normal within one month after cessation of treatment. Beltramini (1936) thinks that failures are due to the gonococci having become localised in the glands of the cervix, a site that is not affected by the hormone.

Rectal Gonorrhoea in Women.—This is a much disputed condition. Some authorities think that it is rare, while others think that the incidence of this condition is high and that it is

often overlooked, as it gives rise to no symptoms and even when it exists, the symptoms are mild. Martin emphasises the presence of mucopus in the last inch or two of the rectum as the most suggestive sign. In 1935, Clement L. Martin reviewed the literature on the subject and stated that in the recent German literature, the general opinion was that rectal gonorrhœa was very common and easily overlooked. The observations of Clements and Hughes also agree with those of Martin. In my experience, I have not come across even one case of rectal gonorrhœa in women, though hundreds of cases of gonorrhœa in women were under my care. Reports of such cases in the Indian literature are practically nil. It is suggested that the difference in the nature and mode of dress and repeated washing of the parts as a matter of daily ablution may be responsible for the rarity of this condition in Indian women.

Brunet and Salberg (1935) studied 250 cases of rectal gonorrhœa in women. They think that this condition is often overlooked as the proctoscopic examinations and smear examinations of the rectal secretions are not done. According to the European writers, the incidence varies from 15 to 85% of all gonorrhœa in women. These 250 cases represented 12% of all gonococcal infections in women.

Treatment. — Irrigation with Pot. Permanganate is not very effective. Acrillavine irrigation 1:5000 gave better results in the hands of Clements and Hughes. Martin recommends instillation twice daily of one ounce of 5% mild silver protein introduced through a rubber catheter. Rest, suppositories of 2% silver proteinate, hot sitz bath, a non-irritating diet, and mineral oil to keep the motion soft are the usual course of treatment.

In conclusion, the effective method of treatment of gonococcal infections is by the production of hyperpyrexia by "Kettering hypertherm" or by chemotherapy with sulphanilamide or its derivative, uleron. The antitoxin treatment is only on trial and the two reports so far available are conflicting. Pyrexial treatment by "Kettering hypertherm" though effective is risky and equally laborious and trying to both the patient and the physician. It also requires careful supervision by experienced physicians and nurses in fully equipped institutions and so is not likely to be widely used particularly by the general practitioner. So, treatment by chemotherapy with sulphanilamide or uleron is the best of all the known scientific methods. It is unique in the

simplicity of its administration, the short period of treatment the large percentage of success, its property as a preventive and curative of complications, the smaller percentage of serious by-effects among a multitude of them and its easy adaptability by the general practitioner. But it must be remembered that it is not a prophylactic against gonorrhœa and it should be used carefully and under the supervision of a physician. Though it is effective by itself as a curative in gonorrhœa, it is more effective in association with (1) alkaline diuretics, as it acts better in an alkaline medium, (2) local treatment with warm alkaline pot. permanganas 1-8000 to 1-10,000 and (3) vaccine to stimulate the protective mechanism of the body.

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Head Injuries

BY

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To write an article on Head Injuries which should be intelligible, comprehensive, easy to remember and at the same time brief, is difficult enough, but to condense, into four typed pages, an already abbreviated article running into twentyfour pages which I have just written for a book, seems to me a Herculean task. So, in this article I shall be able to touch only the bare outlines, which, however, I hope, will be found of some use in correlating one's ideas which get rather confused after reading all about fractures of the skull, concussion and laceration of brain, concussion and compression in a text book.

To start with, a proper *history* of the accident must be taken. If the patient is conscious but does not remember anything about the accident, one may safely conclude that he had concussion.

Determine if shock is present and to what degree; if there are injuries to the scalp, skull and brain and their extent. Whether there is any hematoma, depressed or other fracture. Examine mouth, ear and nose for evidence of hæmorrhage or escape of cerebro-spinal fluid.

The pulse is a good indication of conditions inside the skull.

A quick pulse of small volume usually means concussion. A slowing pulse of increased volume and tension means compression.

A very quick pulse with increased volume is an indication of cerebral laceration.

Respiration is slow and shallow in concussion and quickened in laceration. In compression, it is irregular and stertorous.

Irregularity of rhythm and a high temperature are danger signals.

Pupils are usually equal and contracted with a sluggish reaction to light. *If one pupil is dilated, does not react to light and if this has developed sometime after the accident, the probability is that cerebral compression is coming on.*

Look for twitchings of muscles, flaccidity or spasticity of limbs.

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X-Ray examination is often desirable to determine the presence or extent of fractures, bone splinters, foreign bodies, etc.

Fractures of the vault.—It must be realized that *extensive fractures of the skull may occur without much apparent damage to the brain, and on the other hand serious intracranial damage may result without any fracture.* The fracture occurs at the site of impact but the damage to the brain may either be underneath the fracture or on the other side directly opposite—'contre coup'.

Compound fractures of the skull must be considered a surgical emergency but the operation should not be undertaken before the shock has passed off. Most operations can be performed under local anæsthesia.

The damaged skin and tissues are excised, and the fracture explored. In fissured fractures nothing more is usually required except trying to sterilize the wound.

In depressed fractures, a U-shaped flap is turned down, so designed that after suturing the incision in the scalp would lie over sound bone. A $\frac{3}{4}$ " trephine hole is made along side and the depressed bones and trephine disc removed. Inspect the dura and brain, and if not damaged nothing further is done except suturing the scalp wounds leaving a drainage tube of soft sheet rubber like old rubber gloves rolled up. The drain is removed after 48 hours.

If dura and brain are damaged, wide removal of bone may be necessary. Horseley's skull forceps and Hoffman's gouge forceps are most useful for this purpose. Hot saline is used throughout. Bleeding vessels in the dura are ligatured by under-running the vessel. Bleeding vessels in the bone are treated with Horsely's Wax, or a peg made from a sterilized match stick is hammered into the bone.

Simple depressed fractures are not common in the adult. Whether they should be raised or not depends on the surgeon's experience, presence or absence of symptoms and extent of fracture of the inner table as seen in X-ray pictures.

Fractures of the Base of the skull.—These fractures are often compound; hence danger of sepsis is ever present. The treatment can be summed up in two words *matterly inactivity.* In the case of the ear, however, the external ear should be sterilized and a plug soaked in glycerine acid carbolic lightly placed and frequently changed.

The ear must not be syringed nor the nose sprayed as sometimes advised.

Hexamine is usually given; and sulphanamides on the first suspicion of meningitis developing.

Concussion.—Most cases of head injury show some evidence of concussion, immediately after the accident. The disturbance of consciousness is of varying degree and is accompanied by *amnesia* for the actual moment of the accident, the unconsciousness should not last more than half an hour; if it lasts much longer the patient is suffering from something more serious, especially if it gets deeper as well.

Contusion and laceration.—Unconsciousness may last hours and days. The prognosis is not good even if the patient survives. Decompression may be necessary. The only urgent indication for operation is increasing cerebral compression from such hæmorrhage.

Compression of brain is usually due to œdema following contusion, and hæmorrhage. Compression due to depressed bone cannot be severe. The commonest cause for which surgical interference is necessary is meningeal hæmorrhage. The middle meningeal or one of its branches is most commonly torn.

The clinical picture is as follows:—There may be unconsciousness from the very beginning; or the patient may be only dazed at first, stupor and unconsciousness supervening later; or there may be unconsciousness due to concussion, then a lucid interval, and finally drowsiness and coma. The last is the classical picture of middle meningeal hæmorrhage (though it is not always present).

Early signs of compression are headache, restlessness, intolerance to bright light, irritability. Restlessness after concussion is a suspicious sign.

Later:—drowsiness, unconsciousness, unequal pupils and an increasingly slowing pulse; with the onset of these symptoms, an immediate operation is indicated.

Lumbar puncture should not be adopted as a routine measure for diagnosis and treatment but should be done when compression is suspected to be developing.

Treatment.—In uncomplicated concussion, rest in bed, plenty of fluid (but not by the intravenous route), Chloral and bromides gr. xv each. If restlessness is not controlled hyoscine gr. 1/200 or luminal. Morphine should never be given.

The patient is kept in a dark, quiet room and left undisturbed.

The most important treatment of cerebral injury is dehydration. Mag. sulph. dr. ii in aqua 2 ozs. every two hours till watery evacuations start. If unable to swallow, mag. sulph. 3 ozs. in aqua 6 ozs. per rectum slowly.

Note that in concussion one supplies fluid, in compression and laceration, one dehydrates.

Decompression is usually done in the temporal region if bleeding is seen, more bone should be removed till the bleeding vessels are discovered and dealt with. If no hæmorrhage is found, the dura is opened crucially and left open. The muscle is allowed to fall back and scalp sutured.

After-Treatment.—This is most important. The convalescence must be long, four to six weeks, if late effects are to be avoided. The patient must stay in bed, on a low diet and bowels kept open with salines every morning; bromides or luminal at night.

There are certain peculiarities in children. The prognosis except in infants is better. Bones of the vault being elastic fracture is rare, even if it occurs, it does not extend far. Bone is more easily depressed usually without fracture. Likelihood of damage to meningeal vessels is less, and the brain of the child is less liable to permanent injury.

Contrary to advanced modern teaching, my advice is do not operate for a simple depression of bone. I would not call them depressed fractures unless there is some other urgent indication. Conservative measures answer well in children and I have never had occasion to regret omitting to operate on them. Depressions do not lead to traumatic epilepsy unless there is a spicule pressing on the brain.

A child requires more prolonged rest and freedom from studies.

Treatment of Heart Failure

BY

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THE treatment of acute cardiac failure is to relieve the labouring heart as much of its load as possible. This may be done by :

- (1) Rest, both physical and mental.
- (2) Slowing the Heart Rate by drugs.
- (3) Relieving any embarrassment of circulation due to venous engorgement.
- (4) Maintaining the Nutrition.
- (5) Removing oedema and effusion.
- (6) Relieving the disturbing symptoms such as Dyspnoea, Cough, and digestive derangement.

1. *Rest*.—Patient must be confined absolutely to bed under the care of a competent nurse. All unnecessary movements must be avoided, even feeding and brushing the teeth, that accelerate the pulse rate. The type of bed designed by Lewis is very useful for cardiac cases as it can be altered to provide the most comfortable angle at which the patient finds that he can recline. Arrangement of the pillows is important as slipping down in bed during sleep may provoke attacks of cardiac asthma. Sleep and mental repose are essential and restlessness, anxiety, dyspnoea with cough are the chief enemies to sleep; the voluntary movements of dyspnoea are disturbing. *Morphia* is the most valuable drug in the acute stages of Heart Failure. It can be given without danger. *Danger only lies in giving it in the presence of toxæmia.* The first evening gr. 1/4 to 1/6 may be given hypodermically and should be repeated on succeeding nights as long as needed. When the lungs are much congested it is wise to give atropine gr. 1/50 hypodermically 15 minutes before Morphia.

In an attack of *Cardiac asthma*, morphia acts as a specific and should be given at once. If *acute Pulmonary oedema* threatens, atropine should be given as well. Bleeding is beneficial when break-down has become acute. Intravenous injection of Strophanthin or Digoxin may be given if the patient is no longer on large doses of Digitalis. In chronic heart failure hypnotics may be needed over long periods. *Heroin*...

1/12 by mouth, is particularly useful for cough. A *Linctus* containing Heroin gr. 1/6 or *Codeine* gr. 1/4 is effective. Paraldehyde may cause nausea. It is best given with brandy. *Bromide* gr. 30 works well, reinforced by chloral gr. 15.

Barbitone groups are most useful when insomnia alone has to be defeated or when there is nervous unrest. They are less effective if dyspnoea or pain is present. Luminal and Medinal are the best.

2. *Venesection* :—When Ext. Jugular veins stand out tense, blood should be let out. Venous pressure of over 20 cm. is a call for venesection. This may be gauged by raising the patient and noting the level above the right auricle (manubrium-sterni, at which the Vein collapses. The essence of bleeding is the sudden removal of a larger quantity of blood from one of the veins at elbow. The amount will vary from 12-20 ozs.—The load on the right side of the heart is lightened.

Striking relief is afforded to a patient with enlarged and tender liver by putting six or more leeches along the right costal margin.

3. *Cardiac stimulants* :—*Digitalis* is the supreme cardiac stimulant. According to Cushny, its action on the heart is :

- (1) Stimulation of Vagus :—(a) Slowing of Pacemaker at the S. A. Node.
(b) Shortening of the refractory period of the auricular muscle.
(c) Depressing the conductivity in the conducting tissue.
- (2) Direct depressant action on the conducting tissues.
- (3) Direct action on the muscle fibres causing :
(a) Increase in strength of systole.
(b) Prolongation of refractory period.

In normal persons large therapeutic doses have got no effect on the rate of pulmonary circulation, nor on the venous pressure, nor on the arterial pressure. The output of the normal heart is decreased and the heart diminishes in size. In Heart failure when the output has become lower than normal, digitalis increases it. Size of the heart becomes less. There is improvement in the rate of pulmonary flow, in those cases who benefit from the drug. With the acceleration of the flow in lungs there is increase in the vital capacity and decrease in the residual air in the lungs due to lessening of the area of the pulmonary capillary bed. Digitalis

tends to decrease the size of the heart and increases the force of contraction. This benefits the dilated and failing heart and improves its output.

Auricular Fibrillation.—Therapeutic success of digitalis in this condition depends largely on its depressant effect on the bundle of His, both direct and vagal, so that the number of impulses transmitted to the ventricles is diminished and the ventricular rate is slowed. In the earlier stages of slowing, the effect is both vagal and direct, for fuller doses of atropine increase the ventricular rate. *Later on the slow rate is then due mainly to direct impairment of the function of conducting tissue.* The slowing of the ventricular rate permits a longer diastole, so that the ventricles are better filled and the duration of the phase of nutrition and of the rest is increased. The force of systole is thereby strengthened. If the effect on the conducting tissue is extreme, complete heart block may be induced, and then the ventricular rate becomes regular, at 40 beats per minute. Most patients will be comfortable at the rate of 70 to 80 a minute.

Digitalis and normal rhythm.—Clinical results of the effects of full doses of digitalis on patients with heart failure and normal rhythm may be summarised as follows:—

(1) *Slowing of the heart.*—This is the result of vagal stimulation and is more likely to happen in children. It may occur in adults too.

(2) *General improvement.*—A considerable number of patients show general improvement. Those with œdema seem most likely to improve and their condition may be greatly ameliorated, although there may not be any slowing of heart.

(3) *The blood pressure.*—Here the changes are not constant. The blood pressure may rise again if the heart is improved. This is seen in failure after hyperpiesis. If there is much œdema the blood pressure may be reduced. The full effects of digitalis should always be tried in cases of heart failure with normal rhythm, unless there are contra-indications.

Digitalis preparations.—A very large number of preparations of digitalis are on the market. Many of them are uncertain in composition and are not standardised. They are quite active, but their activity cannot be relied on.

(1) *Infusion of Digitalis.* Leaves is good, but it must be fresh.

(2) *B. P. Tincture.*—Is reliable and effective when given in adequate doses. It should be fresh. An old tincture deteriorates.

(3) *The Powdered Leaf.*—The 4 grain tablets of the British Pharmacopœia are equivalent to 10 minims of the tincture each. 15 ms. of tincture should be given for each 10 lbs. of body weight when estimating the total dosage.

(4) *Digoxin.*—It is a pure crystalline glucoside, isolated at the Wellcome Chemical Works from the leaves of digitalis lanta. It has got the advantage of being suitable for intravenous use. It is soluble in dilute alcohol and is injected diluted with normal saline.

(a) By intravenous injection: An intravenous dose of 1·0 milligram (gr 1/60) causes ventricular slowing which begins in 5 to 10 minutes and is maximal in 1 to 2 hours. The ampoules supplied contain 0·5 milligram.

(b) By mouth: One tablet of 0·25 milligram is equivalent to 15 minims of the tincture. 4 to 6 tablets cause a rapid fall in the ventricular rate in auricular fibrillation beginning one hour after and reaching a maximum in 6 to 7 hours. Six tablets can be given in a single dose to an adult weighing 10 stones or more. For patients who have had no digitalis recently, 4 to 5 tablets may be given. For light weight patients and for those who are on digitalis previously in some form or other, one tablet 6 hourly may be given, until the ventricular rate is controlled.

One tablet twice daily provides an adequate maintenance dose in most cases of fibrillation.

(5) *Guy's Pill.*—Digitalis leaves ... gr. 1 } — 15 minims
P. Squill ... gr. 1 } of Tincture.
Pil. Hydrargyri ... gr. 1 }

(6) *Strophanthus.*—The action is similar to that of digitalis. The preparations are uncertain in their composition. The toxicity is greater. For rapid action strophanthin gr. 1/150 may be given intravenously. The full dose should not be repeated within 24 hours. When given by mouth, strophanthus is uncertain in its effects, owing to the slow and variable rate of absorption from the intestine. *Quabaine* is a preparation of gratus strophthaines made from the strophanthus gratus. 0·25 mgm. is the single I. V. dose.

Methods of Administration. The amount of digitalis needed to produce full effect depends on the *weight of the animal*. A unit of potency has been introduced. One cat unit is 100 milligram of powdered leaf, needed to kill a cat of 1 kilogram when given intravenously. Eggleston considered that 0.15 cat unit per lb. may be needed to effect complete saturation with digitalis. 2.5 grs. of the leaves will be needed per 10 lbs. of body weight or 25 minims of the tincture. These doses are on the higher side, while in practice only 15 minims of tincture per 10 lbs. of body weight is quite sufficient. The really satisfactory method is close and careful observation of the effect on the heart rate in cases of fibrillation. Things to be considered are :

1. Urgency of the failure.
2. Rate of the heart on which depends the 1st. point.
3. The weight of the patient.

(1) *Urgent Heart Failure*:—The method of choice is the intravenous injection of 1 mgm. of Digoxin. Further doses of $\frac{1}{4}$ milligram may be given by mouth every 6 hours. If the tincture is used, 3 iiss or 21 grs. of leaves will be needed. This is to be given in 1st 24 hours, 3 iss, 3i, 3ss, 3ss at 6 hours intervals will do.

(2) *Moderate congestive Failure*:—Here the dosage may be spread over two or three days. It is necessary to allow 25 minims a day for wastage. 3ss T.D.S. for 3 days will do.

(3) *Auricular fibrillation*:—without failure.

Normal Rhythm.—When heart is failing with normal rhythm and the failure is severe, the large doses as in case No 1 should be used, otherwise it is better to use m xx every 6 hours. In adults there is no guiding fall in the rate of the heart, but in children it is deciding. In order to push the drug to the full, it is a good plan to base the dosage approximately on the weight of the patient remembering that it is only a rough guide. Signs of intoxication must be watched carefully. Diminution of venous engorgement, increase of urinary excretion if there is œdema, are signs that the optimum effect is being obtained. Paroxysmal Tachycardia, neither supraventricular nor ventricular tachycardia, derives benefit from digitalization during the attacks as a rule. Ventricular tachycardia may actually be provoked by over-dosage.

Undesirable effects of digitalis.—(1) Sinus arrhythmia owing to the stimulation of vagus. It may be respiratory or phasic,

A severe degree of slowing may provoke unpleasant symptoms of syncope. Atropine will abolish these vagal irregularities.

(2) Heart block due to stimulation of vagus and direct depressant effect on the bundle of His.

(3) *Extra systole*:—Auricular, if no fibrillation.

Ventricular:—They only appear when the rate is greatly slowed, coupling more likely to occur in fibrillation than with normal rhythms. Cases of sudden death due to overdose of digitalis are due to ventricular fibrillation.

Gastro-intestinal symptoms. Anorexia, nausea, vomiting and Diarrhoea when the full effects of the drug have been produced. Vomiting is a central reflex, arising in the heart. As anorexia precedes vomiting, a watch must be kept on this symptom and further disturbance is to be avoided. Vomiting may cause acidosis and full doses of atropine are the best antidote.

Urinary Excretion.—A diminution in the excretion of urine is an early sign of intoxication. Anorexia, Nausea, Bradycardia and Coupling are the indications that the full effect has been reached. It is then advisable to omit a dose or two. Then, the maintenance dose may be started, which usually works out at 3 ss a tincture or gr 3 of the powdered leaf or $\frac{1}{2}$ milligram of Digoxin daily.

Cases which fail to respond.—(1) Some cases of congestive failure with fibrillation. Here Diuretin may do good.

(2) Cases with Aortic valvular disease often do badly when the lesion is due to syphilis.

(3) The presence of chronic renal disease is an unfavourable complication.

(4) Sinus Tachycardia of Hyperthyroidism is not controlled by digitalis.

