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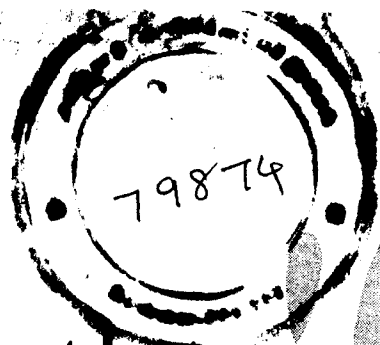
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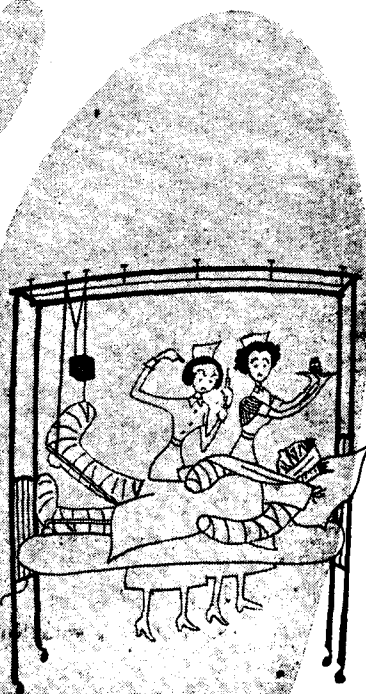
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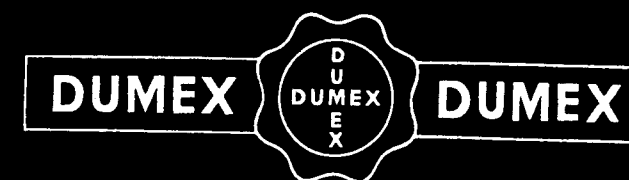
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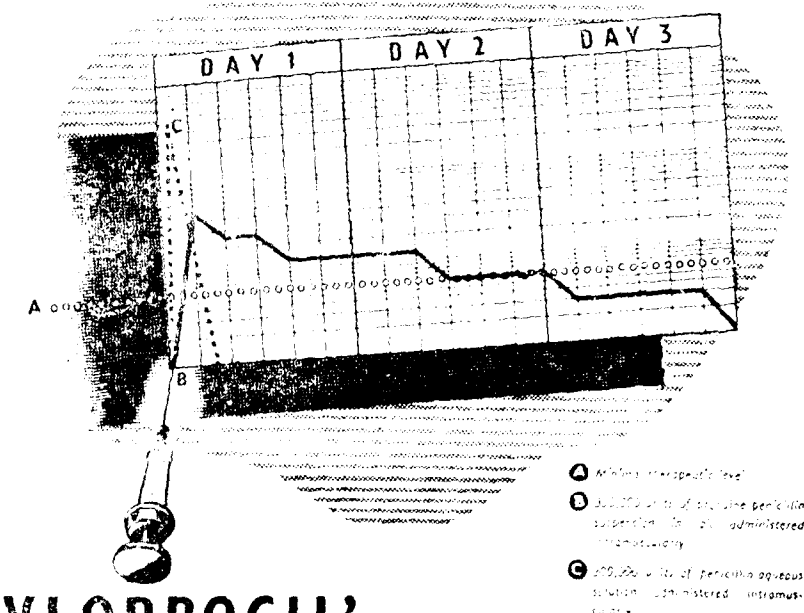
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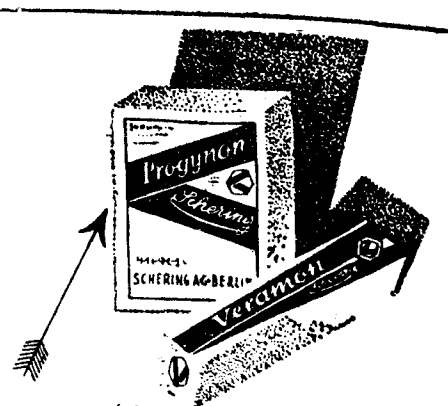
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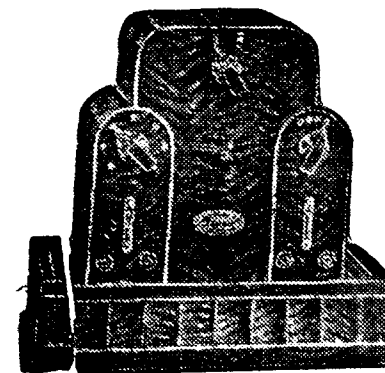
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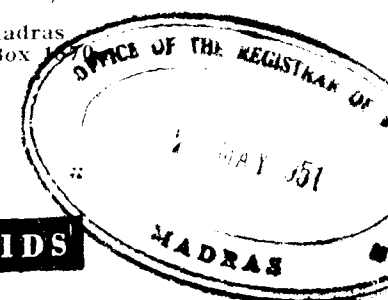
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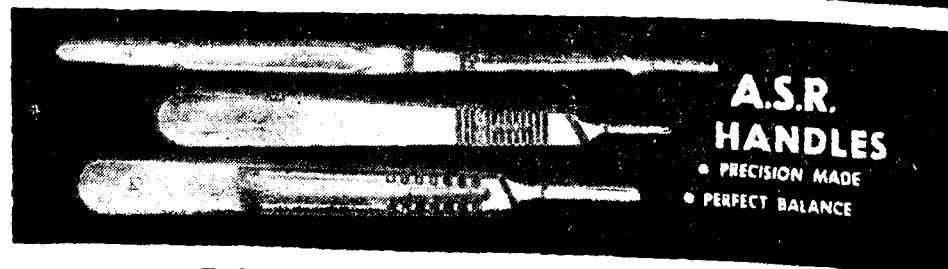
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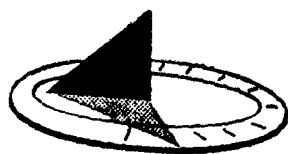
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Pain is the outstanding symptom in cases of localized infections or inflammation. Poultice Heat stops pain—feels good—does good.

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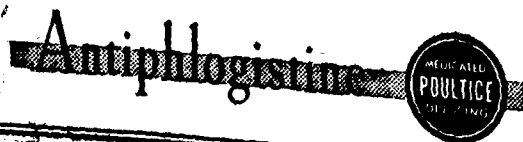
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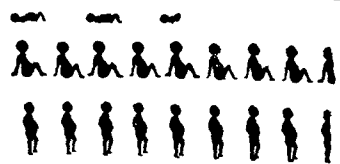
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Elimination of toxic matter elaborated in the system during the acute febrile stage of these maladies is aided by the antiseptic properties of Angier's Emulsion. This preparation has definite soothing and lubricating effects upon the intestinal mucous membrane and contributes to early establishment of the convalescent stage. Angier's Emulsion has a stimulating effect upon the absorptive functions, so that assimilation of

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Intestiform

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Each Tablet contains

Paex Medicinalis (Dry Yeast)	3 gr.
Tannic Acid	15 gr.
Activated Carbon	0.19 gr.
Kaolin	0.38 gr.
Excipients	2.43 gr.

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TROPICAL NUTRITIONAL DIARRHOEA.
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Granules

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Each teaspoonful (5 G.) contains:

Calcium Phosphate	0.25 G.
" Carbonate	0.25 G.
" or Sod. Lactate	0.5 G.
Magnesium Hydrate	0.25 G.
Ferrous Sulph.	10 mg.
Calciferol (Vitamin D)	1,000 i. u.
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Nicotinamide	50 mg.
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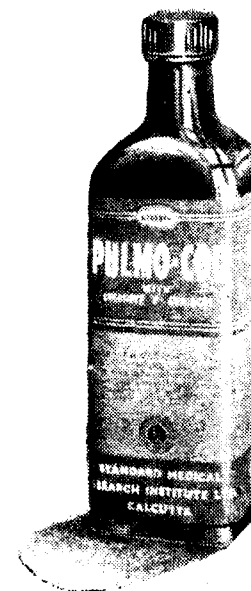
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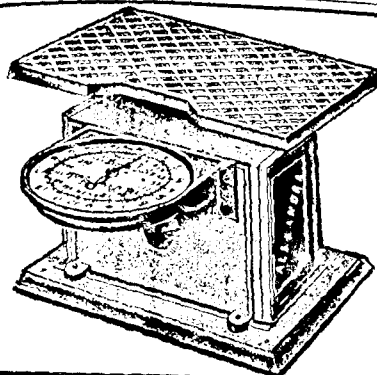
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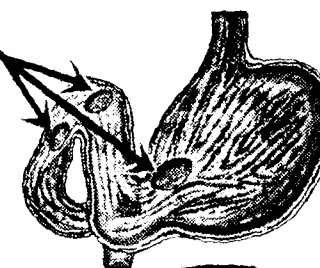
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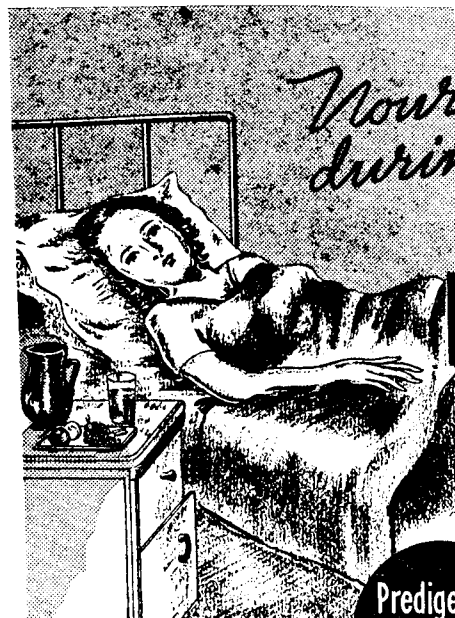