(5) Nervous patients with strong sympathetic tone, when fibrillating may need larger doses than ordinary.

(6) Digitalis is less effective in the presence of fever.

Heart Block and Digitalis.—*Contra-indications*:—Dropping of beat is a contra-indication to digitalis.

(1) Defective conductivity of the Bundle of His is the main contra-indication. Bundle branch block is no contra-indication.

- (a) Aortic Regurgitation.
- (b) High Blood Pressure.
- (c) Extrasystole apart from drug.
- (d) Vomiting from Heart failure is a call for digitalis.
- (e) Patients with complete Heart Block may receive digitalis and full doses without danger.
- (f) Pulsus alternans does not forbid it.

Electrocardiogram:—Appears 2 hours after the beginning of oral administration and persists for some days upto two weeks after leaving off the drug.

Depression of R. T. or S. T. Phase.

Flattening or Inversion of T. wave in II and III lead.

Slowing or widening of R. S. and diminution of R. height.

Early Heart Block as recognised by prolonging the P. R. interval.

Other Stimulants.—*Adrenalin*:—GENERAL: Stimulation of sympathetic nerve endings in the muscle. Other stimulants work through the vasomotor centre but this acts directly at the ending.

CARDIAC:—Powerful cardiac stimulant—Adrenalin is strikingly successful in cardiac arrest, whether in the form of Stokes-Adams attack or during anaesthesia. In peripheral failure it is used on account of its general action of stimulating the sympathetic. Action is temporary and lasts for 2 hours by subcutaneous route. In the treatment of cardiac failure it has got no place as it raises the B. P. and increases the load upon the heart.

Strychnine:—It has got no direct effect on the heart. It stimulates the C. N. System and with it, the respiratory and vasomotor centres, so that a general vasomotor constriction results, splanchnic area is particularly affected and coronary circulation is facilitated. When there is peripheral stagnation in addition to the cardiac failure, where venous engorgement is not present, a large flow of blood to the heart and an increased coronary circulation may cause a considerable improvement in the general condition and may even revive a moribund patient; gr. 1/10 must be given and less than 1/20 gr. is useless. Strychnine is useless in the true capillary paralysis which underlies the fatal form of peripheral failure and it must be regarded as a remedy which has a very limited application in any form of circulatory failure.

Camphor:—May stimulate the respiratory centre. Some people believe that it causes the coronaries to dilate. There is reflex stimulation of the centres in the medulla, so that general vasoconstriction occurs. It causes improvement in the pulse in cases of Pneumonia but not in heart failure.

Cardiazol and coramina are synthetic camphor bodies. Coramine stimulates the medulla in collapse and is valuable in reviving a depressed respiratory centre.

Ether and volatile stimulants:—Ether, ammonia, and other volatile stimulants when taken by mouth or in the case of ether after Hypodermic injection, act as local irritants. They are useful only in the type of "Heart attack" associated with distended stomach. They are rapidly carminative and reflexly stimulate the vasomotor centre so that relief is quick.

Oxygen:—Its value is only seen in cases where there is pulmonary disorder, such as emphysema or where the lungs are much congested. A soft rubber catheter smeared with 2% Novocaine in vaseline is introduced into the nose. It should be pushed in about 2" and should reach the post nares, but not touching the pharynx. It may be held in position by a strip of plaster on the face. The O₂ should be passed through a flask or bottle of warm water at the rate of one or two bubbles a second. O₂ thus may be given over long periods.

Promotion of Diuresis:—Digitalis alone, by improving the circulation, may cause the oedema to disappear. Guy's Pill, containing a grain each of digitalis leaves, mercury and squill is often very efficacious. When digitalis is unsuccessful, the oedema may be combated by diuretic drugs. Lastly, the special collection of fluid must be removed.

Diuretic Drugs.—(1) *Xanthine Derivatives*:—Caffeine is trimethyl xanthine. Theobromine is dimethylxanthine, its isomer is theophyllin. Theobromine, Sodium salicylate or Diuretin and Euphylin are very useful.

Diuretin	...	gr. x-xx	T.D.S.
Theobromine	...	gr. v-x	T.D.S.
Theocin	...	gr. iv-vi	B.D.T.D.S.
Euphylin	...	gr. vii-xv	Intramuscular injection daily.

Tablets. gr. 1/8, such 5 or 6 daily, by mouth.

Intravenous injection is also available. Most potent and safe diuretic.

Treatment of Iritis

BY

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THE success of treatment of Iritis depends largely upon its early diagnosis, cause and careful follow-up of every case. It will not, therefore, be out of place to consider very broadly some of the causative factors of this condition.

The factors that cause iritis are many, while, in a considerable proportion of cases all our investigations give negative results, thus giving us an 'idiopathic' group. Syphilis is responsible for about 25 to 30% of all cases of iritis. A plastic and a gummatous form may be recognised while a congenital form in babies of six months and under is not uncommon.

Gonococcal iritis is found in men in most cases affecting both the eyes and it is usual to get a history of at least one attack of arthritis prior to the eye affection.

A rheumatic form associated with attacks of acute rheumatism, gout, or other diseases like diabetes, also occurs.

Septic absorption from teeth, tonsils, nose, fallopian tubes, gastro-intestinal canal, may also produce iritis.

Iritis complicates various virus diseases like small-pox, mumps, etc.

Tuberculous iritis, though less common in our country, tends to occur in young adults and children.

Diagnosis.—The most important differential diagnosis lies between acute iritis and glaucoma. This is an important point that should engage the attention of the attending physician, as treatment based on wrong diagnosis leads to blindness, beyond repair.

The following table may be useful:—

Iritis.	Glaucoma.
1. Affects all ages; frequent in young and middle-aged people.	1. Common about 50 years of age.
2. One eye is affected; gradual or sudden onset without any warning.	2. Often both eyes show some symptoms. Onset is sudden; majority of cases give a history of warning symptoms.
3. Corneal transparency not affected. Aqueous may be cloudy.	3. Cornea is steamy. Corneal sensibility diminished. Aqueous clear.
4. Anterior chamber normal; or deep.	4. Anterior chamber shallow.
5. Pupil contracted;	5. Pupil semi-dilated—oval.
6. Iris dull in colour, loose pigment and posterior synechia present.	6. Iris clear. No synechia and loose pigment deposits.
7. Pupil reacts sluggishly.	7. Reaction often absent.
8. Deep circumcorneal injection.	8. Uniform injection of the eye ball.
9. Tension.—Normal or soft—rarely raised;	9. Raised tension; eye-ball feels hard.
10. Pain: Usually in the eye and in and around the orbit.	10. Severe pain all over the head, often accompanied by vomiting.
11. Sight: May be slight impairment;	11. Sight may be very little affected or completely blind.
12. Atropine relieves pain.	12. Atropine increases the pain and destroys the vision.

Treatment.—In any case, the aim of the treatment should be to alleviate the annoying subjective symptoms and to preserve, at least, useful vision, if not, full vision. Treatment can best be considered under the following heads:

(1) General. (2) Local.

1. **General Treatment.**—Where the cause of the condition is known, the respective general treatment should be given, viz. Anti-syphilitic remedies in syphilis, anti-rheumatic measures in rheumatism, anti-diabetic treatment in diabetes etc. A thorough search should be made for evidence of any focal sepsis and early adequate measures instituted to eradicate them.

2. **Local Treatment.**—This is mostly symptomatic.

Photophobia.—Keep the patient in a dark room or in a room with diffused light. Dark glasses may be worn. In severe cases, rest in bed is essential.

Pain.—This is often intense and keeps the patient in continued restlessness. Hot compress, thermo-pads, hot borio poultice relieve the pain in many cases. Mild galvanic, sinofaradic, and

sinusoidal currents may be applied. I have found their application in a few severe cases very helpful in addition to other analgesic remedies.

Drugs.—Aspirin in 5 grm. doses answers well in most cases in combating pain. A mixture containing sodium salicylate gr. 10 to an oz. is particularly useful in cases with rheumatic diathesis. Intra-muscular injections of sodium salicylate 1 gr. in 1 c.c. is very effective in cases where oral administration of salicylates fail.

Local Treatment.—Dionin 5% solution sometimes relieves pain. I have not had very good results with this alone, for alleviation of pain.

Leeches.—This, in my experience, is a very useful and a never failing measure. Two fairly big-sized leeches are applied to the temple of the affected side. As the leech goes on sucking the blood, it is interesting to watch the congested eye getting paler comparatively and the patient telling you that his pain is getting better and better. In this connection, it is important to know the exact method of successfully applying leech to the affected part as I have myself experienced and have also heard other people giving their difficulty in successfully applying the leech. The following is the method that I adopt with unique success in all my cases :

The temple of the affected side is well washed with soap and water and dried. I usually wait for a few minutes for the skin to resume its normal temperature at the site before the leech is applied. When the skin is ready, a small area is chosen and a paste of sugar and milk is made and smeared on it. The leech is put into a test-tube with its head towards the open end of the test-tube, the whole tube is gently inverted over the prepared part taking care to see the leech slowly slide along the sides of the test-tube with least disturbance to itself. The test-tube is kept inverted over the spot for some time until the patient feels the bite of the leech. The test-tube may be slightly moved to and fro so as to touch the head part of the leech to determine if the leech has really taken on well. Holding the leech with a towel and applying it on the part is always unsuccessful, probably the leech resents rough handling and suffers from shock, thereby after a few minutes' trial, it really becomes useless for application and refuses to bite.

Atropine.—When once the diagnosis of iritis has been made an intensive use of this drug is indicated. It must be started as

early as possible to avoid complications that would interfere with circulation of lymph within the eye ball and the vision. The action of atropine in iritis is two-fold. (1) It narrows the iris by contraction of its muscle fibres, decreases the hyperæmia within its vessels and thereby reduces the congestion and exudation. (2) The sphincter muscles of the iris are paralysed and allow complete rest for the diseased musculature—an essential factor for any inflamed and diseased organ. Lastly, any newly formed adhesions between the iris and the Anterior capsule of the lens (posterfor synechia) are broken and prevented by the dilation of the pupil. The dosage of atropine must be carefully regulated considering the degree of inflammation and idiosyncrasy of the patient. The useful working strength will be a 1% solution of atropine sulphate which may be instilled many times a day until a full dilatation of the pupil is obtained. It is usual to find well-formed adhesions and pigmentary deposits on the capsule of the lens in most of the cases that come up for treatment, and in such cases the condition has fairly advanced as not to have the desired action by atropine instillation alone. In such cases and in cases where the pupil does not act quite so readily to the instillation of the atropine drops, the following may be tried:

A drop of a 4% solution of cocaine is instilled into the affected eye. After a few minutes when the cocaine has had time to act on the iris, a drop of adrenalin hydrochloride, 1 in 1,000, is instilled. When the adrenalin has begun to act as evidenced by the blanching of the congested conjunctiva, a drop of 1% atropine solution is instilled. This process is repeated three or four times each time the patient comes for treatment. This, I have found very effective in a good many of my cases which would otherwise have been atropine resistant. The success of this method lies in the patience of the attending physician.

In cases where synechia has already formed, a much more powerful midriatic is required. This may be achieved by a sub-conjunctival injection of a synergic mixture of atropine, cocaine and adrenalin. In this connection, it may be mentioned that a few particles of atropine salt instilled into the eye may prove useful at times as well.

It must be remembered that on the early and judicious administration of this drug alone, the success of the treatment and prognosis of the disease depend.

The Treatment of Tropical Liver Abscess

BY

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It is probably true that of all grave tropical diseases none is more frequently overlooked as abscess of the liver. A few general remarks regarding diagnosis may, therefore, not be out of place before consideration of treatment.

The most frequent mistake is perhaps the failure to recognise the presence of disease of any description, even when a large abscess may occupy the liver. In an obscure fever, the discovery of leucocytosis without much relative increase of the polymorphonuclears should suggest the condition. The therapeutic effect of emetine confirms it. A common error is to regard the hectic fever of liver abscess as attributable to malaria and to drench the patients with quinine. In other cases, typhoid fever is diagnosed.

In some cases it is difficult to differentiate between a liver abscess and sub-phrenic abscess even after successful exploratory puncture. In such a case the injection of lipiodol 20 c.c. into abscess cavity and X-Ray examination is of great help. By this method we may definitely determine also the size, shape and boundaries of the abscess which may be of value in its successful treatment.

While the common error is to overlook the presence of liver abscess, it not infrequently happens that abscess of liver is wrongly diagnosed in the painful enlargement of cardiac failure, cirrhosis or carcinoma.

Treatment.—The introduction of emetine by Sir Leonard Rogers both in the prevention and cure of amœbic hepatitis and its sequel, liver abscess, has perhaps been the greatest advance in tropical medicine of the past quarter century.

Three methods of treatment in use at the present day may be considered:

- I. Emetine only.
- II. Emetine and aspiration.
- III. Emetine and open operation and drainage.

Eighty seven cases of liver abscess were treated by me during the period of seven years from June 1931 to June 1938.

I. Emetine only.—Can a liver abscess be cured under emetine treatment only? There is not the least doubt about this; 23 i.e. 26% of my cases were treated by emetine alone. It has been stated that emetine completely cures only the cases of acute amœbic hepatitis and that when actual suppuration takes place, aspiration is necessary. It is true that sometimes it is difficult to determine whether suppuration has occurred without exploratory puncture. In several of my cases diagnostic puncture was made and a few c.c.s. of pus removed and emetine has cured the abscess.

Emetine is given subcutaneously or intramuscularly in one grain doses daily for twelve days. In serious cases it is given in smaller daily doses or combined with strychnine gr. 1/64. In several cases after an interval of four or five days a second course of six or more injections has been necessary. There is much to be said for this purely medical form of treatment, but practically from the patient's point of view it will be an advantage to him to be relieved of the necessity of absorbing the detritus of a large liver abscess, by the simple procedure of aspiration. There is no doubt that convalescence is much more rapid when combining aspiration with emetine in the case of definite large abscesses. Further, there is evidence that some abscesses treated with emetine alone are liable to recur, as in the following case:

L. A. R. 40 years, Male. He had been in medical wards thrice before, in May and July 1933, and treated with courses of emetine. In November, he had emetine injections at home. In January, 1934, he drank heavily. On January 16th, had pain in right hypochondrium and a few days later, painful swelling at back. Two days prior to admission he had severe pain in upper part of abdomen and felt something giving way inside. He developed a troublesome cough bringing up pus and blood. He was treated with emetine and a large quantity of pus was aspirated from his liver. This case had full courses of emetine in June, July and November but the liver abscess was not cured. *It is essential that a large abscess should be aspirated.*

In order to lessen the danger of relapse, especially if cysts of *E. histolytica* are present in the stools, a course of E. B. I.

or yatern or the combined treatment is advisable. Stovarsol in 4 grain doses once daily for a week is also of value. Alcohol should be strictly avoided.

II. Emetine and Aspiration.—This is undoubtedly the method of choice in all large abscesses except for special surgical reasons when open operation may be required. 52 cases *i. e.* 60% of my series had this form of treatment without any fatality. Unless the abscess was superficial and pointing, every case had two or three preliminary injections of emetine before aspiration. This definitely reduced the congestion of the liver and the tendency to bleeding. Aspiration was done with a 20 c. c. syringe with large bore needle or by means of Potain's aspirator under local anaesthesia. I never use Manson's trocar and cannula which I consider a rather crude and dangerous instrument. Most cases required only one or two aspirations. One case required as many as six aspirations and over six pints of pus were removed and the patient was convalescent at the end of one month. The full course of emetine is given to all cases. If the pus first removed proves sterile, resolution nearly always takes place without drainage.

III. Operation and Drainage.—Twelve cases were operated on with three deaths: These three cases are described below:

1st case. Patient admitted with diffuse peritonitis. Laparotomy was done and a large quantity of typical liver pus evacuated. Drainage tube inserted. Patient died two days later.

2nd case. T. 40. Male, very large abscess below umbilicus; Jaundice, extreme anaemia; operation and drainage; Death 10 days later.

3rd case. I 25. Male. He had left medical ward 10 days previously against advice. Admitted with severe dyspnoea, fever with chills and rigors, pleuritic rub. Operation and drainage. Death the same day.

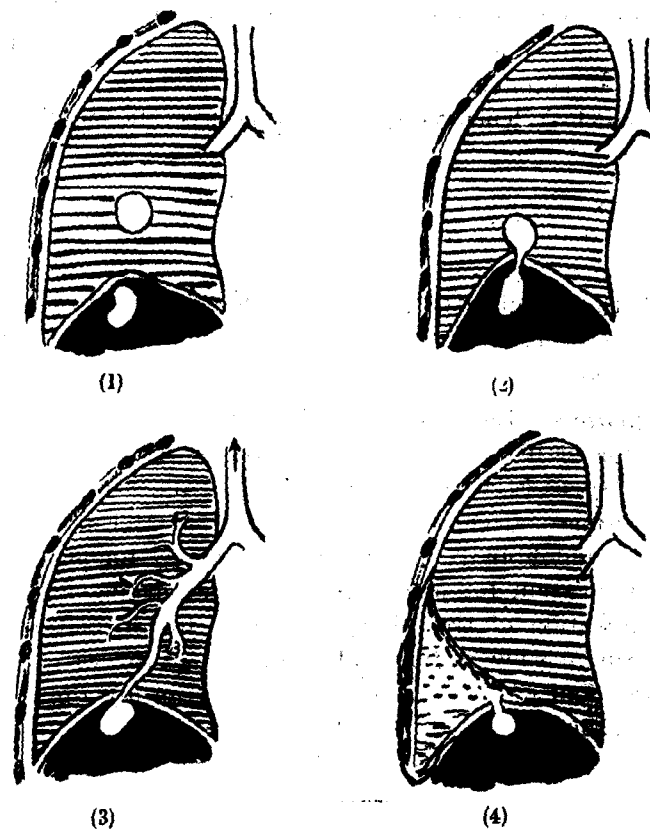
In the last two cases I believe aspiration should have been performed in preference to open operation.

From my experience of liver abscesses, I am convinced that the only indication for operation and drainage is heavy bacterial infection of the abscess. Fortunately, it is extremely rare for bacteria to be present in an unopened liver abscess. Liver pus was sterile in all my aspirated cases where bacteriological examination was done.

In one of my cases there was a localised epigastric abscess due to slow intraperitoneal rupture where incision and drainage was done. The patient recovered. Even here, I believe that careful swabbing out and primary suture was the correct treatment. In case of intraperitoneal rupture with diffuse peritonitis, if pus is found to be sterile, I believe it is wise and safe to close the abdominal cavity completely without drainage and to follow up with emetine injections.

It has long been recognised that to open and drain large tubercular abscesses is commonly fatal through secondary infection, sooner or later, and the same applies sooner than later to large bacteria-free amoebic liver abscesses.

Four types of pleuro-pulmonary complications occur in cases of amoebic liver abscess.



Four Types of Pleuro-pulmonary Complications.

- (1) Pulmonary abscess and independent liver abscess.
- (2) Pulmonary abscess extending from liver abscess.

- (3) Liver abscess bursting into a bronchus with little pulmonary involvement.
- (4) Liver abscess bursting into pleural cavity or transphrenic migration of amœbæ via the diaphragmatic lymphatics—producing an amœbic empyema.

In both types of pulmonary abscess the effective treatment of the liver abscess with emetine or emetine combined with aspiration generally cures the condition in the lung.

The prognosis is gravest when a hepatic abscess ruptures into the pleural cavity, and best when there is a direct communication with a bronchus. When there is a free communication between the hepatic abscess and a large bronchus, satisfactory evacuation usually occurs spontaneously. In other cases, it is essential that the hepatic abscess be treated by aspiration combined with emetine administration. In amœbic empyema aspiration alone without open drainage should be done. Only in cases of secondary infection, and especially if there is a polymorphonuclear leucocytosis and hyperpyrexia should thoracotomy and drainage be performed.

Mortality.—25-30 years ago, the mortality of liver abscess was 50-60%. This was due to two factors. Firstly, the open operation which was invariably performed, and secondly, the neglect of the administration of emetine after abscess was opened. In my present consecutive series of 87 cases, there have been three deaths, *i.e.* a mortality of 3.4%.

Conclusions.—Emetine alone is effective in small abscesses, but if at all large it is essential to aspirate, as there is evidence that such abscesses treated with emetine alone are liable to recur, sometimes after a prolonged interval. Emetine and aspiration is undoubtedly the method of choice for most cases. The only indication for open operation and drainage is heavy bacterial infection of the abscess. When for special surgical reasons open incision is required, primary suture, after letting out the pus and swabbing abscess cavity, is in my opinion the safest procedure.