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Pathogenesis.—The most acceptable view is that arterioles throughout the body become irritable and pass into a state of vasoconstriction due to an indeterminate agent or agents which may be toxic, nervous or even allergic in nature. This vasoconstriction leads to increased resistance to the circulation to which the heart responds by a rise of arterial B.P.

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hypertension in the early stages may be slight and transient, or it may increase and become an ordinary benign hypertension, or it may progress rapidly to an extreme degree with evidence of severe arteriolo-necrotic changes, thus producing “malignant hypertension.”

But renin has not been found in such high concentrations in hypertensives. Again, a number of renal biopsies from recent cases of hypertension, exhibit normal renal tissue. It may be perhaps that in some cases renal disease is primary, while in the majority some other extra-renal factors are responsible. The term essential hypertension is therefore justified. It should not be forgotten that psychic factors play a major part at least in the early labile stages. If anxiety, tension, rage or fear are prolonged over periods of months or years, it is possible that prolonged vasospasm or hypertension may occur. In any case the neurotic traits and emotional conflicts have a very unfavourable influence on the course of hypertensive disease.

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Prof. Selye has been trying to demonstrate, of course on experimental evidence, that essential hypertension is one of the diseases which he calls ‘Adaptation syndrome’; others included in this group are rheumatoid arthritis and rheumatism, peptic ulcer and allergic diseases etc. These diseases he attributes to a breakdown of the normal hormonal adaptive mechanism in which the balance between the two types of cortical hormones namely glucocorticoids and mineralo-corticoids are disturbed and excessive output of the latter produces vaso-spasm; and inflammatory and allergic changes in the tissues of mesoblastic origin.

Considering how diverse and varied seems to be the aetiology, it is no wonder that up to the present time we have not arrived at any one single factor responsible for this disease. We are all agreed that vaso-spasm occurs but what brings this vaso-spasm is far from clear. Whether it is of renal or neural origin, acting through the sympathetic, or of psychic origin, or due to an electrolyte disturbance acting through or without the agency of adrenal cortex, we do not yet know. But one fact must be clearly grasped that it is not one but several factors which bring about this state of the body.

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Original Articles

HYPERTENSIVE DISEASE*

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THE most common and important of all types of heart disease by and large the world over is that due to systemic hypertension with elevation of the diastolic as well as the systolic blood pressure. Hypertensive disease has been defined as the unidentified physiological disturbance or disturbances which lead ultimately to the elevation of B.P.; anatomical changes in the vascular tree, and functional impairment of the involved tissues. It is a syndrome and not a disease.

It is intended to confine this discussion to the majority of cases which constitute the category of "Essential or Primary Hypertension"—the fundamental cause of which is still obscure or undetected or undecided and not associated with any constant gross findings—a designation borne of ignorance and akin to the familiar P.U.O. in this respect. The senile hypertensive does not come within the purview of this article. In him the gradual reduction of elasticity in the aorta and big vessels produces readings such as 160-170/90-95 and is a natural part of the process of growing old. The secondary hypertension of gross nephritis, adrenal tumour, polycystic kidney etc., would not be taken up for discussion.

B. P. determination and interpretation.—This simple yet essential factor in the recognition and treatment of this disorder needs first attention.

* Based on a paper, read at the 2nd All-Assam Provincial Medical Conference at Jorhat.

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and pains in the chest, palpitation, weakness, faintness and headache, dizziness, irritability, insomnia, fatiguability. Surprisingly enough these are the very symptoms attributed to hypertension or hypotension or anxiety and tension states. These symptoms are fairly common in hypertensives who have seen physicians and are in large part iatrogenic. After certain patients have learnt to report frequently for measurement of B. P. a "Sphygmomanometric monomania" develops the knowledge of high blood pressure may initiate a vicious circle in which the anxiety caused by the information raises the B.P. which causes further tension. All these symptoms occur far less frequently in patients who do not know of their hypertension. Reassurance often effectively removes them even if the B.P. is not appreciably altered.

The relation of headache and dizziness is difficult to define. Many hypertensives die without ever complaining of headache—on the contrary, the majority of malignant hypertensives and some benign ones have paroxysmal incapacitating headache. Mostly it turns out to be true migraine.

The recognition of the asymptomatic phase of hypertension is of great importance in view of the present day tendency of radical medical and surgical hypotensive procedures in their evaluation.

The symptoms and signs of cardiac, renal and cerebral hypertensive phenomena are too well known and need no repetition.

PROGNOSIS:—Despite the prevalence of this disease, doctors are still unable to estimate with any confidence its effect on the expectation of life. The younger the age period at which hypertension develops, the less likely is the individual to live out his full life span, yet the average expectation of life for those developing hypertension under the age of 50 is over 15 years. Irrespective of age, sex or diastolic pressure limits, an average case will probably live for 14-19 years.

Paroxysmal dyspnoea, triple rhythm, pulsus alternans and persistently high diastolic limits are bad prognostic signs. Attention should be focussed on the diastolic and not the systolic limits. Retinal changes have often been used as prognostic guide but opinions vary regarding their dependability. They are only a rough guide, for advanced changes may occur with a temporary acute exacerbation of the disease which may subside.

TREATMENT:—As no ultimate and satisfactory conclusion has been reached in regard to the aetiology and functional pathology or rests entirely on empirical grounds. During one era most of the effort was directed towards finding and eliminating foci of infection. To this end lorry loads of teeth, tonsils and gall bladders and acres of sinus walls were removed. For a long time, and in this country even now, hypertensives are deprived of a palatable

meal by withholding meat, salt, coffee, tea and tobacco. Patients are forbidden to work hard—sexual activity is often forbidden thus enhancing nervous tension. A score of drugs comprising of Nitrites, Sedatives, Thiocyanates, Rawfolia Compounds, sedatives *ad nauseam*, to mention only a few, and lastly Tetra-ethyl-ammonium compounds, and in the hands of the more enterprising a variety of mutilating surgical procedures such as thyroidectomy, nephrectomy and various combinations of sympathectomies, have been undertaken. The result, far too often, is the patient spends much of his time scrutinizing his symptoms, and worrying about his blood pressure and the impending catastrophe. Advice to these patients must take into account the fact that the hypertensive tendency will probably persist for the rest of the patients' life, that this may be a long life, and that, in any event, the patient has a right to as much happiness and to as full a life as possible. For most patients it seems more practical to state simply and casually that a hypertensive tendency exists. It is better to avoid telling the patient the exact reading and to try to persuade him to leave that to his physician. Hypertensives have the habit of showing undue inquisitiveness about the limits and hardly has one finished the recording that one is asked "How much?....." In such cases he may be told the truth if it is not high, but if the truth would be alarming, it is a good practice to give the patient a figure that will not frighten him but always record the false and the true reading for future guidance.

General management.—A good rule of thumb would be to avoid restricting the patient's life unless it is certain that the proposed change will really importantly affect the patients' disease. Rigid routines used indiscriminately for all patients are seldom helpful. An activity or relaxation which appeals to one patient may induce tension in the next. To the afternoon nap, some respond with a relaxing sleep, others spend the interval fretting impatiently for the time to get up.

Good mental and physical health is best maintained by a proper balance of work, rest, play, sleep and food. To achieve this, a detailed information about the patients' life is necessary. The adjustment of the patient's life can be accomplished with less strain and dislocation while working than when idle. No hypertensive should, therefore, be asked to give up his work unless reasons for total disability exist.

Adequate rest is the keynote of treatment—an eight hour night sleep reinforced by barbiturates, if essential, a siesta for 1-2 hours after lunch (if not resented) are useful.

There should be one and only one medical adviser who is easily accessible and the patient should have complete confidence in him.