Treatment of Malaria

BY

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THE first essential in the treatment of malaria is correct diagnosis. Malaria may present itself in many forms. In one group of cases, the chief clinical feature is that of a fever which may be intermittent, remittent, continuous or irregular. In another, the predominant features are those of cerebral, cardiovascular, respiratory, renal or gastro-intestinal disease, while in a third, they are those of diseases of the blood-forming organs. The only certain method of diagnosis in a condition with such protean manifestations is microscopic examination of the blood which should be done as a routine in every case in the Tropics, if the more serious forms of malaria are not to be missed. For efficient treatment not only it is necessary to determine the presence and the species of the malarial parasite, but also to discover the intensity of infection and the effects of such infection on the patient. Enumeration of the parasites in each field of the microscope in a thin film preparation will give valuable information on the severity of infection, while a thorough clinical examination including among other things, the estimation of the blood pressure, will enable the physician to ascertain the condition and the requirements of the patient rather than treat him as a mere case of malaria.

The treatment of malaria may be considered under two headings:—

- I. Specific treatment.
- II. Symptomatic treatment.

I. Specific Treatment.—There are two sets of drugs of proved value in the treatment of malaria. One set consists of the alkaloids of the cinchona bark and has been in use for hundreds of years. The other consists of the synthetic drugs, Atebrin and Plasmoquine, of comparatively recent introduction. In the treatment of malaria, two forms of the parasites have to be considered, the asexual forms which multiply in the patient's blood and produce the clinical effects, and the sexual forms which

although they play no part in producing clinical symptoms, are nevertheless, of importance in the propagation of the disease by the mosquito. The action of these anti-malarial drugs against the two forms of the parasites differs. The chief action of Plasmoquine is against the sexual forms while that of Atebrin and Quinine is against the asexual forms. Therefore, the drug of choice in preventing infection of the mosquito is Plasmoquine while for the clinical treatment, Atebrin and Quinine are the drugs to be used. Each of these two has its own special advantages and the choice of drug will depend largely on the experience and personal predilections of the medical man.

(A) Quinine.—Quinine may be administered orally, per rectum and by injection which may be intramuscular or intravenous.

Oral administration.—The method in general use and the most useful is oral administration. This may be done in the form of a mixture, powder or tablets. Owing to the bitter taste, the powder is usually administered in cachets. Tablets are very convenient but care should be taken to see that they are not inert. A tablet that does not disintegrate when placed in a tumbler of warm water for some time, is not suitable. For mixtures soluble salts are required. There are several salts of quinine available but they differ in their solubility and quinine content.

e.g.:—Quinine Hydrochloride	... 81.7% quinine
" Bihydrochloride	... 81.6% "
" Sulphate	... 73.5% "
" Bisulphate	... 59. % "

The sulphate is not very soluble and is usually prescribed with some acid. As whichever salt quinine is dispensed it is absorbed at the base and mostly in the upper part of the small intestines. In choosing a preparation, therefore, it is necessary to consider its quinine content rather than the solubility alone. The mixture that the writer most favours is as follows:

R Quinine Sulphate	... gr. vii
Pulv Acid Citric	... gr. xx
Mag. Sulph	... gr. x
Spt. Anisi	... m xv
Syr. Simplicis	... oz ½
Aqua Add	... oz i

An ounce for a dose, three times a day, for adults.

Given in this form, the quinine seems to be well tolerated and very effective. As a rule, temperature comes down and stays at normal in about three days in the great majority of cases and asexual forms of the parasites disappear from the peripheral blood in about 85% of cases by the end of five days.

Dose of Quinine.—Although quinine may be given in thirty grain doses daily to adults, twenty to twenty four grains are all that is necessary in the ordinary case. In the case of children, comparatively larger doses are required. Children stand quinine well and in their case, the effects of even Benign Tertian Malaria may be serious. It is, therefore, necessary to give quinine in adequate doses. As a general rule, it may be recommended to give double the dose obtained by the formula $\frac{\text{age in years}}{\text{age} + 12}$ to children up to 8 years e.g., child of 4 years may be given 10 grs. daily. Oral administration of quinine is difficult in the case of children owing to its bitter taste. Several tasteless preparations of quinine are available of which Euquinine (about 40% quinine) and Quinine Tannate (about 30% quinine) are examples. Owing to their low quinine content proportionately larger doses should be given.

Quinine in Pregnancy.—In Malignant Tertian Malaria, foetal infection with malarial parasites has been shown to occur and to account for a number of foetal deaths, while abortions occur due to the placental vessels being blocked with parasites. The risks of abortion, therefore, in untreated malaria are greater than the risks of abortion due to any oxytocic properties of any of the anti-malarial drugs, and a pregnant female has to be treated more vigorously than a non-pregnant one. Although Quinine in therapeutic doses is probably without effect in initiating uterine contractions, it, however, augments contractions already started. It is, therefore, recommended to give only small doses e.g., 5 grains at a time and these may advantageously be continued with sedative drugs; e.g., Pot. Bromide gr. xv; this may be given four times a day. In case uterine contractions have started, it is best to treat the patient with Atebrin, and not persist with Quinine.

Other methods of administering Quinine.—*Intravenous injection*.—This is the most effective way of giving quinine in cases where the patient is suffering from the pernicious forms of malaria such as the cerebral, algid or choleraic forms. Certain precautions have to be taken. Quinine should not be given in too concentrated or too dilute solutions. The correct dose and

solution is about six grains of the Bihydrochloride in eight c.c. normal saline. Ampoules of quinine for intravenous injection supplied by Parke Davis & Co, have been the most satisfactory preparation in the writer's experience. The injection should be given very slowly taking one minute for every c.c. of the solution. Rapid injections of intravenous quinine to moribund patients are more likely to kill them outright than to resuscitate them, while the beneficial effect of intravenous quinine properly administered is one of the most dramatic things in therapeutics. Therefore, attention to details is very important. Before an intravenous injection is given in a pernicious case it should be the invariable rule to take the blood pressure.

In these pernicious cases the blood pressure is often very low, figures as low as 80 Systolic are found. An injection of quinine further lowers the blood pressure by about 10 mm. mercury and the patient may not recover from this fall of blood pressure. Therefore, an intravenous injection should not be given if the systolic pressure is below 90 mm. mercury. In such a case the quinine is best given intramuscularly while measures are taken to raise the blood pressure. Meanwhile, normal saline and glucose either by the intravenous or rectal routes, along with intravenous injections of adrenalin 10 minims, coramine, cardiazol should be given. In about an hour or half the blood pressure would be found to have risen by about 10 mm. mercury or more, and at this stage the intravenous injection may be safely given. It may be repeated six hourly. Once the patient has sufficiently recovered to take quinine by mouth, intravenous injections are not indicated.

Intramuscular injections :—In cases where quinine cannot be taken orally owing to vomiting or where there is any urgency it may be necessary to give it by intramuscular injection. Absolute asepsis is necessary and only soluble preparations should be used. Wherever possible, it would be wise to use ampoules for intramuscular injection supplied by reputable drug firms, but where such are not available, Quinine Bihydrochloride gr. xx in 40 minims of distilled water, thoroughly sterilized by boiling may be given. The injection is made into the relaxed muscles of the upper and outer quadrant of the buttock. Injection should never be given into sites where nerves may be injured. In certain cases, in spite of all precautions, a quinine abscess may form, and rarely the solutions may get between the muscle planes and track down to the sciatic nerve and set up a severe neuritis. These accidents

are rare and they should not deter adoption of this method where it is indicated; at the same time there is no advantage in giving quinine intramuscularly where it can be given orally and there is an added risk. Routine injections of intramuscular quinine are not therefore recommended.

Rectal administration of Quinine :—There is difference of opinion as to whether quinine is absorbed per rectum. It is also said that it is very irritating per rectum, that it is not retained and that it causes ulceration and sloughing of the colon. There is no doubt that if the usual acid mixture of quinine is injected per rectum all this is true. With due precautions and modifications it is possible to administer quinine per rectum safely and effectively. In a number of cases where this was done with oral and intramuscular cases as controls, the results, although not as good, were quite satisfactory. Quinine appeared in the urine, temperature came down to normal, parasites disappeared from the blood and sigmoidoscopic examination of the colon showed no ulceration. The method recommended is to first wash out the lower bowel with water, then give a starch and opium enema. After half an hour Quinine Bihydrochloride gr. xxx in 3 ozs. of normal saline is injected into the rectum through a rubber catheter passed high up. The foot of the bed is raised and the buttocks are bandaged and the patient advised not to strain. It would be found that most patients will retain this quite well. Although not suitable for general use, occasions may arise where the method of rectal administration may be the only one available and therefore it is quite useful to have it in mind.

Duration of Quinine Treatment.—Whichever way quinine is given it is necessary to know how long to continue its administration. There are two schools of thought. Some advocate short courses of treatment repeated at intervals and others give quinine continuously for long periods. The form of treatment the writer has found most satisfactory is to give quinine in full doses for five days by which time the temperature would have come down to normal and asexual forms of the parasites would have disappeared. For another five days quinine is continued in the same dose but along with Plasmoquine Simplex one sixth of a grain twice a day. At the end of this period the patient is given a tonic consisting of iron, arsenic etc. for another ten days. Then a course of quinine gr. vii twice a day and Plasmoquine grain one sixth once a day is given for another five days. No further quinine is given unless there is a relapse when the original treatment is repeated.

(B) Atebrin.—The other drug of proved value in the treatment of malaria is atebrin. It is a yellow powder manufactured by the Bayer company. It may be administered orally or by injection.

Oral administration.—For oral administration atebrin is usually issued in tablet form (dose 0.1 gm.) The average daily adult dose is 0.3 gm. Children are given proportionately smaller doses, the following daily doses being those recommended for average sized children to whom it is best given in milk.

Up to 1 year	... 0.05 gm. (i.e. $\frac{1}{2}$ tablet).
1—4 years	... 0.1 gm.
5—8 years	... 0.2 gm.
Over 8 years	... 0.3 gm.

A course of oral atebrin for an adult consists of one tablet three times a day for five to seven days. Certain precautions have to be taken. It should never be given on an empty stomach, but after some food. A daily laxative such as *mist alba* should also be given to prevent any untoward effects. The immediate results of oral administration of atebrin are very similar to those of quinine. The average fever period (the time taken for the temperature to come down to and remain normal, calculated from first dose of medicine) in 220 cases treated with quinine gr. vii three times a day was 2 days and 6 hours while it was 2 days and 8 hours in 144 cases treated with atebrin 1 tablet three times a day. At the end of five days' treatment asexual forms of the parasites were found in the peripheral blood in 16.5% of 206 quinine treated patients, and in 10.3% of 241 atebrin treated patients. Quinine was however found to lower the temperature appreciably, that is by about 2° F. five hours earlier than atebrin. This was probably due to its antipyretic properties.

Atebrin by injection.—For injection, a soluble preparation Atebrin Mussonate, is available. It is issued in sealed ampoules in 0.375 gm. doses, and is readily soluble in water. The contents of one ampoule are dissolved in 9 c. c. of sterile distilled water. The injection is usually made intramuscularly and is given into the upper and outer quadrant of the buttock, taking the same precautions as in giving quinine. One injection suffices for a day and it should be repeated in 24 hours. Two such injections are often all that is necessary to control the fever and rid the blood of asexual forms of the parasites even in severe cases. It would

be advantageous however, from the point of view of preventing relapses, to follow up these two injections with a further five-day course of atebrin tablets by mouth. Intramuscular injections of atebrin mussonate are very rapid in their action and dramatic improvement is seen even in pernicious cases of malaria. If a more rapid effect is desired it may be given intravenously also. It would then be safer to inject 0.1 gm. intravenously and the other 0.2 gm. intramuscularly. After an interval of six to eight hours a further intravenous injection may be given if the condition of the patient shows no improvement. Intravenous injections should be reserved for desperate cases.

The action of atebrin mussonate by intramuscular injection has been compared with that of quinine similarly administered. Two injections of atebrin mussonate 0.375 gm. at intervals of 24 hours were given to one set of patients and two injections of quinine Bihydrochloride gm. xx at similar intervals to a control set. The patients were kept under observation in hospital where reinfection was not possible, for three weeks. Four hourly temperatures were recorded and daily blood examination done. It was found that atebrin mussonate was more rapid in its action than quinine, the fever period in the quinine cases being about 9 hours longer than in the atebrin cases.

With regard to relapses there were about 28% in the atebrin cases and about 50% more in the quinine series. This was during the Ceylon malaria epidemic of 1934—35 when exceptionally heavy infection was encountered; the relapse rate during ordinary times would probably be much less.

(C) Plasmoquine.—Plasmoquine has a pronounced action against the sexual forms of the all three parasites; it has also some effect on the asexual forms of benign tertian and quartan parasites. In the early days, after its introduction it was used in the treatment of clinical malaria, and comparatively large doses were given but with many toxic cases. Its chief use now is to destroy the gametocytes in the blood which are but little affected by atebrin and quinine, and which persist in the blood after the asexual forms and fever have disappeared.

Plasmoquine should not be given along with atebrin as the toxicity of both is increased; it may be given in combination with quinine and thus administered, it seems to make quinine more effective against relapses. The usual forms of treatment recommended by the writer are: (1) five or seven days atebrin followed by Plasmoquine Simplex gm. 1/8 twice a day for five days.

(2) Quinine for five days followed by Quinine and Plasmoquine gm. 1/6 twice a day for five days. Since its main use is not in the treatment of clinical symptoms there is no necessity to administer it to infants and very young children unless it is desired to completely sterilize a community of gametocytes. For adults the daily dose necessary is 0.02 gms. (gm. 1/3) and older children a proportionately smaller dose. With this dose gametocytes disappear from the peripheral blood in about 95% of cases in five days and in 100% cases in seven days. In patients untreated with Plasmoquine crescents have been observed for over three weeks in the peripheral blood.

Toxicity of antimalarial drugs.—1. *Quinine*: Nausea, noises in the ears and slight deafness are commonly met with in patients taking therapeutic doses of quinine but these hardly interfere with its continuance in the large majority of such patients. In certain sensitive individuals more serious symptoms supervene. Cutaneous eruptions ranging from erythema to urticaria may occur. Hæmorrhages, petechæ or purpuric in the skin, and in considerable quantities from the nose, gums, gastro-intestinal tract and urethra, have been found in patients suffering from severe malaria and treated with quinine, but it is not easy to determine how much of these are due to the drug and how much to change in the system caused by the disease. Amblyopia due to quinine is occasionally met with. One of its most serious toxic actions is the part it plays in producing hæmoglobinuria and predisposing to black-water fever.

2. *Atebrin*.—Yellow staining of the skin, sclerotics and tongue has been observed but it causes no inconvenience except for the pigmentation. It is however of importance for 2 reasons. It is frequently mistaken for jaundice; careful examination of urine for bile and the blood for the Van den Berg test and Icterus index will show that it is not jaundice. A series of hepatic efficiency tests consisting of the Bromsulphalein, Icterus index, qualitative and quantitative Van den Berg tests in the blood, and examination of the urine for bile pigment, bile salts and quantitative urobilin carried out in patients receiving atebrin, before and after treatment, showed no evidence of liver damage due to the drug. Instead with the cure of malaria the liver was found to improve in efficiency. The other importance of this pigmentation is that it shows a tendency in some cases for the drug to get deposited in certain tissues. The exact cause of this is not known. Toxic cases have been encountered where deep pigmentation of

the visceral tissues have been associated with the failure of the excretion of the dye by the kidneys, where, while the tissue fluids showed atebrin, the urine was quite free.

Severe epigastric pain is occasionally met with but this is due in the majority of cases to the disregard of the advice not to give it on an empty stomach. Cases of mental disturbances, sometimes of a serious character are occasionally met with, and these are too well authenticated to be all put down to malaria. Sudden collapse has been found in several cases where it was given by injection to small children. Toxic results will however be minimised if care is taken not to give the drug by injection unless the urgency of the case demands it, and also if cases of nephritis, advanced anæmia and severe malnutrition are excluded from atebrin therapy.

3. *Plasmoquine*.—When the drug used to be given in large doses toxic results were not infrequently met with. Cyanosis was an alarming symptom and is due to methæmoglobinæmia. Epigastric pain was met with and in certain cases a severe form of anæmia. At present when comparatively small doses are given hardly any toxic symptoms are met with, except in idiosyncratic individuals. Plasmoquine should be given on a full stomach, and at the first appearance of cyanosis or abdominal colic it should be withdrawn.

Although every medical man should be familiar with the toxic effects of the drugs he uses, undue importance should not be paid to them as would lead to withholding the drug where they are indicated. Toxic results are as a rule rare, and the risks of untreated malaria far exceed the risks of toxic effects from these drugs. Timidity to use the drugs in adequate doses is strongly to be deprecated.

Choice of Drugs.—It is necessary to say a few words on the choice of these drugs. The employment of plasmoquine should be reserved for the destruction of the gametocytes and in combination with quinine for the prevention of relapses. The clinical attack of malaria can be very efficiently treated by other drugs available. The question of whether atebrin or quinine should be used is often not easy to decide. They are both similar in action and in effectiveness, and are available in suitable forms both for oral administration and injection. In case of idiosyncrasy to atebrin or quinine, there is no use of persisting with the same drug, but the other should be used. The full course of atebrin treatment can be completed in 5 to 7

days and it is not unpleasant to take, but a course of quinine takes much longer, and its unpleasant taste and by-effects on hearing often prevent it being taken for the necessary period. The chief advantage of atebirin is in pregnancy and in those predisposed to Blackwater fever. It is also reputed to be superior to quinine in preventing relapses; but as there is no uniformity of opinion as to what constitutes a full course of quinine to be compared with the full course of atebirin which is known, no comparable figures are available. The writer's personal experience has been that a five day course of atebirin is superior to a five day course of quinine in preventing relapses, but not to a prolonged course of quinine for two weeks. A course of quinine for five days followed by quinine and plasmoquine for another five days was found to be superior to a course of atebirin for five days only followed by plasmoquine for five days. Relapses depend on numerous other factors besides the drugs used—the species and strains of parasites, the virulence of the organism and the intensity of infection, and not the least important, the resistance of the patient. Therefore, strictly comparable figures are difficult to obtain. Quinine has been in use for a long period and considerable tolerance has been acquired to the drug, and it may safely be given to patients who are ill with other diseases where atebirin would be contra-indicated. There is no objection to treating severe cerebral and other pernicious cases with both atebirin and quinine simultaneously.

II. Symptomatic Treatment of the individual case.—The following observations made during the recent Ceylon epidemic may perhaps be of value in the treatment of the individual case.

The case mortality in a series of 647 cases was 4.3%, but 28% of these deaths were in patients admitted moribund and who died within a few hours of admission. The mortality in those in whom there was a reasonable chance of treatment was 3.09%. Malignant tertian infections were eleven times more fatal than benign tertian ones. The cerebral, algid and choleraic forms were extremely serious conditions with heavy mortality rates. The mortality in this group was 18% while that of the ordinary febrile cases was 1%. Malaria was more fatal to women than to men and more fatal to the pregnant women than to the non-pregnant. The prognosis was bad in patients with low blood pressure such as a systolic of 90 mm mercury and in cases of heavy infections. The occurrence of vomiting and hiccough in patients already

severely ill was of very grave prognosis. The important points in treatment are as follows:—

- (1) In the severe forms *e.g.* algid, cerebral etc. vigorous treatment by injection is necessary. Careful attention, however, should be paid to the condition of the patient. Directions for giving intravenous injections have already been given. Comatose and semi-conscious patients may also be given quinine or atebirin through a nasal tube passed into the stomach, and they may also be given glucose or milk in this way.
- (2) Lumbar puncture is of value in cerebral cases and often relieves fluid under tension.
- (3) Vomiting in malaria quickly responds to adrenalin which should be given in 20 or 30 minim doses in $\frac{1}{2}$ an ounce of iced water every hour, for 4—5 hours.
- (4) Hiccough calls for prompt treatment as it exhausts the patient. Choretone gr. x to xv in capsules, or Benzyl Benzoate 20 drops of a 20% solution in alcohol taken in water may be found of value as also mustard plaster to the epigastrium and a fly blister over the phrenic nerves in the neck. In both these conditions specific antimalarial treatment should be given by injection.
- (5) In the case of infants and young children, the danger of fatal convulsions is great due to sudden rises of temperature. An antipyretic drug like Pyramidon may be given if the temperature is very high. Chloral and Bromide should be given in addition to the quinine, and in the case of children attending for out-patient treatment, it would be a wise practice to prescribe a separate mixture of chloral and bromide and give clear instruction to the parents for its use when fever rises high and also at the first premonitory symptom of convulsions. By this simple expedient, lives can be saved.
- (6) There is no reason to starve a malarial patient; except during the height of the fever when only liquid diet may be retained, the diet should be as generous as possible. Starvation produces a vicious circle and delays recovery.