Avoidance of excessive fatigue and exercise beyond the point of shortness of breath; and a rational and a co-operative limiting of social obligations are essential.

If these general principles are followed it is perhaps only probable that patient's life and usefulness will be prolonged. But it is reasonably certain that he will be a great deal happier during the time that remains.

Psychological approach is an extremely important one and has been utterly neglected. A very thorough incursion into the patient's psychological background is essential. Find out about his home life, his business, if he was under pressure or in unpleasant surroundings, his recreations and hobbies, his passions and worries. Having found these, we must do everything we can to readjust the patient's life so that the inequalities and incompatibilities can be minimised, if not altogether eliminated.

Dietetics:—Low protein, salt-free and anti-obesity diets have been recommended. In place of using a dietary formula as a cure, it is more to the point to fit the diet to the needs of the patient. For the overweight, anti-obesity diets are in order. To what extent the joy and purpose of life i.e. eating is to be curtailed for the sake of doubtful pleasure of merely existing is an open question. No harm can occur from moderate indulgence in proteins. It makes little difference whether they are of animal or of vegetable origin. Indiscriminate prohibition of eggs, fish, meat and game is therefore to be strongly deprecated. A low Sodium intake to specifically less than 0.5 gram daily such as achieved by rice, fruit, sugar and milk diet is useful, but if continued too long becomes extremely insipid and exaggerates the anxiety state. The availability of Na ion exchange resins would obviate this restriction. These resins bind dietary Na in the intestines and not let it get absorbed in the blood. Perhaps before long our hypertensives and others in whom salt has to be restricted will discard their salt-free diet, eat normal food, leaving it to a resin to remove the Na from their intestines.

Drug therapy:—I have had little if any success with the use of so-called blood pressure lowering drugs—when the varied and uncertain ætiology is kept in mind, is it any wonder that any single specific drug purely hypotensive and universal in its application should become available? Drugs of the Rauwolfia series, which have great popularity with many of us in well controlled experiments, have failed to produce constant substantial falls. Besides they have no appreciable effect on diastolic levels.

No one would grudge a judicious use of sedatives to allay the anxiety state, but they should not be used as a routine to the point of distressing clouding of consciousness.

The use of Thiocyanates warrants some remarks: The safe and successful administration of this drug requires so much careful attention, so dependable a co-operation and the availability of a properly equipped lab. for repeated blood assays and they produce

so slight, inconstant and unpredictable a fall that neither all patients nor all physicians are in a position to contemplate their use.

Purgatives as a routine use have outlived their utility and the earlier they are abandoned the better it is at least for the patient.

SURGICAL TREATMENT.—Sympathectomy has been widely practised in recent years but there is little agreement on the indications of the operation. It benefits by causing splanchnic vasodilatation and consequent reduction in peripheral resistance. In any case this operation slows the progress of the disease with relief of concomitant symptoms. Few would deny that any male or female between the age of 40–50 with established hypertension, severe headaches and other symptoms, a good myocardium, no permanent C.N.S. changes and good renal functions should be given the benefit of the operation. Not enough follow-up has been possible to properly assess the benefits from this procedure but the undue optimism shown in the beginning is fading into scepticism.

In spite of all these measures, we cannot yet cure hypertension. The imposing list of remedies and their advocacy by so many different persons reveal their very weakness. We have not yet a specific cure for hypertension. Whether to match the numerous causes of hypertension, we may have to develop a variety of cures or whether a single drug or chemical or other measure will neutralize hypertension in the majority of cases no matter what the original cause, we do not yet know.

Tetanus

Noel and McSwain of the Nashville Hospital review all the cases of tetanus treated at their hospital during the last 20 years, numbering 105 in all. In treating cases of tetanus every effort is made to furnish adequate caloric and fluid intake by the mouth by nasal tube, or parenterally. Because of the danger of death by asphyxiation or pneumonia, mucus is aspirated from the pharynx periodically. Tracheotomy was found necessary in only one case. Where possible the wound is excised. They consider 80,000 to 100,000 units of tetanus anti-toxin adequate for a case and suggest an initial dose of 40,000 units intramuscularly; and 10,000 units are injected around the wound before excision and 4,000 units intramuscularly every day thereafter for 6 or 8 days or until clinical manifestations have subsided. The most satisfactory sedatives were found to be phenobarbital and paraldehyde. The authors have abandoned the use of curare, phenol, and mag. sulphate. Penicillin is useful for its effect on the secondary pyogenic organisms usually accompanying the infection with tetanus. In the authors' series of 105 patients the mortality was 46 per cent.—(*South. Med. Jour.*, 43, p. 53, 1950).