- (7) In chronic malaria, the anæmia has to be treated on its own merits. Iron, liver, marmite, liver extracts, will all help to hasten recovery.
- (8) Removal from endemic areas to more healthy districts is necessary in chronic relapsing cases.

In conclusion it cannot be too strongly emphasised that no case of malaria is too hopeless for treatment; there is no field of medicine where difficult cases offer more perplexing problems both in diagnosis and treatment, and where correct diagnosis and intelligent treatment are rewarded with more dramatic results.

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Treatment of Acute Otitis Media

BY

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I. In the case of acute *non-suppurative* i.e., the acute catarrhal otitis media (also called the sero mucous middle ear catarrh), the treatment should begin with (1) clearing the fluid in the tympanum. This is best done by inflation by Politzer's method, and repeated every other day till the exudate disappears. Gentle massage of mastoid from above downwards with a little lubrication, daily for about five minutes, is of doubtful value. Similarly, small fly-blisters, below and behind the ear, are also believed to be of some use in diminishing the exudate. Under the above treatment, if the fluid persists even after a week, the membrane should be incised with the strictest asepsis, lest a non-suppurative condition be converted into a graver suppurative one. In adults, especially in these non-suppurative cases, paracentesis can be performed, under local anaesthesia. A pledget of cotton wool soaked in Bledvad's drops (cocaine hydrochlor and acid salicylas āā oz. 1 with spirits rectificatus 3 oz.) is placed against the drum-head and retained therefor about 20 minutes before the operation. Even after paracentesis, daily inflation is quite essential not only to drive out the fluid, but also to keep the opening patent. In addition to inflation, sometimes suction may have to be employed by means of a Siegel's speculum, in those cases when the exudate is too viscid to be completely driven by inflation alone. After inflation, the meatus is cleaned and dried with sterile gauze or cotton wool, and a pledget of wool is placed against the meatus. The usual massage of the mastoid process may also be continued with some advantage. The tendency for the incision to close can be further prevented if the patient is made to do the Valsalva's experiment three or four times a day, in addition to the daily politzerisation above. In spite of this, if the perforation closes too soon, there is no harm in repeating the incision. Under this regime, one should expect a cure within a month, at the latest; if not, either general constitutional conditions or the causal local conditions in the nose or nasopharynx, especially adenoids in children, should be immediately attended to.

II. In the *acute purulent* variety of Otitis Media, the treatment depends upon the clinical type.

1. In the milder forms, where a perforation is not likely to occur, all that is necessary is to carry on the usual general measures, *viz.*, rest indoors, or in bed, for children, free bowels with calomel at night and salines in the morning, and a conservative treatment locally. 15 gr. each of acid carbolic and menthol, mixed in oz. iv of glycerine is a good sedative for the otalgia. Cocaine, menthol in paroline, laudanum, and a patent costly preparation called Otagen can also be used as ear-drops with advantage. Dry heat, either by a half filled hot water bottle, or hot salt or bran bag, radiant heat from a carbon bulb, or the hot air douche, should be invariably recommended; but poultices are condemned. The ear drops and fomentations can be used as often as desirable. After the inflammation has subsided, it is better to advise the patient to undergo a course of catheterisation or politzerisation, just to hasten the return of hearing.

2. In the more severe type of inflammation, where a tiny perforation has occurred or is imminent, paracentesis is certainly called for. The following are the detailed data for an immediate paracentesis:—A rise in temperature persisting, severe headache, drowsiness or vertigo, pain so severe as to rob the patient's night sleep, marked deafness; and by examination of the drum-head either a severe form of inflammation, or a localised collection bulging a small area of the drum, or a pulsating discharge through an inadequate drainage, especially in a bulging drum. It will not be out of place to mention here that many a patient may think that "puncturing the drum" will make him deaf. One justification is that even if the incision may not save the hearing, it will not affect it adversely, and "to wait for the drum to burst" not only imperils his hearing to a greater degree, but also endangers life itself. Secondly, a timely myringotomy may not prevent a mastoiditis in all cases, but it is certain that it lessens the chance of mastoiditis by providing a free drainage, and hence our justification. Besides, it relieves pain immediately.

It is useful to remember a few technical details of myringotomy. Especially in purulent cases, the operation is so agonising, though momentarily, that a general anaesthetic is essential even in adults, preferably ethyl chloride. Of course, in children it is more useful to control a restless child. It is not advisable to syringe the meatus either before or immediately after the operation. The skin and meatus can be cleaned with spirit or Tr. iodine swabbed. Recumbent position with head slightly raised and face turned to

the sound side is very convenient. After focussing the light, the meatus is swabbed of any pus, and the speculum introduced only till the isthmus, lest the approach be made still narrower by the thickness of the speculum. The myringotome is held by the free hand like a pen, and introduced just above the meatal floor, but not touching it. It should be remembered that as the meatal floor dips, it is difficult to see the lower part of the membrane, and so the knife should be depressed before pushing the point through the maximum bulging part of the membrane. Further, if we remember the natural anatomical slants of the membrane (which are more marked in children) and especially to ensure a thorough cut (not merely a scratch) of the most dependant lower part of the membrane which is not so easily accessible as the upper one, due to the slants mentioned above, we would appreciate the rationale of carrying the incision always from below upwards, though some authorities would advise otherwise. By the latter process, the receding lower part of the membrane is likely to escape unhurt. The fibrous architecture of the membrane is like a spider's web. So, a straight incision will not collapse the membrane as a curved or an angled one, behind the handle of the malleus. The only remote dangers are, dislocation of incus or stapes, and puncture of a highly placed jugular bulb. The latter can be easily arrested by packing. The after-treatment consists in giving the inflamed tissues absolute rest for 48 hours, *i.e.* no syringing or mopping till acute symptoms disappear. All that is necessary is to cover the ear with dry dressing and changed as often as is necessary; not even hydrogen peroxide drops. Nasal douching or a gargle or any operative measures for tonsils or adenoid within three weeks of subsidence of temperature, are contra-indicated. Of course, a concurrent nasal infection should not be overlooked. Oily sprays to the nose and steam inhalations are recommended.

After paracentesis, the exudate in the beginning is rather blood-stained serum, and it is only after sometime that copious purulent discharge is seen, with marked relief in pain. During this stage of purulent discharge, either due to natural perforation, or as a result of paracentesis, there are two simple classical methods of treatment *viz.*, (1) the dry method, by which a small piece of sterile gauze or cottonwool placed in the meatus, with the aid of sterile aurai forceps, and changed, as it gets saturated with pus. This is more convenient for adults, and when the services of a trained nurse is available. But in children,

and lower classes, (2) the wet method is more useful. The meatus is gently syringed with warm boric lotion or sterile saline solution as often as necessary, depending upon the rapidity with which pus accumulates. As the discharge diminishes, the frequency of syringing is lessened; but it is continued till the discharge stops entirely.

In those cases, where there is delayed healing or the condition tends to be subacute or chronic, Vaccine Therapy is supposed to be useful, especially in children. The pus for the Autogenous Vaccine is obtained from the tympanum either during myringotomy or when operating for acute mastoiditis, or from a natural perforation. In the latter case, the meatus is syringed with sterile saline, and a swab of cottonwool dipped in absolute alcohol left in the meatus for about five minutes. After its removal the necessary material is obtained by inserting a sterile platinum loop through the perforation, and transferred into a blood acetic agar plate.

If, in spite of adequate treatment, and especially in the absence of a nasopharyngeal infection, the discharge persists for more than 3 weeks or a month, without any improvement, a mastoid drainage is usually indicated. Further indications for a conservative mastoid operation are:—A copious discharge persisting, marked deafness, a tiny perforation, pain unrelieved even after paracentesis, and especially occasional diminution of discharge accompanied by pain and discomfort. Some otologists go to the extent of advising an early mastoid operation even in the absence of fever and mastoid swelling. Anyway, none can doubt the fact, that an early operation gives the best chance of restoring hearing, and obviates the dangers of intracranial complications.

After the acute symptoms and the swelling in the membrane have subsided, systematic inflation should be carried out, if the hearing does not improve rapidly. Adenoid vegetations and infections of nasopharynx should be attended to. Finally, it is very essential that the Surgeon-in-charge should satisfy himself that the middle ear cleft is dry, before discharging the patient as "cured", lest the condition should pass on into one of 'chronic otorrhœa' with all the attendant disabilities.

Pleurisy and its Treatment

BY

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THE treatment of pleurisy depends on a knowledge of its cause and also on a right understanding of its significance. That this is not always understood is frequently seen in patients with a history of pleurisy coming for consultation or treatment to the Union Mission Tuberculosis Sanatorium, Arogyavaram. Often, want of proper treatment of the initial pleurisy is the reason why later they have to come to the Sanatorium, sometimes with quite an advanced pulmonary tuberculosis necessitating a prolonged treatment, and also possibly requiring serious operative procedure which would have been avoided if the pleurisy had been treated on right lines.

Differentiation of Pleurisies.—When there is pleurisy, it is the duty of the doctor to find, if at all possible, the cause of the pleurisy. When there is exudate (wet pleurisy), this should be examined for any infecting organism. In many of the non-tubercular pleurisies, such as streptococcal or pneumococcal pleurisies, this is fairly easily found by simple laboratory methods. Pleurisy associated with neoplasm may sometimes be difficult to diagnose if there is not definite X-ray evidence of growth in the lung parenchyma, but effusions in such pleurisies are usually blood-stained and sterile. In tubercular pleurisies it may be possible to find the tubercle bacillus, but if the exudate is clear, this is possible in only a small proportion of cases by simple laboratory methods; cultures on special media or guinea-pig inoculation may be required to reveal the tubercle bacillus.

When there is no exudation associated with the pleurisy (dry pleurisy) the cause for the pleurisy may be difficult to ascertain with certainty.

If all the methods of examination available to the doctor have failed to reveal an infecting organism and the presence of a neoplasm is excluded, it is right to assume that the pleurisy is tubercular in origin. It has been estimated that 85 per cent of all pleurisies are tubercular.

Treatment.—It is impossible in this paper to deal in detail with the treatment of pleurisies caused by pyogenic organisms.

But it may briefly be stated that the old method of open drainage immediately the pleurisy is diagnosed, irrespective of the stage, is no longer used. The present technique is to use the closed method of aspiration and washing out during the early stages, with open drainage only if pus is definitely formed and the mediastinum has had time to become comparatively fixed. Many of the failures in the earlier treatment of such pleurisy by the open operation were due to the mobility of the mediastinum causing respiratory and circulatory embarrassment.

The treatment of *tuberculous pleurisy* differs considerably from the above in many particulars:

(A) *Treatment of General Condition.*—Whether the pleurisy is with or without effusion, the patient must first and foremost be treated as an individual suffering from tuberculosis. "A mere pleurisy which may develop into tuberculosis"—a description frequently heard—is not scientific, and leads to a wrong idea, often in the mind of the patient and even of the doctor. A tuberculous pleurisy is a sign of active tuberculosis, although sometimes it is a comparatively benign manifestation of this disease, provided the nature of the infection is understood and proper treatment instituted. The treatment should not be stopped with the disappearance of symptoms, such as fever and pain. But a general treatment under open-air conditions such as is carried out in a sanatorium, must be continued for at least two months more, whether the patient be in an institution or at home. Even after that time the family doctor should keep the patient under observation for the next two or three years, examining him about twice a year, even though the patient may appear to be well.

(B) *Treatment of Local Condition.*—Apart from symptomatic treatment, such as drugs and plasters for relieving pain, strapping, etc., each pleurisy has to be treated on its own merits. The most important thing to consider is the state of the underlying lung, and this to a large extent determines the treatment of the pleurisy. In some patients a careful elucidation of the previous history of the patient will give an indication of co-existent lung affection. But wherever possible, an X-ray examination should be made. If there is effusion, it may be necessary to aspirate this, as later described, in order to be able to see the lung condition.

1. *Dry Pleurisy*:—If, on examination, the lung is found to be free from tuberculous disease, treatment on general and symptomatic lines is all that is needed. If there is much pain

which does not yield to ordinary medication, an induction of artificial pneumothorax with just sufficient air to separate the pleural surfaces may be used for a few weeks.

If the lung is found to be affected, artificial pneumothorax has to be started without delay, to prevent the formation of adhesions between the visceral and parietal pleurae. An inflamed pleura, if left alone, sooner or later, becomes adherent, and then if the condition of the lung later requires collapse treatment, a satisfactory artificial pneumothorax cannot be induced. The artificial pneumothorax will have to be kept up until the lung condition has cleared up, even though the pleural condition clears up much earlier.

2. *Pleurisy with Effusion*:—Effusion is one of Nature's ways of producing rest for a diseased lung and therefore in theory, an effusion should not be interfered with. But there are other factors which have to be taken into account, such as the presence of continuous fever, symptoms of pressure, and the possibility of the formation of undesirable adhesions due to the organization of the fluid. This last reason specially, makes it obligatory to aspirate, unless it is quite certain that the lung is not affected. When the effusion is large, it is impossible to see the state of the underlying lung without first aspirating the effusion; therefore, for this reason, too, aspiration is necessary.

Although aspiration of the effusion is here said to be necessary, it is not mere aspiration, but in every case there has to be replacement of the fluid aspirated with air. On the one hand, this supports Nature's method of giving rest to the lung, and on the other hand, it is necessary for preventing distressing symptoms due to sudden change of intrapleural pressure, such as violent coughing, oedema of lungs and even signs of collapse. These symptoms may be seen if an attempt is made to aspirate a large amount of fluid at one time, without replacement with air. It is not always necessary nor is it advisable to replace the same amount of air as fluid aspirated, specially when there is a large effusion; for example, if 2000 c. c. of fluid is aspirated, it may only require 1000 c. c. of air to avoid change of pressure symptoms and to keep the lung under collapse. This can only be judged at the time of the aspiration by watching the patient.

How long the pneumothorax induced at the time of aspiration, should be kept up, is decided as when pneumothorax is used in dry pleurisy, by the condition of the lung. When there is no

disease apparent in the lung, the air may be allowed to be absorbed and no further pneumothorax may be necessary. If, however, the fluid accumulates again, further aspirations with replacement of air may be necessary. If there is disease in the lung, the pneumothorax must be kept up until the lung condition is healed.

The technique of aspiration of fluid with air replacement is best done by the bi-puncture method, using a Potaine's needle in one of the lower inter-costal spaces for aspiration, and a needle connected with a pneumothorax outfit in one of the upper inter-costal spaces for introduction of air. By this method there can be simultaneous aspiration of fluid and replacement of air. Another method, not so satisfactory, is to use a syringe with a two-way stopcock; after the aspiration of two or three syringes full of fluid, one or two syringes full of air may be injected. This method takes more time, and it has the additional disadvantage that there is no manometer by which to judge the intra-pleural pressure.

3. *Tuberculous Empyema*:—The ordinary tuberculous empyema with no secondary infection is treated at the beginning along the same lines as pleurisy with a serous effusion. No attempt should be made to have open drainage. If, however, the fluid is thick and difficult to aspirate, it may be necessary to dilute it with neutral iodine solution. The continuation of pneumothorax for a long period in patients with tuberculous empyema, even if the underlying lung is affected, is not always desirable. The reason is that when there is pus there is a tendency for the pleural surfaces to get thickened, with the result that the lung cannot re-expand when the pneumothorax is stopped. If the lung cannot re-expand, the effusion is likely to persist, and then the only way to prevent this persistent empyema is an extensive thoracoplasty operation. Even if the stopping of the pneumothorax means that a cavity in the lung is unhealed, it is still advisable to let the lung get adherent, and then later attempt to treat the lung by a permanent collapse by thoracoplasty. In such cases a less extensive thoracoplasty is usually required than in those in which the pleural space has not been previously obliterated.

When there is a secondary infection in a tuberculous empyema, an attempt ought to be made, by frequent aspiration and washing out by the closed method, to sterilize the pleural cavity. The washing fluid used may be weak solutions of iodine, acriflavine, gentian violet or methylene blue. Introduction

of gomenol may also be tried. If these fail, open drainage will be necessary, and later a complete thoracoplasty may be required to obliterate the pleural cavity, if the lung does not become adherent by itself.

Summary.—1. Necessity for the proper understanding of significance of pleurisy.

2. In differentiating the pleurisies, about 85 per cent are found to be tubercular.

3. The treatment of tubercular pleurisy is discussed:

- (a) The patient must be treated as a tuberculous individual and general treatment for tuberculosis be given even after the local symptoms have cleared.
- (b) The local treatment varies with the individual, the chief factor being the condition of the lung itself.
 - (i) With dry pleurisy, when there is no lung affection, only general and symptomatic treatment is necessary. When there is lung affection also, a pneumothorax has to be started and kept up till the lung condition is healed, or else adhesions will form which will prevent a later pneumothorax.
 - (ii) With wet pleurisy, aspiration is generally necessary, but it must be by the closed method, and aspiration must always be accompanied by replacement with air. The pneumothorax has to be kept up if there is lung affection also, until the lung affection is healed or else adhesions will form. The technique of aspiration with air replacement is given.
 - (iii) With tubercular empyema an attempt should be made to sterilize the pleural cavity by the closed method of washing out. A pneumothorax induced in tubercular empyema should not generally be kept up long, even if the lung affection has not cleared, as thickening of the lung pleura prevents re-expansion of the lung and healing of the pleura, possibly necessitating later an extensive thoracoplasty.

Treatment of Lobar Pneumonia

BY

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PNEUMONIA is a septicæmia with predominating pulmonary involvement. Though the pneumococcus is often the cause of pneumonia, uncomplicated pneumococcal pneumonia is rare and secondary organisms as Streptococci, Staphylococci, Pfeiffer's bacillus, Friedlander's bacillus, Typhoid bacilli, Gonococci and Bacillus Pertussis are often found along with the pneumococci. These secondary organisms may themselves cause pneumonia and they alone may be present in the sputum. The diagnosis of pneumonia is usually delayed to the stage of consolidation and much time is lost when early treatment in the congestive stage can bring about sufficient immunity for recovery.

Rest.—Absolute rest in bed is essential. Bed-pan must be used. Many physicians advise fresh air with a vengeance, opening out all the windows and doors even on a wintry day. The bed must be placed in the centre of the room so that there is no direct blast. It is better to confine the patient to bed for 2 to 3 days after the temperature has come to normal.

Clothing.—A shirt or a jibba opening down the middle is best. Ganjee jackets are antiquated. The body may be covered by a blanket. In no case must the patient sleep with the head and face covered by the blanket.

Diet.—Liquid diet. Barley water 4 ozs. every 4 hours, with glucose. Glucose must be given $\frac{1}{2}$ lb. a day. Sweet lemon and orange juices are allowed. Fluid must be given in plenty. Soda water may be taken freely. Milk must be restricted to $1\frac{1}{2}$ pints a day and given with soda, coffee, tea or ovaltine. Albumin water is a nourishing addition to the diet. Panopepton or liquid peptonoids or palatable peptone may be given 1 oz. at a time, mixed with water, 4 times a day only.

General Medicinal Measures.—The mouth must be gargled with listerine. Purgatives are best avoided, since they increase the fluidity of the bowel and are likely to produce tympanites. A

soap-and-water enema is helpful. A diaphoretic mixture such as :

R Pot. Citras	...	gr. x
Spt. Aetheris Nitrosi	...	m xv
Liq. Amm. Acetatis	...	3 1
Aqua Chlor. add	...	3 1

Ounce one every 6 hours is useful.

Tepid sponging, both morning and evening, when temperature is about 102° F. gives relief. When the temperature rises above 103° F. ice must be applied to the head. The headache in some cases is relieved by veramon. Eau de cologne to the head is welcome. Apply Indogiston or any of the kaolin poultices available in the market under different names. The poultice must be applied only to the back and sides, since the weight of a poultice $\frac{1}{2}$ inch thick over the front having to be lifted 40 times a minute is a serious exertion to the patient. Pain is relieved and cough induced.

Specific Measures.—(1) *Serum*.—When the case is taken on hand early, i.e., within 48 hours, anti-pneumococcus serum must be given. The pneumococci must be typed before the serum is given. The empirical or routine administration of serum in all cases of pneumonia must be condemned, for pneumococcal pneumonia is a rare condition and serum is useful only in uncomplicated pneumococcal infection and such cases are roughly one-fourth the total number. The following report is made by the Committee appointed by the Medical Research Council of Great Britain to enquire into the therapeutic value of Anti-Sera for lobar pneumonia.

(1) Concentrated Anti-Pneumococcal Serum for Type I cases reduces their mortality in adults between 20 and 40 years but has no effect on elderly patients. The liability to empyema is greatly reduced.