PUERPERAL INFECTION *

U. N. NAYAK, L.M.S., L.M. (Rotunda),
Mangalore.

Definition.—Puerperal infection includes all the morbid conditions arising in the puerperium as a result of the introduction of organisms into the genital tract, before, during or after labour at full term, miscarriage or abortion.

Since the application of antiseptic and aseptic principles to midwifery, this infection has been slowly vanishing from lying-in-hospitals. Unfortunately, in private practice, there is not the same improvement, owing to various difficulties which private practitioners have to face. Want of ante-natal supervision, unhygienic surroundings where labour is conducted, inadequate training of midwives are some of the difficulties usually met with in private practice. The percentage of mortality is still very high in India, whereas it is very low in Europe and America.

Physiology.—Defence mechanism :—(1) The vaginal secretion in a healthy pregnancy is increased in quantity and contains epithelial cells, leucocytes and mucus, moistened by a serous transudate through the epithelium. It is acid in reaction and contains numerous bacilli called the Dodderlein's Bacilli. These bacilli are anaerobic, non-motile and produce lactic acid. This acid results from the fermentation of glucose derived from the Glycogen in the epithelial cells in the vagina. During pregnancy Glycogen is laid down in increasing quantity in these cells. This acid concentration is now-a-days regarded as the chief prophylactic agent against implantation of pathogenic organisms. During labour, however, especially if it is prolonged and the membranes have ruptured, these bacilli are washed off, and their activity is inhibited by the haemorrhagic discharge and the escaping liquor amnii which is definitely alkaline.

(2) The cavity of the uterus is separated from the vagina by a plug of mucus. This is a very good protection from infection. Once labour starts this plug of mucus is expelled and this protection is removed.

(3) During pregnancy there is a marked leucocytosis. This in itself is a protection. Recently some obstetricians have claimed that the blood develops increased bactericidal properties as pregnancy advances.

(4) There is yet another defence against infection. It is by the reticulo-endothelial cells in the outer layers of the uterus. These cells are particularly concerned with the supply of antibodies. Hence their importance.

(5) Besides these, during labour, in the first and second stages, there is an increased vaginal secretion, and flushing of the vagina by

*A lecture delivered before the South Kanara Branch of the Indian Medical Association at their monthly meeting held at Mangalore on 20-1-51.

the sterile liquor amnii on the rupture of the membranes. After childbirth there is another flushing of the vagina by the remaining liquor amnii, and lastly there is the mechanical mopping action of the placenta and the membranes in their passage through the vagina.

Sources of infection.—Uterine infection is brought about by the following organisms:—(1) Haemolytic streptococcus 70%; (2) Anaerobic streptococcus; (3) *Bacillus coli*; (4) *Bacillus Welchii*; (5) *Staphylococcus aureus*; (6) *Pneumococcus*; (7) *Gonococcus*; and (8) *Bacillus aerogenes capsulatus*—(Saprophytic existing in company with streptococcus, produces a lot of gas inside the uterus).

Haemolytic streptococcus :—The natural habitat of this organism is the throat. It does not occur in the healthy genital tract but it is occasionally seen in about 2% of the cases. It is found in the throat of a large number of people who are usually referred to as carriers. Doctor and nurse carriers are therefore a grave menace to puerperal women. Infection of this organism is very frequently conveyed to the patient's genital tract by "Droplet Infection." The attender's hands are contaminated by such droplet infection, or the organisms are sprayed direct on the vulva or vaginal entrance in speaking, coughing or sneezing. Some parturient women may have the organisms in their own throats, and may infect their own hands and convey the organisms to their vagina when touching or washing the vagina with their own hands.

Anaerobic streptococci :—These are found in the vagina and also on the vulva of a number of pregnant women. They act as phagocytes and when conditions are favourable take on the role of a pyogenic organism. They are responsible for a number of infections following difficult or instrumental delivery. They usually attack the veins of the placental site, giving rise to phlebitis and thrombosis and go on spreading the infection to the femoral iliac or even to the inferior vena cava. They also infect blood clots, break them into minute particles, which are carried into the blood stream, giving rise to multiple abscesses and infarcts in the lungs.