(2) Similar effects were observed in Type II cases with the administration of Type II Anti-Serum.

(3) Immediate serum reactions of a dangerous type are rarely met with.

(4) The use of Serum is not recommended except under conditions where typing of the pneumococcus can be obtained.

(5) A dose of 20,000 Felton units of Anti-Serum must be given of both Type I and Type II, if the typing will

be delayed for a day and then 20,000 units of Type I or II given after the result of the typing is known. If no clinical improvement occurs in the first 48 hours, it is useless to continue it.

- (6) The serum must be given intravenously. The first injection is made, 1 c. c. in a minute, slowly, and taking about 15 minutes for the injection. Adrenalin $\frac{1}{2}$ to 1 c. c. should at once be injected subcutaneously if the patient reacts unfavourably with Anaphylactic shock. Some serum preparations contain protein substances which are toxic to most individuals. To safeguard against this 1 c. c. of the serum is given intravenously and the remainder injected slowly after half an hour, provided no untoward symptoms have occurred. A total of 120,000 units must be given.
- Contra-indications.* (1) Asthmatic patient. (2) Patients suffering from Arterio-sclerosis.

- (2) *Vaccines.*—These are also useful only when the case is tackled early. Mixed Vaccine containing pneumococci, streptococci, and B. Influenza is usually given. 600 millions is the usual dose, repeated every 24 hours until three doses are injected. When given on the first day, the temperature falls rapidly and the general condition improves.

- (3) *Non-Specific Immune Therapy.*—The object is to stimulate the production of non-specific anti-bodies which prevent the onset of pneumonia by resisting the invasion of the organisms causing pneumonia. For these preparations to be effective, they must be given on the very first day of infection. When the pneumococcal toxin is fixed in the tissues, these preparations are useless. These preparations which are widely advertised as a sure and rapid cure for pneumonia can only prevent the symptoms developing. They are incapable of curing the condition.

Treatment of special symptoms.—Sleeplessness can be combated by a chloral and bromide draught or by Paraldehyde in olive oil per rectum. Expectoration by expectorant drugs is required only in cases complicated with other organisms, where the bronchioles are blocked. Stimulant expectorants as Amm. Carb. and Tr. Senega with Vin. Ipecac. and Pot. Iodide are useful. When the cough is distressing, Tr. Camphor Co. or Syrup Coscillana Co. is indicated. Delirium can be controlled by Morphia $\frac{1}{4}$ gr., repeated, if necessary. Morphia must be avoided only

when there is cyanosis or meteorism. For children, expectorants and stimulants must be given from the beginning. Emetics also will have to be given for children, since they swallow the sputum instead of spitting it out.

Treatment of Complications.—(1) *Circulatory failure* is due either to the direct action of the toxin or the myocardium or to the vasomotor failure from the action of the toxin on the centre. Circulatory failure can be prevented by the administration of liberal amount of Glucose from the beginning. When cyanosis occurs, oxygen must be administered continuously through a nasal catheter. The administration of Adrenalin prevents dilatation of the capillaries and prevents peripheral failure. Subcutaneous injections of oxygen 100 to 200 c.c. prevents collapse by oxygenating the tissues. Venesection 10 ozs. is useful if there is engorgement on the right side of the heart. Many still use Digitalis to prevent and also to treat heart failure in cases of Pneumonia. Digitalis adds another poison to the heart which is already poisoned by the circulating toxins. Digitalis does not slow the febrile pulse and has no action in preventing peripheral collapse. Dr. W. H. Wynn states that Digitalis-treated cases show an increased mortality of 7.7%. Many practitioners say that they have saved the lives of many a patient by adding Tr. Digitalis in the mixture from the beginning. Those cases recover because most of the preparations of Digitalis do not act, since standardisation of the drug is not perfect. Brandy must not be given, since it dilates the already dilated capillaries of the skin and causes depression by lessening the blood circulating in the internal organs. Camphor-in-oil, Cardiazol, Teoral and similar preparations act by their action on the medullary centre and not by their action on the heart. They fail us miserably in cases of severe heart failure.

- (2) *Tympanites.*—Can be relieved by Turpentine atupes, Turpentine enema or by the passage of a flatus tube. Pituitary extract $\frac{1}{2}$ to 1 c.c. is also useful in many cases to relieve tympanites.

It is not the place here to deal with the treatment of various complications and sequelae of Lobar Pneumonia affecting other organs as meninges, peripheral nerves, kidneys etc.

The emphasis of treatment in a case of lobar pneumonia must be laid on correct, early diagnosis, earlier administration of anti-serum after typing, treating the liability to heart failure judiciously by avoiding poisoning of the already poisoned heart with digitalis and other drugs or upsetting the digestion by giving creasote.

Views on Therapeutics of Psoriasis

BY

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Locally.—Bath. Sodii Bicarb oz. iv to a gallon.

Drugs:—The most important is "Cignolin" (Bayer), strength being $\frac{1}{2}$ —1% in an ointment form.

Other drugs which may prove useful are, Coal tar, acid salicylic, chrysarobin; pyrogallol; sulphur ppt. etc.

Ultra-violet therapy—locally on the lesions and baths are also helpful.

In cases of Rupoid lesions (psoriasis rupoides), and psoriatic lesions of the palms and soles, superficial X-ray therapy works very well.

I have also used fractional doses of X-rays on the thyroid gland—and they cause the disappearance of the lesion.

Internally various drugs have been tried. Recently, 'Liver Therapy' has come into vogue. I have tried it and recommend it.

Arsenic and its allied preparations are used since ages, and I recommend the same in chronic stationary cases.

Orally, thyroid is also useful, but the disadvantages of oral administration outweigh the advantages, so personally, I do not use it.

Injections: Flouriscin (1%) intravenously, has come into prominence and I also encourage its use. The dose is 5 c. c. repeated at weekly intervals upto a total of 6 injections.

There are various other things tried viz., auto-blood; various milk preparations; T. A. B. vaccine; B. coli vaccine etc. Cases somehow or other show temporary improvement, but one cannot definitely say whether a permanent cure is possible.

In this disease, where actual causative factor is not known, the line of treatment may not succeed perfectly, but one has got to try and see that the disease disappears for ever, or that the interval time between two attacks is prolonged. Hence, I am putting forward my views and I shall be pleased to accept the views of my colleagues on the therapeutics of this disease, which I have seen to be quite common in Bombay.

Views on Therapeutics of Psoriasis.

By Dr. H. A. Maniar.



PSORIASIS.

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The accompanying plate is one of 'Psoriasis vulgaris', which has cleared up under the X-ray therapy on the thyroid gland. I have kept the case under observation, and, so far, he has not had a recurrence.

In psoriatic arthropathy (which may very likely be mistaken for specific arthropathy and skin lesions for secondary cutaneous manifestations) salicin or salicylates do very well.

There are cases who do well, only under the change in the atmospheric conditions or climate and this factor may act as a fallacy, in the working out of our results after treatment. This is a disease, where, patients go on changing from one specialist to another and I think we should try to gain their confidence and make an endeavour to see that: (1) The existing lesions subside; (2) The interval between two attacks is prolonged; and (3) stop the recurrence for ever—(a factor which is likely to baffle the dermatologists of even international reputation.

Obstructive Retention of Urine

BY

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ONLY the commonest causes in each age group will be dealt with in this short article. These causes comprise over 90 percent of obstructive retention.

In babies	...	Phimosis.
In young men	...	Acute gonorrhoea.
In adults	...	Stricture of urethra.
In old men	...	Enlarged prostate.
And in the female	...	Pregnancy and retroverted uterus.

Diagnosis.—Is usually easy from the history of the case but in case of difficulty, a thorough routine examination of the genito-urinary system has to be made. In stricture and enlarged prostate, there is a history of increasing difficulty in passing water.

The treatment of this condition in general practice in India and in the smaller hospitals, leaves much to be desired. The ideal regarding the proper management of these cases seems to be rather vague and primitive and even in the bigger mofussil hospitals, the treatment is usually rather sketchy. These are strong words and I know that these remarks will be resented by many but I am afraid they are only too true.

In the mind of the average medical practitioner, treatment of retention centres round the silver catheter—the most dangerous weapon in the whole field of surgery. More damage has been caused by it than by any other surgical instrument. I am sure one can easily do without a silver catheter. Even if one has not got gum elastic catheters or bougies, Liston's bougies and soft catheter suffice for most cases, atleast in an emergency:

One must bear in mind three principles :—1. Strict Asepsis.

2. Avoidance of laceration to the urethra; and that congestion and spasm are usually present.

3. To decompress the bladder slowly.

But I am ashamed to have to put down in print that none of these rules are observed except in their breach.

The first is easy to observe at any time. The second is easy if one forgets the silver catheter and does not use force. The third rule requires a little time and trouble.

An element of congestion and spasm is present in almost every case of retention due to stricture which is after all the commonest cause. An enema and a hot hip bath relieve the congestion and spasm and urine is very often passed in the bath. If a bath is not available, hot fomentations over the perineum should be applied for half an hour. After that, instrumentation should be tried.

The best instrument to use is a gum elastic bougie or catheter. The modern gum elastic instruments are boilable.

If a gum elastic catheter or bougie be not available, the next best instrument is a No. 8 or 9 Liston's metal bougie, boiled and properly lubricated. The instrument must be warm, as a cold instrument causes spasm. Urine will probably start escaping alongside the bougie. If it does not, leave the bougie in for a few minutes, take it out, introduce one or two bougies of bigger size and then a soft catheter can be passed and the bladder relieved slowly. Further dilatation can be carried out in a day or two.

A silver catheter in the hands of the expert is likely to cause a false passage, in the hands of the general practitioner, it very probably will. In any case it would cause some laceration.

Decompression of the Bladder.—Another very common mistake in India is to relieve the bladder very quickly.

Whenever possible, decompression should be done very slowly, especially in elderly patients, as their kidneys are liable to be more damaged. Sudden emptying of the bladder predisposes to shock and anuria.

Decompression is best done as follows.—If urine is seen escaping alongside a bougie, leave the instrument in the bladder and let it drain slowly.

If a catheter has been passed, let two ounces of urine escape every hour, by shutting off and opening the catheter, opening at intervals.

If the retention is due to enlarged prostate which should be suspected in all elderly people, a 'bi-coude' gum-elastic catheter is desirable but is not essential. In India, the prostate begins to enlarge at fifty but of course all enlarged prostates do not cause symptoms.

If instrumentation fails, which it does if someone else has made a false passage or two, or in very resilient strictures, one of the following courses must be adopted :

1. Suprapubic puncture with a fairly fine needle such as a lumbar puncture needle and not with a hydrocele trocar. The site of puncture should be exactly in the middle line and a

finger's breadth above the symphysis pubis. A few drops of novocaine should be used to raise a wheal at the site of puncture. The needle should be held carefully, the bladder is allowed to empty itself slowly to about half its original (distended) size, then a little sterile, weak, antiseptic lotion is introduced slowly and the fluid again allowed to drain out *but not completely*. After a few hours of the puncture a bougie should go in slowly. If, after three punctures, the urethra still refuses to admit a bougie, one of the next two measures has to be taken.

2. *Suprapubic catheterization*:— Ordinarily, suprapubic cystotomy, however, should never be done in acute retention as a preliminary measure especially in elderly subjects. The only thing that should be done is to insert a self retaining catheter.

3. Wheelhouse's operation should be done if the above procedures fail. Even after the perineal wound has healed the patient must have weekly dilatations, then at longer intervals, for atleast six months.

Any instrumentation, except that with a soft rubber catheter, must be preceded by anaesthetization of the urethra. Novocaine does not anaesthetise mucous membranes, so percaine or cocaine must be used. Percaine is used in dilution of .1 percent but do not omit to use Jena glass syringe and containers.

Cocaine in .5 percent solution with the same strength of sodi bicarb is very efficacious and safe. 2% cocaine as used formerly and without sodi bicarb is certainly toxic.

Other causes of non-obstruction retention are impaction of blood clot, stone or foreign body.

Non-Obstruction retention is due to interference with the normal contractile mechanism of the bladder and may be classified as follows.

- (1) Post-operative, almost seen after rectal operation: usually follows abdominal operations, etc.
- (2) Diseases or injury of the spinal cord. The injury may be only a slight jarring to complete destruction.
- (3) Inflammations in the neighbourhood of the bladder.
- (4) Anxiety states.

Retention due to causes 1 and 4 now-a-days do not require catheterization. Doryl 1 c.c. or by the mouth with fomentation over the perineum is all that is required. Esmodil is said to be equally good but I have not used it yet.

I have heard that medical men are sometimes in doubt as to whether the bladder should be regularly relieved in spinal asepsis where there is over-incontinence. Doryl will act in tabes or disseminated sclerosis but not in severe spinal injuries. Regular catheterization at stated intervals with the utmost aseptic care must be instituted.

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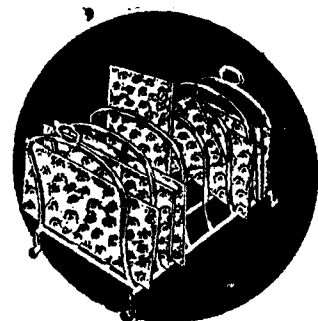
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Modern Treatment of Acute Rheumatism

BY

H. S. Bawa, M.B., B.S., D.T.M., D.P.H., P.C.M.S.,

I/c. Civil Hospital, Fatch-Jang, District—Attock.

IT is an acute infectious disease characterised by fever, multiple Polyarthritides especially of bigger joints, and with marked tendency also to attack the valvular endocardium of the heart as well. Its other manifestations are acute or chronic Tonsillitis, Chorea, and in children, as fever with skin rash. The infection enters through the Tonsils and less commonly through the nostrils.

Treatment is to be carried out under the following heads:—

1. Alleviate the pain and distress.
2. Control as far as possible the Rheumatic Processes.
3. Encourage the great natural resistance to the disease.
4. Conduct the patient safely through the convalescence.

The first step towards alleviating the pain and distress is *absolute rest in bed*. The bed should be comfortable. He should avoid all unnecessary movements and for this reason, it is advisable to have powerful nurses, who can manage the heavy lifting. He should wear loose night dress made of soft flannel. It should be opened down the front for its whole length and also along the sleeves. He should be put in soft light blankets. Diet should be liquid as milk, water—plain or aerated; fruit juices and diluent drinks during the acute stage. Milk diluted with water and 10 grs. of Soda Citras added to every $\frac{1}{2}$ pint of milk is good. Meat Juice to be avoided. Home-made lemonade with potassium bicarb added to it, may be placed by the side of the patient. He should take 3 to 4 pints of milk and water in 24 hours. Try to increase the weight of the patients, who are generally about a stone under-weight. There should be no need to restrict the diet of these patients in meat, as is traditional, although 24 hours on nothing but fruit juices once a month is often beneficial. It is said that Micro-coccus Rheumaticus possesses powerful acid-producing properties; hence alkaline treatment of Acute Rheumatism is quite relevant. In countries where meat is taken in excess, if the disease occurs, it is recovered from; and in countries where diet is meat-free, it is fatal; hence, each case has to be judged on its own merits. If the kidneys are affected, the meat should be avoided, otherwise, the patient should be liberally fed. Bowels should be

kept open always with mild aperients as Liquorice, cascara, senna, or a saline.

Local treatment of the Affected Joints.—These will include procedures for (a) relieving pain. (b) giving rest, (c) restoring function to affected joints.

1. Drugs useful for relieving pain are :—Aspirin, phenacetin and caffeine powders and drugs of phenazone group as pyramidon or novalgin, exalgine etc. Garden and prontosil tablets are good to try. If at night, sleep is interfered with, then give aspirin grs. 10, caffeine grs. 5, and Codia phosphate gr. 1/6. Heat applied locally to the area of pain gives relief. Methods of doing this are :—Poultice, Antiphlogistine, Mud-packs, Hot water baths or hot paraffin wax painted round the joints, exposure to radiant heat lamp, or wet packs or stupes of saturated solution of mag-sulph or soda salicyl solution or of *Fullers solution* i.e. Soda bicarb drs. 6, tinct opii ounce one, glycerine ounces two, and water 1/2 pint. Application of Ichthyol, belladonna, glycerine and Thermogen wool also gives relief. Sometimes *ice compresses* do good. Thermo-cautery or blistering with plaster cantheridis above and below the joint 1/2 inch wide and 4 to 6 inches long prove useful. When there is much effusion, *aspirate* the joint and if necessary wash the joint with hot isotonic saline or hot normal saline.

2. Rest to the affected joints is given by placing the joint in a comfortable position and taking away all the weight by means of a cradle. If need be, put the joint on suitable splint or even plaster of Paris splint, so that absolute immobility of all the muscles be secured. In sub-acute cases, application of oil of winter-green preparations as Tinct Iodine, Methyl Salicylate or Mestán 1/2 in Olive oil or Linement Gaultheria co or Lint A. B. C. or *Spirol* or *Agnicol* in Olive oil or *Jothion* oil 10% are worth trying. Sometimes, hypodermic injections of 2 1/2%, Formic acid or 1 c. c. of 1 in 1000 watery solution of *Acid Salicylic* in the neighbourhood of the joint or 25% solution of mag sulph in 4 c. c. doses may prove useful.

Medical Prescriptions which are commonly administered in Acute Rheumatism.—The drug commonly used for adults is soda salicylas and for children and feeble sensitive subjects *salicine* or Acetyl Salicylic Acid be given. Soda Salicylas be given in doses of 15 to 20 grs. every three hourly, till the pain is relieved. After that, keep the same dose or slightly less *T. D. S.* for a week or so, to prevent a relapse. Alkalies as acetate or citrate, or natural salts which may become alkali in the body must be given with

sodicylas. The favourable prescription is :—Soda salicyl grs. 20, Pot citras grs. 20, Spirit ammonia dr 1/2, Succus Lemonis dr 1/2, Aqua ounce one. Along with it, give Fullers Mix i.e. Sodabiparb grs. 90 Pot, Acetas grs. 30, and at the time of drinking, add Citric Acid grs. 30, and Succus Lemonis one ounce to make it effervescent mixture. Some authorities recommend the following prescription :—

Soda salicyl ounce one, Soda bicarb ounce one, Spirit ammonia aromatic ounce one, Acqua ad ounces 24. Divide into 24 doses. One dose every hour till the temperature comes down and then cut the dose to half every two hourly and then such a dose three times a day for some time to prevent relapse. Other medicines which should be given are, Guaiacol carb, Benzosol and Quinine salicylate, etc. These should be given in doses of 5 to 10 grs. in capsules or catchets. In recent years *Rheumatic Phalacogen* and *Collosal* preparations, especially for sub-acute and chronic cases, have come in the market. Rheumatic Phalacogen is given hypodermically in doses of two ten to c. c. It is wise to start with one c. c. and increase gradually according to the reaction produced. It may be given daily or after 48 hours according to the reaction produced. *Collosal sulphur* and *Collosal iodine* are given orally or by injection; hypodermically or intravenously. Two new Japanese preparations Sinomenine Hydrochloride and Feothiol, have been found very useful in sub-acute cases, especially in middle aged ladies. Two very serious cases were brought to my hospital with marked rheumatic pains in all the joints and with inability to move about in the bed. Two injections of Sinomenine Hydrochloride relieved them of their pain, and they were able to get up in the bed.

Bee-sting Treatment :—It is alleged that bee-keepers are immune to rheumatism; so why not get the rheumatic patients stung by bees and get the best of it for them?

Treatment in convalescence.—Put the patient on Quinine salicylate, as :—Salo quinine salicylate grs. 10 in catchets *T. D. S.* and then later on, Arsenic quinine mixture.

Treatment in complications.—When heart is attacked by it, put the patient in bed, relieve the pain and feed him up. Spare the heart all avoidable strain by all appropriate medicines. Salicylate and Strychnine should be given in such cases with care.

Acute Rheumatism with fever.—Ice cold bath or sponge to the body and head, and treat the coming collapse with diffusible stimulants and injections. Repeat the bath, if again required. When the temperature has become low, he should be put on Soda salicyl—Quinine mixture, to keep the temperature down.

Rheumatic Tonsillitis.—Throat gargles with potassium chloras or Formaline solution; and paint the throat with Iron-glycerine, or insufflate with Aspirin powder. If Tonsils are enlarged, and unhealthy, enucleate them.

Treatment of Rheumatoid Arthritis

BY

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Definition and Distinction.—Rheumatoid Arthritis should be distinguished from rheumatism. Rheumatism affects the large joints; pain is flitting from one joint to another; joints are asymmetrically affected and they are painful during rest also. While, rheumatoid arthritis affects the small joints; joints affected are symmetrical and they pain only on movement; the pain does not flit from one joint to another. Rheumatoid arthritis is atrophic in contra-distinction to osteo-arthritis which affects the large joints and is hypertrophic in nature.