***Bacillus coli* :—**The source of infection from these organisms is either the bowel or the urinary tract of the patient. Infection by these organisms is very common.

***Bacillus Welchii* :—**Infection by this organism is not very common. The source of infection is in most cases the bowel of the patient. When it occurs, there has usually been a good deal of manual or instrumental interference, as in abortion cases. It produces plenty of gases.

***Staphylococcus aureus* :—**Infection by this organism is also very rare. They usually produce localised lesions like parametritis and perimetritis.

Pneumococcus :—The source of infection is usually the throat and nasopharynx of those in attendance. This infection is peculiarly prone to affect the endometrium, pleura and the joints.

Gonococci :—Infection by these organisms is rarely very acute.

Channels of entrance.—The channels by which the offending organisms or their toxic products are absorbed are numerous. The perineal and the vaginal tears and also the cervical tears are all the common points of entrance. The uterine cavity, and particularly the placental site, are the most dangerous channels by which infection may enter. The greatly developed lymphatic system of the uterus is also another portal of infection.

Predisposing causes.—During pregnancy, anaemia, debility and toxæmias of pregnancy undoubtedly lower the general resistance. During labour, trauma, hæmorrhage, fatigue, shock, especially after complicated or instrumental labour, have got a very definite prejudicial influence and favour infection. Constipation is also regarded as a predisposing cause as a loaded rectum interferes with the proper drainage of the uterus. Retention in the uterus of portions of placenta or membranes is followed by infection as such dead tissue is favourable for the growth of the organisms. There is also slight acidosis induced by labour, and, when it is prolonged, acidosis becomes pronounced. Increased acidity in the blood always favours the development of certain infections.

PATHOLOGY.—As the endometrium is in a raw condition especially at the placental site, the first infection is an endometritis. Occasionally it is limited to the placental site, but more often it is generalised. Two types of endometritis are seen :—(1) Putrid endometritis ; and (2) Septic endometritis.

Putrid endometritis :—The organisms that produce this variety of endometritis are saprophytes, anaerobic streptococcus, staphylococcus and gas-producing organisms which infect the retained fragments of placenta, membranes and blood clots. This condition was formerly known as *sapraemia*. The ragged mucosa is found thickened and shaggy and presents all the appearances of a sloughing wound. This may be localised to the placental site or distributed all over the whole uterine surface. The lochial discharge is dirty, blood-stained, purulent, frothy and very offensive in smell. It is increased in quantity. Outside this necrotic layer, is a barrier of leucocytes, which limits the infection. The muscle tissue outside this barrier is oedematous, but there is no metritis. This condition inhibits involution and hence uterus will be found to be enlarged and flabby.

Septic endometritis (Puerperal septicæmia).—The uterus is enlarged but is not so soft as in the putrid variety. The surface is covered by a dirty yellow fibrinous exudate and is therefore very smooth. The leucocytic barrier is less definite, and, in many cases,

it is decreased or even suppressed. It is not foetid in pure streptococcal infection, but if the infection is mixed up with saprophytic organisms or *B. coli*, there may be offensive odour. The infecting organisms spread into the lymphatic spaces and a general metritis follows. Infection may spread elsewhere also and may give rise to parametritis, perimetritis, thrombophlebitis, salpingitis, oophoritis and to general septicæmia or even pyæmia.

(1) *Metritis* :—In metritis abscesses form in the muscular wall and below the endometrium as a result of a direct lymphatic spread of the organisms or infection of thrombi in the veins.

(2) *Parametritis* (Pelvic cellulitis) :—It is frequently the result of infection of lacerations of the cervix. This may also be caused by infection spreading by the lymphatics from the uterine cavity. At first there is only inflammatory oedema and the process may go no further. Sometimes it is followed by pus formation in the connective tissue of the broad ligament. A pelvic abscess, if unopened, burrows in any direction and not uncommonly opens in the groin. It may also burst into any hollow viscera.

(3) *Perimetritis* (Pelvic peritonitis) :—This is usually the result of direct lymphatic spread from the endometrium. In mild cases, there is a fibrinous exudation and formation of adhesions, which may wall off the pelvic organs. In more severe cases there is pus formation, pus collecting in the pouch of Douglas and sometimes in front of the uterus. If protective adhesions are not formed general peritonitis takes place.