Erythro-cytic sedimentation rate is of distinct value in separating rheumatoid arthritis which is of atrophic type from the arthritis of degenerative and traumatic group. Any case presenting joint symptoms with a sedimentation rate above 30 m. m. in 1½ hours can usually be considered as belonging to the rheumatoid group provided, other forms of infection have been eliminated. Higher the sedimentation rate, greater the probability that arthritis is rheumatoid.

Thus, rheumatoid arthritis is a form of multiple arthritis affecting the peri-articular tissues, the synovial membrane, the joint cartilage and the bone itself. It shows tendency to symmetrical distribution and affects especially the smaller joints of the extremities.

Importance of Early Treatment.—Rheumatoid arthritis is a formidable disease and hence no time should be lost on treatment with so-called anti-rheumatic drugs. If the disease remains unchecked, it frequently leads to most deplorable and tragic results. A physician who waits until "the fire had burnt itself out and left only the charred remains in the form of distorted joints and twisted limbs" is failing in his duty towards his patient. It is well to remember especially in rheumatoid arthritis that:—

*A little fire is quickly trodden out
Which, being suffered, rivers cannot quench.*

Search for Infection.—As there is much in evidence in favour of the hypothesis that rheumatoid arthritis is due to

bacterial infection and sensitisation, it becomes essential that a thorough search should be made all over the body for any focus of infection and when found, it should be eradicated or treated as soon as possible. In many cases the infection is obvious either in the teeth or in the tonsil. If teeth are infected they should be sacrificed. To avoid severe reaction only a few teeth should be removed at a time. If X-ray shows an apical abscess, the apical infection should be removed by Gairdner's method of sterilizing the infected bone area by removal of the alveolar layer over the site of the lesion and curetting the diseased tissue after removal of the offending tooth. If the source of infection is not obvious, careful investigation must be made of the nasal sinuses, gastro-intestinal tract, gall bladders, the urinary tract, the prostate and the uterus.

General Treatment.—Every effort should be made to increase the vitality and the resistance of the body and hence the patient should be treated on the principles underlying the treatment of tuberculosis. As in tuberculosis, so in rheumatoid arthritis there should be abundance of sun-light and fresh air. The patient should have cheerful surroundings, good food, mental repose and physical rest to the affected joints in particular and the whole body in general. The aim is to combine the best elements of the sanatorium and an orthopaedic hospital.

Climate:—Dry, non-hilly and equable climate is to be preferred. Cold and damp localities should be avoided.

Diet:—A generous, mixed and well-balanced diet, within the compass of digestion should be ordered. It should be rich in proteins and animal fats. If flatulence or other symptoms of amylaceous dyspepsia occur, it may be necessary to restrict carbohydrates. Preparations e.g., Ext. of Malt with Cod Liver Oil, B. W. & Co., Radiostoleum or preparations like radiomalt, containing vitamins A, B₁, B₂, and D or Adexolin (Glaxo) are useful in increasing the resisting power of the patient.

Articles rich in vitamin B. e.g. whole-meal bread, wheat germ, marmite etc. should be taken freely. Beemax is a convenient form to take. In rheumatoid arthritis a deficiency of vitamins A and C and possibly B₂ is not uncommon. Hence, this should be supplied in the diet, although whether the deficiency is causal, still remains unproved.

Alcohol should be usually forbidden. If, however, the appetite is poor, a little whisky may be allowed, if it is found advantageous.

Local Treatment.—The objects of the local treatment are to allay inflammation, relieve pain and prevent ankylosis and deformity. The joints should be kept warm by wrapping them in cotton wool. Some pain-relieving application *e. g.* Glycerine Belladonna should be applied. The joints should be kept at rest but the patient should be encouraged to move the joints four or five times when the dressings are replaced. Rest of individual joint by means of a light plaster-splint, split laterally, with gentle movement once daily through the fullest possible range, actively when possible, is the soundest advice. Under no circumstances, the daily movement of the joint be neglected and the range of movement must be gradually increased.

Symptomatic Treatment.—1. *Anæmia*:—Microcytic Hypochronic anæmia is present to a greater or less extent in most of the cases and requires treatment with iron. Ferri et Ammonii Citras, 45 grains a day or Bland's pill 30 grs. a day may be given. Fersolate (Glaxo) is an admirable preparation for anæmia.

2. *Achlorhydria*:—In over 30% of the cases, achlorhydria or hypochlorhydria is present. It should be treated with Acid hydrochloric dil, 20 to 30 minims in lemonade after meals, to be given indefinitely.

3. *Pain*:—Aspirin is as effective as any other analgesic. The smallest dose that relieves pain, should be given. If the acid form causes indigestion, the soluble salt, calcium acetylsalicylate or the salicyl carbonate may be given. Aspirin and Veramon, 6 grains of each, are useful at bed time, as they relieve pain and induce sleep.

4. *Chronic intestinal infection*:—When patient's symptoms or examination of the stools point to this, intestinal antiseptics should be used *e. g.* guaiacol, benzosol, benzo-naphthol, sulphur, ichthyol, salol, quinine salicylate, dimol and iodine etc. Of these probably the best is guaiacol carb in 5 to 10 grains doses, three times daily. Iodine is another useful drug. It may be given as Liqr-iodi simplex, one minim in an ounce of milk, three times daily after food, increasing it by one minim daily until 20 to 30 minims, three times daily are taken and then working down again for a course. Some physicians like to use iodine in the form of colossal iodine, one or two drachms in a wine-glass full of water twice a day after meals. Others give French tincture of iodine, which contains no potassium iodide in 6 minims doses three times a day. Colossal sulphur in one to two drachm doses is

another useful drug, often given alternately with iodine. When prolonged treatment with antiseptics is required, it is advisable to vary the antiseptic drug from time to time.

Vaccine Treatment.—Autogenous and stock vaccines have been used in all stages of the disease with varying results. The routine treatment with stock vaccine should however be deprecated. Combined vaccines *i.e.* autogenous vaccine prepared from the unusual type of streptococci found in the stool and from the organisms found from some other infective focus *e. g.* teeth and tonsil etc., have yielded good results. Vaccine treatment should be started with a small dose, say half a million and gradually increased to 100 to 200 millions. The actual doses and the intervals between them depend upon the reaction and the effects produced. The more acute the case, the smaller should be the dose. A prolonged course is usually needed.

Protein Shock Therapy.—It is used in early stages of the disease. The more recent the case, the greater the chance of success. The non-specific protein therapy methods are:—

1. T. A. B. Vaccine *i. e.* dead culture of Typhoid and Paratyphoid A and B organisms, is given intravenously. Starting with a dose of 25 millions of Typhoid and 12 millions of Paratyphoid A and B working upto 100 to 200 millions, at intervals of five to seven days, constitutes a course. Within an hour or two of the injection, a sharp rigor occurs with a rise of temperature to 102° to 103° F. In successful cases, patients are greatly benefited. The joint pains become less, the movements in the joint are more free, the swelling diminishes and the general well-being of the patient improves.

2. Fresh cow's milk, boiled for ten minutes on water-bath, has been used intramuscularly. The starting dose is 0.5 c.c. which is gradually increased to 5 c.c. at intervals of four or five days. Proprietary medicines, Lactolan and Aolan, have also been used with success.

3. Colossal sulphur (Colsul Crooks) is injected deeply into the gluteal muscle, beginning with 0.5 c.c. and then increasing the dose, every four or five days by 0.5 c.c., to 4 or 5 c.c. Colossal sulphur gives a milder reaction and the effects appear to be more lasting.

4. Auto-hæmo-therapy-injection of blood or serum of the patient into his gluteus muscle, has relieved many cases of this disease. Normal blood, after clotting, due to some colloidal

arrangements, behaves as a foreign protein. Blood may be given sub-cutaneously or intramuscularly in doses of 10 to 50 c.c. and Serum in doses of 1 to 3 c.c. intravenously, subcutaneously or intramuscularly. Patient's own blood is useful since, as in many cases a toxin or its resultant anti-body is circulating in blood.

Cresc-therapy.—It is very useful in arthritis, which, while infective in origin, is not due to any known cause. Best results are obtained in cases of not more than two years' duration. The treatment should only be tried, when erythrocytic sedimentation rate is definitely accelerated. Before the treatment is begun and during its course, the erythrocytic sedimentation rate should be determined at intervals. Decrease in the sedimentation rate is a sure sign of its suitability and utility.

Inorganic salts, sanocrysin and cresalbin and organic salts, allochrisin, solganol B and myocrysin have been employed. Of these, the mostly used are solganal B and Myocrysin. Many physicians like to use oily Solutions of gold, as they are more slowly and uniformly absorbed, but with them the risk of cumulative action is great. Others prefer to use watery solution of gold. In Buckley's opinion, the watery solutions in small doses are easy to control and therefore, free from risk of cumulation.

The starting dose is 0.01 grm; it is then increased by 0.01 grm. at intervals of seven days, until it reaches upto 0.1 grm. which is never exceeded. A total of 1 to 1.5 grm. constitutes a course. An interval of two to three months or longer is allowed to elapse before a second course is given.

Sometimes, inspite of every care, symptoms of intolerance arise. These are pruritus, skin rashes of different types and gravity, stomatitis with ulceration, albuminuria, hæmaturia, bronchial catarrh and even agranulocytosis. To guard against these unfavourable developments, German physicians administer glucose simultaneously. This is considered to be of no good effect by others. H. J. Williams uses calcium gluconate. This in his opinion enables the use of large doses and for longer times.

If, however, symptoms of intolerance do arise, they may be suitably treated. Forestier advises hyposulphite of sodium 10 to 20 c.c. of a 10 to 20% solution intravenously for treating skin symptoms. Liver has been tried with good effect and is also otherwise useful in Rheumatoid arthritis. Over-dose is avoided by careful observation of kidney, mucous membrane and skin and by periodic blood counts.

Histamine Treatment.—Histamine is known to act upon the arterioles and capillaries, causing dilatation and flushing and hence may be useful, as, in Rheumatoid arthritis, the circulation in the affected joint is defective. Histamine may be used by cataphoresis, inunction of ointment or injection, the most commonly used method is by Cataphoresis. This rapidly flushes the joint, but the effect is temporary and therefore it should be followed by massage and passive or active exercise. To make use of this method in general practice, a specially prepared foil called 'Katexon' may be obtained. It may be here remarked that the efficiency of physio-therapy, may be due to the liberation of histamine and choline compounds by the tissue cells when stimulated or subjected to minor forms of trauma.

Bee-Venom.—The general belief that persons who have been frequently stung by bees do not suffer from Rheumatoid arthritis has lead to this being tried as a treatment. Special preparations of bee toxin are prepared and marketed for this purpose and are given intradermally.

Sympathectomy.—It has been tried with varying effects. It may be useful in carefully selected cases, as a symptomatic measure for the relief of pain but should not be regarded as, in any sense, a specific remedy for the disease. It may yield good results in very early cases with markedly deficient capillary tone.

Treatment in later stages.—When the disease has entered a more chronic stage, the methods of physiotherapy and balneotherapy should be applied with a view to stimulate the function of the skin and promote elimination, to relieve pain and muscular spasm and to re-educate the functions of muscles and joints.

These methods are :—

1. **Heat.**—It is applied to the affected joints in one form or the other. In sub-acute cases, moist heat in the form of poultices, hot mud or peat packs and steam baths are soothing to the patient. In chronic cases better results are obtained from dry heat up to a temperature of 300° or more.

2. **Diathermy and radiant heat.**—Diathermy is very effective in producing hyperæmia, as the tissues are heated below the surface to a considerable depth. Radiant heat is useful when multiple joints are affected.

3. **Ionisation.**—It is of great service after the application of heat. For this 2% solution of potassium iodide or soda

salicylas may be used. It is however doubtful whether the ions liberated reach the deeper tissues of the joint. The undoubted therapeutic effect is due to the passage of the current which promotes the absorption of the inflammatory thickening. Ionisation with histamine (1 in 5000 solution) is recommended to improve the local circulation.

4. *Massage*:—The more sensitive the condition, the lighter should be the massage. In more chronic cases, the massage may be firm. The duration of massage and its frequency varies with the individual case. Massage should be given freely to the wasted muscles above and below the joint. It improves the circulation of blood and lymph, opens the stagnant capillaries and allows the antibodies to reach the diseased tissue.

5. *Balneotherapy*:—Immersion baths of peat, brine, sulphur and foam baths produce beneficial local effects and in addition stimulate the general circulation and activate general metabolism. These baths, if given intelligently are of great help; they may do harm if carelessly prescribed.

Plombier's douches *i.e.*, lavage of the colon on Plombier's system, may be useful in cases of rheumatoid arthritis of intestinal origin. For this plain water, with a drachm each of sodium chloride and sodium bicarbonate to a pint, may be used. The temperature of the fluid should be nearly 100° F. and 30 to 40 ounces of the fluid should be run. Lavage should be given on alternate days. It helps in cleaning the bowel and reducing the absorption of toxin.

6. *Spa treatment*:—It has many advantages. A wide choice of physiotherapeutical combination is available and various balneological treatments can be effectively carried out. Mineral water at these spas is useful in eliminating the toxins from the skin, kidneys and bowel. Change of air, environment, scene, climate and hopeful attitude of the patient are very conducive to the well-being of the patient. Spa treatment is considered to be more useful in chronic cases. Certain physicians however recommend this in all stages of the disease. Treatment in all stages is carried on, at Halcyon hot springs which has been the Mecca for patients suffering from Rheumatoid arthritis for 50 years. The pools are five feet deep and large enough for swimming and exercise. The temperature of the men's pool is 106° to 108° F. and of the women's pool is 102° F. Exercise is strictly enjoined, as a strong indisposition to exercise is an essential feature of the disease and is the cause of endless trouble. Such

patients require physicians of the military type who manhandle the patient rather than of the fawning type who hears and heeds every whim and fancy of the patient. The joint is only the servant of the muscle and water is perhaps the best medium for developing muscles, a procedure best carried in the therapeutic pool.

7. *Orthopædic exercises*:—When the acute stage has passed, deformities if any can be dealt with by the manipulation of the orthopædic surgeon under an anæsthetic. The patient is enjoined to maintain afterwards, the improved stage of movement by exercise since remedial exercises are monotonous; rowing, swimming, cycling, gymnastics and gardening help to keep the patient cheerful. Sir Leonard Hill is of opinion that the movements of stiff and painful joints, carried out by the patients themselves, but guided by the skilful nurses, are more beneficial than the massage when given after the treatment by heat, light, or electricity. A good deal of time and labour can be saved by substituting exercise for massage.

Surgical Treatment.—It may be required for any deformity which may have occurred inspite of every effort to avoid it. By rest, suitable splinting, extension by weight and tenotomy, a good deal of disability may be avoided. Surgical interference is only allowed when the joint is quiescent and the general condition of the patient good. It consists of tenotomy, aspiration, capsulotomy, synovectomy, arthroplasty and arthodesis. The need for these only arise when the joint is so fixed as to greatly interfere with the patient's health or with his occupation and wage-earning capacity. However, if minor procedures are adopted from the very beginning, the major operations will be rarely required.

Summary.—Rheumatoid arthritis is defined. The importance of erythrocytic sedimentation rate, as a diagnostic measure is stressed. The treatment of the disease must be taken in hand early. The whole body to be searched for infection and if discovered, it should be eliminated or eradicated. The diet should be generous and well-balanced and should be rich in proteins, animal fats and vitamins, especially A₁, and B₂. The carbohydrates may be restricted if the patient is dyspeptic. There should be abundance of fresh air and sun-light and the climate should preferably be dry and non-hilly. The joints should be wrapped in cotton wool with some pain-relieving application. The joints must however be moved a few times when the daily dressings are changed.

Anæmia, achlorhydria, pain and chronic intestinal infections should be suitably treated with preparation of iron, acid hydrochloric dil, analgesis and intestinal antiseptics.

Other lines of treatment are :—

1. *Vaccines*.—Both stock and auto-genous vaccines have been used. Combined auto-genous vaccines have proved useful.

2. *Protein-shock therapy*.—The commonly used substances are T. A. B. vaccine, milk, colossal sulphur and the patient's own blood. The first is the most favourite and has yielded good results.

3. *Cresc-therapy*.—Inorganic and organic salts of gold have been used. The mostly used gold salts are solganol B and myocrysin. The gold salts are useful when the erythrocytic sedimentation rate is increased. It should be given in the doses described. Over-dose is avoided by careful observation of kidney, mucous membrane and skin and by periodic blood counts. The symptoms of intolerance if they arise should be treated suitably as described.

4. *Histamine treatment*.—It has been given by inunction and cataphoresis. The latter method is preferred.

5. *Bee-venom*.—This is not much in use. Bee-toxin has been given intradermally.

6. *Sympathectomy*.—It should only be used as a pain-relieving measure in carefully selected cases.

Treatment in later stages.—Consists of the following measures :—

1. *The physio-therapy*.—i.e., heat, diathermy, ionisation and massage.

2. *The balneo-therapy*.—Immersion baths of peat, brine, sulphur and plombier's douches.

3. *Spa treatment*.—It has many advantages. Wide choice of physio-therapeutical combination is available. Mineral water helps in the elimination of toxins. Change of scene, environment and climate makes the patient cheerful and hopeful.

4. *Orthopædic exercises*.—Are useful in connecting the deformity when the acute stage has passed.

Surgical treatment.—It consists of tenotomy, aspiration, capsulotomy, arthroplasty and arthro-desis. The need for these only arise as a last resource when the joint is so fixed as to greatly interfere with the patient's health and his capacity to earn.

Treatment of 'Dhobi's Itch' and other Forms of Ringworm

BY

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TINEA Cruris or Dhobi's Itch, is a variety of ringworm which is very commonly met with. It is so prevalent that in the opinion of a dermatologist "the disease is so very common that I go to the extent of making my own maxim viz. that every body in Bombay, or for the matter of fact, in India, has suffered, is suffering or will suffer from Epidermophytosis (Dhobi's Itch)."

Dhobi's itch affects such parts as remain moist due to excessive perspiration. Therefore, the areas affected are groins, medial parts of thighs, scrotum, peri-anal area, axillae, palms and soles and interdigital webs—specially of the feet. In the early stages the patches are characteristic of ringworm, but later on, as a result of scratching the intensely itchy lesions, eczematous changes take place. The lesions may further be complicated by the invasion of the secondary pyogenic infection. According to its clinical appearance, the fungus infection of hands and feet is classified as Erythematous, Vesicular, Scaly or Keratinised. The infection may remain localised to the interdigital spaces or may extend to the palm or the sole of the patient.

The chief aim of the treatment is to effect a cure and prevent recurrences by the use of fungicidal drugs and stressing the importance of common-sense rules of personal hygiene. If the skin presents the signs of irritation of inflammation or if secondary infection has taken place, soothing and antiseptic remedies are indicated first. One can prescribe either calamine lotion or a cream made as follows:—Zinc oxide dr. i, Pulv. Amyli. dr. i, Lanoline dr. ii, oil Amygdalæ dr. iii, Aqua calcis dr. iii. Lassar's Paste (Zinc oxide grs. 120, Amyli. grs. 120, Vaseline grs. 240) either full strength or half strength can also be used, and Hydrarg. Ammoniata grs. 10 to 20 to an ounce of the paste may be added if secondary infection is present. Sepsis in the hands and feet can be dealt with by compresses of Potas-per-mang. 1—2000 to 1—500 or acriflavine 1—1000.

Of the various fungicidal drugs, acid salicylas is more suitable. It is best prescribed in the form of the well-known

Whitfield's ointment, (acid salicylas grs. 20, Acid Benzoic grs 30, Vaseline drachm i). Whitfield's ointment is a very efficacious remedy for practically all types of ringworm. It may be applied once or twice daily, either alone or in combination with some other drugs as indicated. Before applying this or any other fungicidal remedy, the parts should be well washed with soap and water and the epithelial debris be removed.

Some advise to use Whitfield's ointment by night and a dusting powder by day time. The powder keeps down the moisture and hinders the growth of the fungi. Any of the powders given below can be used.

Thymol di Iodide	... 1 Part.
Pulv. Amyli	... 3 Parts.
Zinc oxide	... 4 Parts.
or	
Acid Boric	... 3 ii.
Zinc oxide	... 3 i.
Xeroform	... 3 i.

or our simple Pulv. Acid Salicylici Co. (Acid Salicylas oz. $\frac{3}{4}$, Acid Boric oz. $2\frac{1}{2}$, French Chalk ozs. $21\frac{1}{2}$.)

Another plan of treatment claiming to have the highest proportion of permanent cures consists in rubbing with a cotton wool swab saturated with a 10% chrysarobin in equal parts of acetone and spirit methylated. After a morning bath, all the peeled off skin and roofs of vesicles have to be removed before this application is made. Cheap and boilable socks etc., may be used. Later in the evening, as much chrysarobin as possible is washed off with soap and water, and Whitfield's ointment is rubbed in. This routine has to be carried out for about four weeks unless chrysarobin erythema supervenes when that solution should be discontinued. If desired, one may use chrysarobin ointment in place of this solution.

Dhobi's Itch is a very obstinate condition and recurrences are frequent. Therefore, the treatment has to be persisted for a considerable time. When the symptoms are brought under control the patient is likely to give up treatment thinking himself free from the disease. This partially cured condition, further assisted by our habits and climate, flares up again within a short time.

After an apparent cure, some form of treatment has to be continued in order to prevent recurrences. I have found the following solution very effective in the treatment and prevention of ringworm.

Acid Salicylas	... grs. 15.
Acid Benzoic	... grs. 25.
Hydrarg. per Chlor	... grs. $1\frac{1}{2}$.
Spt. Methylated	... 3 i.

This solution may be lightly applied or may be rubbed in according to the chronicity of the lesion and the delicacy of the skin. It does not stain or soil the clothes. Unlike any ointment, the patient feels as if no medicine is applied, as the solution evaporates in no time. It does smart while applying, but, with the exception of the scrotum, the smarting is not intense, very often negligible, and of a short duration only. To minimise smarting, Chloretone grs. 15 to an ounce of the solution may be added.

Tinea Corporis or ringworm of the body, unlike Dhobi's Itch, is easily curable. If seen early, paint the patch with equal parts of Tinct. Iodi and Liquor Iodine Fortis. Whitfield's ointment, Ung chrysarobin. or the Spiritous Solution of Acid Salicylas mentioned above are all effective.

Tinea Capitis or ringworm of the scalp, Tinea Barbae or ringworm of the beard (and moustaches) and Tinea Unguium or ringworm of the nails are the remaining forms of ringworm. Ringworm of the Scalp is a disease of childhood. It may be remembered that it is not the skin but the hairs that are usually affected. For the treatment to be effective, complete removal of the affected hairs is necessary, which can be done by X-ray epilation or setting up local inflammation by using ointments of either oleate of mercury or copper or croton oil. For practical purposes the hairs may be cut as short as possible or the scalp may be shaved and Whitfield's ointment with Hydrarg Ammoniata should be used till the patches disappear and healthy hairs grow. Ringworm of the beard is treated in the same way.

Ringworm of the nails is treated by completely removing the nails under anaesthesia or by daily application of Whitfield's ointment after scrapping the nails which are first softened by daily application of Liquor Potasii.

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A Few Salient Points in the Treatment of Syphilis

BY

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A KNOWLEDGE of Syphilis is important not only to the specialist but also to the general practitioner. It was once expressed by Sir William Osler that one who studies Syphilis in all its aspects learns half of Medicine. Hence, I feel myself justified in giving a short review of the treatment of Syphilis as adopted by modern syphilologists.

Although there is no standard or rule of thumb method in the treatment of syphilis and each case needs individual treatment, we may take the recommendations published by the Health Organisation of the League of Nations (New England Medical Journal Dec. 1931) as our guide with a few modifications with regard to dosage. These recommendations are in short:

1. Treatment should be commenced as early as possible in the sero-negative primary stage. For this, the fullest possible use of the microscope in the examination of the secretion from the primary lesion or from the adjacent lymphatic glands should be made.
2. Prior to the institution of the treatment, there should be an adequate physical examination to determine the absence or otherwise of any indication for caution in respect of dosage.
3. It is essential in carrying out the treatment, that a strict supervision of the patient should be exercised, especially in respect of mucous membranes, skin, kidneys and liver.
4. Observations, clinical and serological, after completion of treatment should be adequate and in any case for not less than 3 years.
5. Adequate examination of the cerebro-spinal fluid, at least before dismissal from observation, is essential.
6. The following principles should be followed in actual treatment:—(a) Employment of a comparatively heavy individual dosage of the arsenobenzene and of bismuth or mercurial compound, doses being administered in rapid succession, especially at the commencement.

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- (i) Maintenance of a persistent attack on the disease avoiding interval of such length as to afford the parasites an opportunity of recovering.
- (ii) To administer approximately as much treatment to primary as to secondary cases.

The relative merits of the continuous and intermittent forms of treatment have not yet been established. Both would appear to yield satisfactory results. The intermittent treatment is nevertheless in effect a form of continuous treatment in that there is continuous absorption of Bismuth from the site of the injection for some weeks after a temporary suspension of treatment.

TABLE.
Scheme of one course—For male adult under 50 Years.

Week "914" Grammes.	"606" Grammes.	In sol. compound of Bis. containing Bismatal in Grammes.
1st. to 8th. week. .6 gm. to .75 gm.	.4 to .5 gm.	.2 to .24 grams.
9th. week. —	—	.2 to .24 grams.
10 th. week. —	—	.2 to .24 grams.

- (a) Cases which become serologically negative during or at the end of the course, should receive for such course at intervals of 3 to 5 weeks.
- (b) Cases which have not yet become serologically negative at the end of the 1st course or during subsequent courses, should receive a minimum of courses beyond that during which the serological finding finally becomes negative.
- (c) Cases presenting signs of relapse of an early type should be treated as in class (a).

Women require more or less the same course, the single dose being reduced in the case of 914 by 0.15 grms. and in that of 606 by .1 grm.

So, in view of these facts, it is the primary duty of every practitioner, to impress upon the patient, the importance of a long, continuous treatment as soon as the diagnosis is made, and to discuss frankly all aspects of the treatment. If the patient is poor, he may be directed to a free or charity clinic. In our hospital, many take one course but very few care to run up for subsequent courses. Majority of the cases disappear as soon as the lesions clear up.

Early Syphilis:—Early commencement of treatment as recommended is very important as 100% cure can be expected only

in cases of sero-negative primary syphilis, when the serum becomes positive the percentage of cure falls to 90 or 80% with our modern available treatment. Hence, a dark field examination of the secretions on these cases is highly essential. The lesions of early syphilis do not need any special local treatment except soap and water cleanliness and saline dressing; in cases of Sub-preputial chancre, when the patient is in severe pain, a dorsal slitting under local anaesthesia is very useful.

A thorough physical examination should be made with the examinations of urine in order to find out the presence of co-existing disease which might modify the treatment such as Rheu. Heart Diseases, Tuberculosis or Nephritis. The weight of the patient has also to be periodically recorded. As regards general measures, the importance of plain wholesome food, of avoidance of alcohol and tobacco, especially the chewing of tobacco, must be pointed out to the patient. Sexual intercourse must be avoided during the course of the treatment and should be restricted during one year following treatment and reliable condoms be used on each occasion.

Choice of the Drugs:—The drugs commonly used are arsenobenzene compound, Bismuth, mercury and iodides. According to the consensus of present-day expert opinion, the original Salvarsan, '606' is still held to be superior to other arsenical compounds in the treatment of early syphilis. Because of the difficulty in technique, only Neosalvarsan '914' is given by the majority of practitioners at present. Solu-salvarsan is a new product put up by the Haverro-Trading Company which is a ready made solution that could be easily administered both I. V. and intramuscularly. I have no large experience of this product but if the efficacy of the product is equal to that of original Salvarsan, this ought to have replaced the original product because of the ease of administration. The members of the Sulpharsanophenamine group are not generally used now either in early or in late syphilis as they tend to cause toxic reaction like dermatitis, and nephritis. These products are not to be given intravenously, as they may cause nitritoid crisis and they are intended only for I. M. use. The use may be confined to fat subjects and children when the veins are not very prominent and in cardio-vascular syphilis.

Bismuth has attained an important place in the treatment of syphilis and has almost replaced mercury. There are several generally accepted compounds like, Bismostab, Bismogenol,

Quina, Glucosol, Oliba, and Bisoxyl. The Bismuth compounds are ~~to be~~ given intramuscularly and intravenous use of the drugs is not advisable as it is found to be highly toxic when given intravenously. A course consists of 10 injections given at intervals of 3 to 6 days, of a product containing 2 grm. of the *Bis metal*. The use of Bismuth is highly advantageous in the case of infantile congenital syphilis or in the preparatory treatment of cardio-vascular or Hepatic Syphilis or Nerve syphilis. Bismuth is also spirochaetical as Arsenic but less toxic, but it cannot be substituted for Arsenic. Mercury, on the other hand, is only weak treponemicidal, but it is supposed to act as "resistance builder" in the sense that in some way, it stimulates the patient's tissues to destroy treponemes and this helps to heal the infection.

Iodides have been used in the treatment of syphilis for many years and the mode of action is not well understood. They are supposed to help the resolution of granulomatous tissue and thus aid in the penetration of syphilitic inflammatory tissue by the more active Arsenic and Bismuth preparations. The Iodides are prescribed during the interval between the courses and in late syphilis—especially syphilis of the nervous system.

So, for all cases of early syphilis, at least 4 courses of each of an arsenophenamine and Bismuth are absolutely necessary. In point of time, this means for an average patient with sero-negative primary syphilis, exactly one year of treatment and with sero-positive primary and early secondary syphilis, about 15 months. The duration of the treatment in these cases, is based on serological control. A blood Kahn should be done at the beginning and at the end of each course.

The treatment should be continued for one full year after the serological reaction has become negative. Spinal fluid should be examined as a routine in every case so as to detect any asymptomatic nerve syphilis and the treatment to be modified accordingly.

Modification of the treatment:—When such diseases as V. D. H., T. B. and Nephritis complicate early syphilis, the treatment has to be modified and less intensive measures are to be adopted. In India, the total amount of Arsenic given for a course is 1.5 less than the dose adopted in the West; i.e. 3.5 gm. of N. S. are given in the place of 5 grs. for a single course.

Occasionally, we come across a drug resistant patient whose original lesions fail to heal and who develops new secondary

lesions. The spirochaetes become resistant only to a single drug and a change to another arsenic compound may bring about prompt healing. Intensive treatment is necessary and these cases are rare when Arsenic and Bismuth are used simultaneously. Non-specific protein therapy also is available in these cases.

Latent Syphilis:—Cases of asymptomatic syphilis in which the blood Kahn is positive or a case in which there is a clear cut history of infection, previously inadequately treated, even though the serological test is negative, come under this class. These include only cases in which the spinal fluid is normal. Management of these cases depends upon the duration of infections. If this is of less than 2 years, an attempt should be made to achieve radical cure and should be treated on the same lines as early syphilis. If the infection is of more than 2 years, cure is no longer probable and one can expect only arrest of the disease; and hence, in these cases, the treatment used should be very intensive and continuous.

Wassermann fast Syphilis:—This is due to the presence of foci of syphilitic inflammation somewhere in the body, most commonly in the nervous system. Cardio-vascular apparatus, bone or viscera—in these cases, a thorough investigation must be made including examination of the C. Spinal fluid and fluorescence of the cardiovascular system. If the spinal fluid is abnormal, the case must be treated as nerve syphilis. If the C. S. F. is negative, the patient's physical status must be carefully reviewed from the stand-point of neurologic examination and detailed study of the cardio-vascular apparatus.

The commonest error of omission in late syphilis, is the over-looking of uncomplicated syph. aortitis (without Aortic insufficiency or aneurysm) the existence of which may be apparent only to an examiner, thoroughly familiar with the minor signs and symptoms. If the Cardio-vascular system is normal, bones should be examined including the nasal septum.

If the cause is not found, the case is to be considered as one of latent syphilis and the treatment continued for further two years, regardless of the response of blood to Kahn or W. R. It is unwise and unnecessary to increase the intensity of the treatment or to exhibit new drugs or to adopt various forms of non-specific treatment in an effort to reverse the persistently positive test in latent, osseous, or late congenital syphilis. If W. Fastness is due to cardio-vascular, visceral, or neuro-syphilis, the aim of the

treatment becomes the amelioration or arrest of these conditions rather than to have mere reverse of a positive blood test.

Syphilis and Pregnancy.—The routine use of serological test in all pregnant women and adequate treatment of the syphilitic mother during pregnancy are the two procedures recommended for the complete eradication of congenital syphilis. All pregnant women with a definite blood Kahn should be treated and the treatment demands no special precaution as all women tolerate anti-syphilitic drugs without any deleterious effect on the pregnancy and foetus.

If a woman is nearly at term, an injection of arsenophenamine may precipitate labour, but aside from this, there need be no fear of miscarriage or abortion as a result of treatment. Arsenophenamine is the drug of choice, but, as the technique is difficult, we may use Neosalvarsan or Solu-salvarsan. The urine and blood pressure should of course be carefully watched in these cases.

Tertiary Syphilis.—The iodides are particularly valuable when gummatous lesions are present. The actual choice of drug and scheme of treatment is less important than in early syphilis, as in these cases, we expect only to arrest the disease and not to cure it. If there is involvement of the Cardio-vascular system or of the nervous system, the treatment should be modified. In this connection, it is necessary to draw special attention to the danger of Herxheimer reaction from that injudicious use of 'Arsenic' in gummatous laryngitis, cardio-vascular and nerve syphilis.

Treatment of the Nerve-Syphilis.—Prolonged and adequate treatment of syphilis, systematic and periodic examination of the N. system and routine examination of the cerebro-spinal fluid will prevent the onset of Nerve syphilis. The three lines of treatment generally adopted are: (1) General care including eradication of all septic foci, rest and freedom from worry and change of surroundings (*e. g.*, a holiday in a dry sunny climate). Drugs: Iodides are invaluable in 10 grs. doses 3 times a day. Mercury is indicated when a gradual therapeutic effect is desirable and Bismuth has great curative effect and is less toxic. Olesol, Bivital and Olbia—theliposoluble compounds are specially indicated.

Above all these drugs, prolonged use of Tryparsamide with or without Bismuth is the treatment of choice in Nerve-Syphilis. Tryparsamide is a pentavalent arsenical drug of low toxicity; it is only weekly treponemicidal but it has a highly penetrative power

and very pronounced tonic effect. The usual dose is 2 to 3 grms. a week, the average course consists of 24 grms. in 8 to 10 weeks. This has given a higher percentage of clinical and serological cures than any other single method. This drug has to be cautiously used in cases where visual symptoms are present as the presence of optic atrophy is a contra-indication for its use. But according to a few syphilologists, toxic amblyopia develops only very rarely after its use and optic atrophy is an absolute contra-indication.

Fever therapy—is also valuable; Malaria therapy has come to stay. I have no experience of malaria therapy. We always give T. A. B. I. V. and milk I. M. They are, of course, therapeutically less active.

Cardiovascular Syphilis.—In these cases, careful examination and individualisation of treatment are very essential. We must avoid untoward reaction of any sort to the drug employed *e. g.* nausea and vomiting which might throw an additional strain on an already damaged Heart muscle, and therapeutic shock (Herxheimer reaction) which causes sudden death from coronary occlusion or rupture of an aneurysm. We must also avoid therapeutic paradox by which is meant the rapid healing of the syphilis inflammatory tissue in myocardium, aortic leaf-let or wall and its replacement by connective tissue. Thus, in spite of the improvement of the lesion of syphilis, the patient is functionally worse off than before and may be precipitated into congestive Heart failure.

Hence, there is definite risk in the use of Arsenic in cardiovascular system for the reason stated above. The patient should be given Bis or Hg. in combination with K. I. as preparatory treatment before AS is exhibited. Bismarsen in doses of .05 to .2 gm. is useful. If the cardio reserve is very low, arsenobenzenes should be carefully avoided. The patient should be carefully examined periodically and it is desirable to give an yearly course of treatment, for the associated Neuro syphilis; tryparsamide which exercises no deleterious effect of the Arsenophenamine on the cardiovascular apparatus may be freely employed.

Congenital Syphilis.—The principles of treatment are precisely the same as in adult infection. Adequate treatment should be given as early as possible as after 2 years, the radical cure is probably no longer possible and in late syphilis in adults, the disease can only be arrested. Because of the technical difficulty of

administration, the drugs chosen are Bismuth, Sulpharsanophenamine, Solu salvarsan, acetylarsan, all of which can be given I. M. If the general physical condition is very poor, it is wise to start treatment with Hg. preferably with inunction (1 gm. for infant) Spirocid or stovarsol in fractional doses—both of them compounds of Arsenic may be given by mouth, if the child is free from lesion in the mouth; cases of Interstitial Keratitis need local treatment also—atropine, dionine, and dark glasses.

Untoward reaction to Treatment.—Some of the avoidable reactions are due to faulty technic of the administration of the drug. These reactions may conveniently be classified into three groups: (1) Immediate reaction. (2) Slightly delayed reaction occurring about 6 to 24 hours after injections. (3) Delayed reaction appearing from one day to several weeks later.

The so-called nitritoid crisis consisting of cutaneous flushing, choking, constriction of the throat, cough, vomiting and palpitations is usually caused by the rapid injection of the drug. Sometimes when Sulpharsenophenamine is given I. V. there is a tendency for this reaction to occur. A dose of adrenalin will relieve these symptoms. Slightly delayed reaction like malaise, headache, nausea and vomiting or diarrhoea occurs after Salvarsan more often in women and these are probably due to impurities in the water, dietary indiscretion and constipation on the part of the patient. These symptoms are usually mild and disappear within a few hours.

Post arsenophenamine jaundice and dermatitis are complications which appear later on; 5 c. c. of 5% solution of Sod. dehydrochlorate I. V. daily for 3 days is recommended for jaundice in addition to High carbohydrate diet, glucose and saline cathartics. For dermatitis, 5 c. c. of 10% solution of calcium thiosulphate for 3 days or calciotab (Boots) may be given. If this product is not available, calcium gluconate and sodium thiosulphate may be given alternately.

Treatment of Tetanus

(As followed in my ward in the Campbell Hospital, Calcutta)

BY

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BEFORE considering the actual methods of treatment, it may not be out of place to give a short description of the diagnosis and classification of the clinical types of the disease.

The disease is classified as to its severity according to the lengths of the incubation period i.e., from the date of receipt of the injury up to the date of development of the clinical symptoms :—

- (1) Short incubation period—within one week.
- (2) Long incubation period—beyond one week.
- (3) Cases in whom the incubation period cannot be definitely ascertained; these cases probably belong more to the short incubation period.

Mortality in the short incubation period is 80.6%; Mortality in the long incubation period group is 45.2%, while that in the third group is 62.8%. Out of the few cases of tetanus neonatorum treated, not a single case ever recovered.

Evidently, the prognosis of cases belonging to the short incubation period group is very grave as evidenced by the high mortality figure.

The following is the list of peculiar injuries responsible for causing tetanus :

- (1) Nail or fish-bone pricks in the soles of the feet.
- (2) Cuts by broken pieces of glass.
- (3) Common street injuries.
- (4) Pricks by broom-sticks.
- (5) Chronic otorrhoea, especially in children.
- (6) Abortions, miscarriages, puerperium, menorrhagia, menstrual periods.
- (7) Compound fractures.
- (8) Post-operative, intramuscular injections of quinine.

The main signs and symptoms as noted in our patients are :

- (1) Peculiar and unmistakable facial expression or grin, known as 'risus sardonius.'
- (2) Extreme rigidity of the abdominal muscles.
- (3) Arching of the spine—anteroposterior or lateral.
- (3) Trismus,—complete or partial.
- (5) Tonic contractions of all voluntary muscles.
- (6) Spasms—manifested early or late.

The main principles in the treatment as followed by us consist in:—

- (1) The spasms if frequent are very painful and exhausting to the patient, these spasms contribute mainly to the immediate cause of death either due to respiratory or cardiac failure. So, we always try to keep the patient under the full action of various hypnotics in order to minimise the frequency of the spasms.

- (2) Treatment of the local site of injury by thorough cauterisation and dressing the wound daily with hydrogen peroxide and lightly bandaging the part in order to admit access of air. Treatment of the local site of injury is very important, as this is the place where elaboration of tetanus toxin by the bacilli is taking place, so every attempt should be directed towards destruction of this factory. Use of light bandaging which admits free access of air and hydrogen peroxide are inimical to the growth and multiplication of the bacilli due to the impairment of anaerobic condition.

- (3) Injection of tetanus-antitoxin serum in adequate doses.

Before any treatment is done, the most important thing is to accommodate the patient in a dark room provided with black screens and with the least disturbance to the patient. The patients are so sensitive that even a sudden gust of wind, or a noise or even the sounds of shoes is enough to cause a sudden fit of spasms.

The next item in treatment is surgical care of the wound, by excision of the unhealthy debris of the ulcers, thorough cauterisation by carbolic acid and subsequent dressing of the

wound by hydrogen peroxide and light bandaging. In obstetric cases, regular Tincture Iodine vaginal douches (one drachm to a pint) are given twice daily.

In otorrhoea cases, the ears are thoroughly cleaned with hydrogen peroxide and Glycerine Acid Carbolic dropped. In tetanus neonatorum cases the cord is touched with Tincture Iodine and infiltration of anti-tetanic serum is done round about the cord.

Hypnotics used.—1. Chloral hydrate and Potassium Bromide mixture, 15 grains each three times a day or as often as necessary.

2. Luminal $1\frac{1}{2}$ grains twice or thrice according to the severity of the cases.

3. Ortol, Sodium amytal tablets.

4. Intravenous injections of Somnifern ampoules.

5. Paraldehyde, Chloral hydrate suspended in Olive oil and administered per rectum.

6. Magnesium Sulphate solution (25%), administered intravenously. We are giving this drug an extensive trial.

7. Chloroform inhalations in very obstinate cases, when we cannot control the spasms by any other means.

A few facts regarding intravenous therapy in tetanus.—

We have tried uptill now about 80 cases; administration of sedatives and of anti-tetanic-serum were totally withheld. Out of these 80 cases, 44 were cured, 36 died, mortality being 45%. Out of the 44 cases that were cured all of them belonged to the long incubation period and of the 36 cases that expired, most of them belonged to the short incubation period.

25% solution of Magnesium sulphate was used, average dose per case was between 15-25 c. c., given twice daily and repeated in some cases even thrice daily according to the severity of the symptoms.

Action of this drug as noted by us.—Most of the patients respond almost immediately, the spasms disappear, the tonic contractions of the muscles relax considerably, the trismus becomes very much less marked, in some cases the jaws totally relax, the opisthotonos diminishes and the patient falls asleep and begins to snore almost immediately.

These are noticed as soon as a few c. c's of the solution are run inside the vein. But unfortunately, this sedative action of

Treatment of Complications.—1. *Broncho-pneumonia*:—Commonest complication, prognosis in such cases is extremely bad.
(a) Calcium Chloride 10% solution, 2-5 c.c., intravenously.
(b) Mistura stimulant expectorant—one ounce three times a day.
(c) Frequent administration of Oxygen inhalations.
(d) Atropine 1/150 gr., Camphor in ether.

We are of opinion that the intravenous injections of Mag. Sulph alone cannot sufficiently and surely control the severe spasms as well as the other symptoms of tetanus unless this treatment is combined with other sedative drugs either per mouth or by the rectum. We have to investigate this matter more fully with more cases before we can pronounce definitely any good effect of intravenous Mag. Sulph therapy in tetanus.

Serum therapy.—Anti-tetanic serum (B.C.P.W.), 12,000-20,000 I.U., is given intramuscularly and intravenously daily during the first week in addition to treatment by sedatives. Now-a-days we have stopped giving serum by the intrathecal route because our previous experience in this connection is very much against it. We would never recommend intrathecal administration of serum in tetanus.

It is argued by many that administration of tetanus anti-toxin-serum in those cases who have already developed the disease is useless, as the toxin has already been fixed to the nerve tissue and permanent damage has been done; moreover, the anti-toxin molecule is a big one and therefore it will not diffuse through the choroid plexus and ultimately reach the site of the lesion. But our wide experience in this connection is found to be otherwise and we are definitely of opinion that the use of anti-tetanic serum in association with sedatives, in adequate doses, definitely lowers the mortality in tetanus.

(e) Injections of anti-tetanic serum must be very cautiously given and always in smaller doses.

2. *Sweating*:—due to painful and exhausting spasms. Too much sweating in a tetanus case lowers the vitality very soon and sometimes patients die of collapse and cardiac failure. Atropine, Cardiazol, and adrenalin injections are given.

3. *Exposure keratitis and corneal ulcers*:—Boric lotion wash, Liquid paraffin drops as preventive, otherwise atropine drops, Ung. Acid Boric, Ung. H. O. F. $\frac{1}{2}\%$ etc.

4. *Cyanosis*:—Some patients suddenly become cyanosed and general condition becomes alarming. Oxygen inhalations, atropine, cardiazol etc.

5. *Fracture of ribs and dislocation of jaws have been seen*:—Proper surgical treatment should be done in such cases. Sometimes we receive cases on transfer from the surgical wards with compound fractures developing tetanus subsequently as a complication. In such cases appropriate treatment for the surgical condition must also be carefully done. Sometimes question of amputation might arise where serious threat to life is impending.

6. *Bed sores*:—Strict supervision must be maintained against the development of bed sore which is serious and is a fatal complication. The patient must be accommodated on a soft bed and smooth bed sheets. Frequent changing of the linen is necessary in many cases because the patients soil them with urine and faeces. Scrupulous cleanliness, rubbing the backs with spirit and powders applied thickly are necessary.

7. *Chronic asthenia*:—In a few cases the patients in the convalescent stages develop progressive weakness with wasting day by day. Good dieting is essential. Scrupulous cleanliness regarding oral hygiene by antiseptic mouth washes is essential as a prophylactic against aspiration pneumonias and septic parotitis.

8. *Biting of the tongue*:—a piece of round cork may be kept between the jaws.

Prophylactic treatment against tetanus.—1. Scrupulous surgical cleanliness of all wounds by thorough washing with Hydrag. lotion 1 in 500 and lavish application of Tr. Iodine. Injection of anti-tetanic-serum 3000 I. U. in every case and in more serious injuries, another injection should be given one week later.

2. Tetanus toxoid can be used in the same manner as diphtheria toxoid to produce active immunity through the development of specific anti-toxin. Two or three injections are given. The interval being one or two weeks. The immunity lasts for at least a number of years. It may come to be used to immunise troops.

3. Strict supervision of obstetrical cases.

4. Supervision and control of biological products, especially vaccines and sera.

5. Removal by thorough treatment of all foreign matters from wounds as early as possible.

Dieting a tetanus patient.—Due to the complete trismus (lock jaw), in many cases the question of dieting is of vital importance. Every effort must be directed towards oral feeding if it can be done at all and the services of a kind and sympathetic nurse are specially needed. Milk, fruit juice should be introduced into the mouth by a small spoon in drops and the poor patient encouraged to swallow. Otherwise nasal feeding by a catheter should be done. A careful and trained nurse must be doing this because of the risk of the liquid going to the larynx, in which case, the patient might be suffocated. Rectal feeding by peptonised milk, 5% glucose are also given if feeding by the mouth is not possible.

Typhoid Fever: Diagnosis and Treatment in General Practice

BY

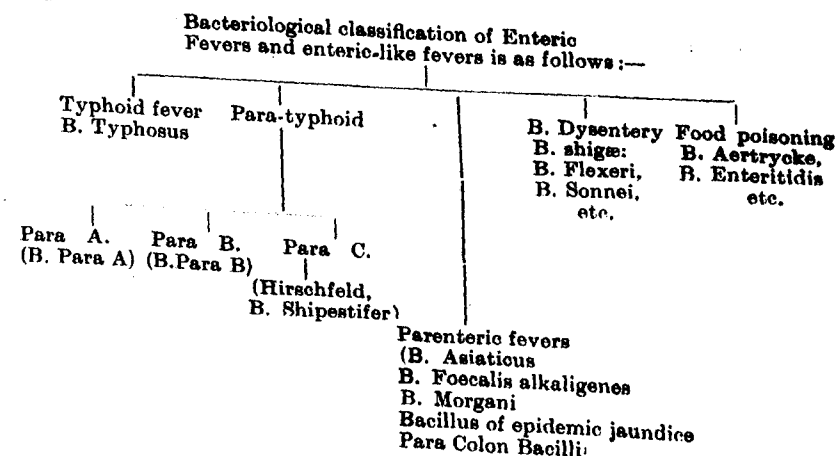
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Member, Bombay Medical Council, Hon. Physician, K. E. M. Hospital,
Medical Superintendent, City Fever Hospitals, Arthur Road,
and Maratha Tuberculosis Hospital, Bombay.

It is an acute infectious fever of long duration caused by B. Typhosus.

There is an allied group of paratyphoid fevers caused by B. Para A, B. Para B., and B. Para C, which are clinically indistinguishable from the classical typhoid fever.

They are all essentially septicæmias and the T. Bacilli settle down in Payer's patches of the small intestine and solitary lymph follicles of large intestine, spleen, liver, gall-bladder and bone marrow. We shall describe the classical typhoid as the type.



The main diagnostic points are as follows:—

1. The onset is gradual with headache, lassitude, general pains and sometimes with epistaxis.
2. Characteristic temperature chart with early staircase-like rise, high sustaining during the 2nd week and then followed by a slow decline by lysis during the 3rd week is typical of typhoid fever.

3. The pulse is slow in proportion to the temperature and dicrotic.

4. Tongue is furred centrally in a broad strip or two bands and clean at the edges; later it is dry, brown and cracked.

5. Fullness of the abdomen with tenderness and gurgling in right iliac region.

6. Recent enlargement and tenderness of the spleen.

7. Rose spots. (To be distinguished from insect bites, prickly heat and inflammation of follicle in hot climates.

8. Pea soup stools.

9. Bronchial catarrh.

10. Peculiar stolid look, perhaps deafness, typhoid state and characteristic toxæmia.

Diagnosis of Para Typhoids A. B. & C. and others is more a bacteriological than a clinical one and the principles of treatment are the same in all. The treatment is divided into certain headings as follows.

Treatment.—Prophylaxis: I. PUBLIC MEASURES:—The following should be carried out:—

1. Notification.
2. Pure water supply (preferably chlorinated.)
3. Control of dangerous food, milk, stale fish, ice-cream vegetables etc.
4. Safe disposal of typhoid excreta collectively.
5. Safe disposal of ordinary excreta by sewage, drainage etc.
6. Removal of cases to fever hospital if efficient nursing is not possible at home due to want of knowledge, means or facilities.
7. Public disinfection of bedding etc., from infected premises.

II. PRIVATE MEASURES:—1. Removal of susceptible persons from the household.

2. Isolation of cases at home.
3. Systematic disinfection of patient's stools, urine, sputum and other discharges and clothing. It may be done by heat or by means of disinfectants. Most effective are carbolic acid 1-20 and its derivatives.

(a) Stools of a typhoid patient should be treated with 1-20 carbolic, twice the volume of faeces and kept for two hours.

- (b) Urine is treated with carbolic (1-20) $\frac{1}{2}$ the volume of urine; or H. P. lotion (1-1000) $\frac{1}{4}$ of urine and kept for two hours.

In mofussil, the stool should be buried and properly covered with earth in such a way as not to contaminate neighbouring water supply after being treated with a disinfectant as above.

Urinals and bed pans should be scalded with hot water after disinfection.

- (c) Soiled bed linen is treated by dipping in 1-20 carbolic or lysol or cyllin 1% for two hours.
- (d) Bath-water-chloride of lime from fresh tin 5 oz. for one hour is efficient for 40 gallons.
- (e) Nurses and attendants should pay special attention to hand disinfection (wash in 1-1000 H. P. after soap and water scrubbing) before taking food in particular.

- (f) All food should be covered and not exposed to flies.

4. Inoculation with T. A. B. Now there are no two opinions regarding its value. It should be given in two doses 5 c.c. and 1 c.c. respectively at an interval of 10 days.

Immunity lasts for a year and half to two years.

It has been noticed by us during the recent epidemic that even if the injection is given during an incubation period it has definitely some modifying effect which is also recorded by antibody titre which shows a far higher agglutination reaction.

There was a suggestion of giving one dose of 1 c.c. T. A. B. vaccine instead of two as is usually done.

We believe that it is not at all a safe procedure.

III. Finally we may mention that typhoid carriers form one of the major problems for a sanitarian. Various methods such as use of intestinal and urinary antiseptics and others *viz.*, salol, urotropin, vaccines, removal of gall-bladder etc., have been tried as the treatment for chronic carriers with dubious success.

The fact that typhoid carriers discharge bacilli intermittently makes it difficult to tackle this problem and again there is no state law to control the movements of these dangerous persons. 2 to 5% of the persons who have suffered from typhoid become permanent carriers. Others usually become free from discharging bacilli within a short period after the illness is over.

I. General.—Rest in bed, expert nursing, care in diet, early diagnosis and maintenance of the resistance of the patient are the points of chief importance in the treatment of this disease. Absolute rest should be the rule from the beginning of the illness and the patient should not turn or do anything by himself. He should not be removed from one place to another unless absolutely necessary.

Expert Nursing.—This is possible in a modern hospital but, if there are no such facilities, and a patient has to be treated at home, all specific directions as regards diet, sponging, disinfection and records of temperature, pulse and unusual symptoms should be given in writing to the Nurse or the family member in charge of the patient. Only urgent reasons would justify removal of a case from one place to another. Cotton or linen night dress opening all the way down should be worn by the patient. A sheet or a blanket is enough covering in ordinary weather and it must be kept on during the active stage. The room should be airy and nice-looking. The Nurse should wash the patient daily between blanket with tepid water containing a little lysol or cyllin (1 in 2500).

Care of the mouth.—She should clean the patient's mouth with an alkaline mouth-wash such as Borothymolin. Bed sores should be prevented and should report if back or any other part is becoming red in spite of nursing measures. She should also report if there is unusual interval in passing urine (retention).

Diet.—This is all important. Anything which is rough or leaves a hard residue should not be given.

Our routine is to give milk or whey oz. 8 and glucose water every 4 hours. Fresh fruit juice in small quantities (oz. 4) is also given daily. Total caloric value comes to about 1500 during the acute stage. After temperature has been normal for 7 days, soft diet *e. g.* rice, thin bread and butter may be added. These should be gradually increased. Water is given freely throughout the acute stage. Lemonade or ice-cream may be given. If the milk is unsuitable causing diarrhoea, then it should be diluted with alkaline water such as citrates. Tea, cocoa, coffee, and albumin water are useful additions. The modern trend is to give more calories, up to 3000 or more even during the acute stage. How far it has increased the incidence of hæmorrhage and perforation cannot be definitely ascertained. But there is, it seems a greater tendency to relapse in these cases.

II. Specific.—In cases coming within a week, following may be given a trial without any ill-effect:—

- (a) 1. Typhoid immunogen
2. Phylacogen
3. Bacteriophage.

In certain cases there was a definite improvement in toxæmia though it is premature to say anything dogmatic on it as the observations made were on a very small number of patients.

(b) Anti-typhoid serum 20 c.c. I. M. for 3 days. We have tried Bengal Chemical Anti-typhoid serum on 90 patients in the above manner. The result obtained was that it had no effect on the mortality rate though it was found that fewer persons developed complications in those to whom serum was given. But it did not affect the severity of complications.

Drugs:—No drug is known which will cut short the disease. Intestinal antiseptic should be given for marked putrefactive changes as shown by diarrhoea, distension and foul stools.

Salol grs. v. t. d. s. is given as an intestinal antiseptic.

Urotropin grs. x. t. d. s. is given to lessen the chance of bacilluria, with the following combination:—

R	Quinine hydrochloride	...	gr. iii
	Urotropin	...	" x
	Salol	...	" v
	Calcium Lactate	...	" x b. d.

And Mist. Ferri Hydrarg- oz. i b. d.

R	Tinct. Ferri Perchlor	...	℥ x
	Liq. Hydrarg Perchlor	...	℥ x
	Spirit Chloroform	...	℥ x
	Glycerine	...	3 s
	Aqua ad	...	3 i

III. Treatment of Special Symptoms and Complications:

Pyrexia: If temperature goes above 102 F., tepid sponging is given. If temperature is very high, then sponging with iced water or ice compress and ice water enema are given.

Toxæmia:—Most of the cases have a fair amount of toxæmia but some have more bordering on the "Typhoid state". In all these cases and in cases in which there is a typhoid state, toxæmia is combated by daily injection of 50% glucose I. V. 25 c.c. or 5% glucose in a pint of normal saline subcutaneously as may be necessary. In severe cases, subcutaneous injection of 5%

glucose saline in the morning is followed by 50% I. V. glucose 25 c.c. on the same evening.

In many of the severe cases there is retention of urine during the acute second stage when they require catheterization with due precautions. We might mention that this complication does not at all affect the prognosis unfavourably unless it is carelessly handled.

For sleeplessness a special bromide mixture may be required.

For rapid feeble pulse, cardiazol with ephedrine drops x under the tongue or coramine 1 c.c. injection, repeated six hourly if necessary, has been found of use.

Constipation:—It is relieved by a small soap water enema or glycerine enema. To prevent hard stools, liq. paraffin dr. 4 may be given in the evening. Saline or other purgatives should not be given.

Diarrhoea:—Diet may require attention. If milk is given, it should be changed to whey, and stopping of everything else except whey, barley water and glucose water may be required. If the diarrhoea is severe i.e. if stools exceed 4 per day, pulvis creta cum opii gr. x with bismuth carb. gr. x in a powder form t. d. s. or more may be given or tannigen 3 to 10 grs. four times a day would be useful. The following enemata is also of use:—

R	Tinct. opii	...	dr. i
	Bismuth Sub.	...	oz. i
	Pul. Ipec.	...	dr. ii
	Starch	...	oz. i
	Hot water	...	pint i

Tympanites:—It should be treated by the following measures:—All food by mouth except glucose water is stopped.

1. Give enemata turpentine dr. i to pint i.
2. Apply Turpentine stupes to abdomen four hourly if necessary.
3. Give turpentine in milk m. iv b. d.
4. Pass a rectal tube.

Haemorrhage:—Every stool should be inspected for blood. As soon as some is noticed, the following should be resorted to:—

1. Keep iced bag over abdomen.
2. Raise the foot of the bed.
3. Inject coagulin ciba 20 c.c. I. M.
4. Inject morphine gr. 1 subcutaneously.
5. Stop all the feeds by mouth except sips of glucose and iced water.
6. Avoid all stimulants.

7. Inject calcium gluconate 10 c.c. intravenously and repeat 4 or 6 hourly.
8. Later on give pulvis creta cum opii grs. x t. d. s. by mouth.
9. Blood transfusion may be given if the pulse is very feeble.

In a case of hæmorrhage it is very important to keep the patient quiet and for that morphine may be repeated if necessary after 6 hours.

In severe or repeated hæmorrhages, patient is usually restless and the above is essential. No food should be given for 48 hours after the hæmorrhage except glucose water. Bowels should not be opened for 72 hours and after that liquid paraffin dr. iv by mouth may be given at night. Hæmorrhage, though a serious complication, is not a fatal one and if treated well, there are chances of recovery.

Apart from dietary indiscretion, hæmorrhage is precipitated by even slight exertion or movements by the patient especially during the second stage and therefore, it is important to avoid this.

Perforation :—As it is mentioned in most of the text books, withhold morphine until diagnosis is made and operate if diagnosed within 24 hours. Stop all the food by mouth. We personally believe that once perforation has occurred, it is invariably fatal (though some have reported cases of recovery) and nothing is of any avail.

During convalescence, the following iron mixture is given :—

℞ Ferri et quinine citras	...	gr. v
Liq. strych. hydro.	...	℥ iv
Spt. Chloroform.	...	℥ v
Infusion Calumba add	...	oz. ss
Mft. mist. t. d. s. daily.		

For a child, Syrup Ferri Phos. Co. dr. i. t. d. s. daily after food should be given.

Change of air and attention for general debility and for cases of mental depression are advisable.

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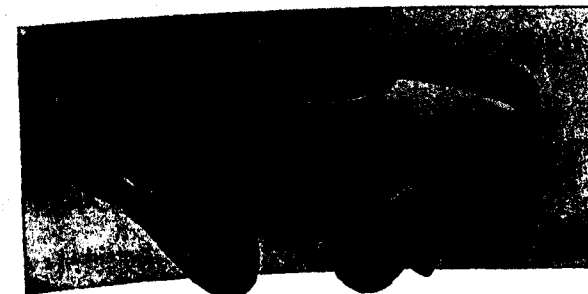
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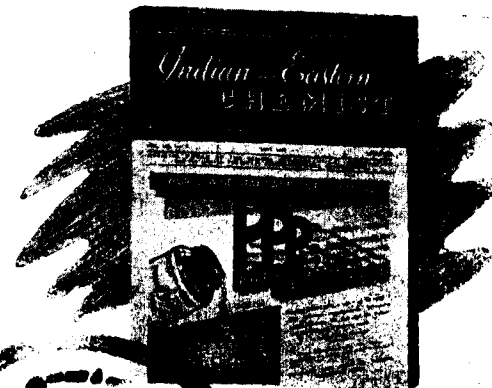
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