(4) *Thrombophlebitis* :—If the veins of the placental site or elsewhere in the uterine wall become infected, either directly or as a result of the lymphatic spread, phlebitis occurs with secondary thrombosis and the thrombi usually become infected. The phlebitis may spread upwards by the ovarian vein or the lymphatic veins to the inferior vena cava or downwards to the femoral and saphenous veins. Thrombophlebitis occurs in a large number of cases. This is a frequent starting point of phlegmasia alba dolens and of pyæmia.

(5) *Pyæmia* :—Sometimes portions of infected thrombi become detached and are carried away to any part of the body, giving rise to metastatic abscesses. Acute endocarditis, pleurisy, septic broncho-pneumonia or arthritis are some of the sequelæ.

SYMPTOMS.—*Putrid endometritis* or *sapraemia* :—Usually on the evening of the third or fourth day, there is a rise of temperature and pulse rate, very frequently preceded by a rigor. Patient complains of headache and sickness and looks very miserable but does not complain of abdominal pain. The lochial discharge is increased in quantity and is very offensive and dirty and brownish in colour. Uterus is found to be enlarged but not very tender to touch.

Septic endometritis (Septicæmia) :—The time and severity of the onset of the puerperal septicæmia depends on the virulence of the

attacking organisms. Cases do occur in which the patients become ill as early as the second day of the puerperium, but not later than the third day. There is a sharp rise in temperature and pulse, and very often a rigor. Temperature rises to 103°F to 104°F. Pulse rate is also markedly increased. The uterus is unduly large, but the involution is not so characteristically interfered with as in the previous varieties. It is tender on palpation. The lochial discharge gradually diminishes in quantity and is not foetid. The mammary secretion also decreases. If the infection passes beyond the endometrium, the symptoms become more severe. Patient looks very ill, eyes are sunken, nose pinched. The mind is usually clear but sometimes there is delirium and coma may supervene. Vomiting may occur if general peritonitis develops. Diarrhoea with offensive stools, is a late symptom and also of serious import.

Pyæmia:—This may occur as an additional complication in an acute attack, but sometimes arises abruptly about the end of the first week in cases in which mild pyrexia has been observed. Characteristic symptoms of this is a succession of rigors with high temperature and pulse rate, with definite remissions of pulse and temperature between the rigors. Metastatic abscesses form wherever the thrombi lodge. Septic endocarditis, empyema, bronchopneumonia, joint lesions may also occur. Prognosis depends on the site of the abscesses and the resistance of the patient.

PROGNOSIS.—Prognosis is good in localised infections, i.e., putrid endometritis, but in septicæmia it is more serious. If complications arise such as phlegmasia alba dolens, pyæmia and parametritis etc., cases are apt to be protracted. If general peritonitis supervenes, the outlook will be very grave. After the recent inventions such as the Sulphonamides, Penicillin and antiseptic lotions like Dettol etc., the percentage of mortality has been very considerably reduced. Hence prognosis is changing rapidly.

PROPHYLAXIS.—1. Ante-natal care of the patient must be such as to improve her general condition. Vitamin A must be prescribed to raise the patient's resistance to infection.

2. Doctor and nurse must endeavour to avoid contact with infectious patients and should not treat or attend, if they themselves are suffering from sore throat. Masks must be worn (containing 4 layers of gauze) by doctors and nurses. These need not be sterilized but must be very clean; but it is better to sterilize them. These masks prevent droplet infection and once worn must not be touched with the hand. They can be worn for a period of 4 or 5 hours, but not more than this. After use they may be washed in antiseptic lotions and dried or destroyed if not convenient to wash.

3. Active antiseptic measures to the vulva may be applied like Dettol cream. Constant washing of the hands in antiseptic lotions like Dettol lotions 5% should be resorted to. Dettol cream is effective for two hours.

4. Vaginal examinations should be as few as possible.
5. Each stage of labour must be so managed as to avoid exhaustion, bruising, lacerations and hæmorrhage.
6. All lacerations must be repaired at once so as to close up all possible channels of entrance of infection.
7. Bowels must be attended to by enemas, purgatives etc.
8. After the birth of the child neither finger nor instruments should be allowed to enter the vagina unless absolute necessity demands it.
9. No douche should be given, unless all antiseptic measures are observed i.e., patient must be thoroughly washed with lotion, and can and rubber tubing and nozzle must be sterilized before being used.

TREATMENT.—1. *Nursing:*—Nursing must be extremely good. It is better to treat these cases in maternity institutions. Patients must be isolated and a special nurse must be engaged. She must know that she should not carry infection to others. Proper attendance to bowels, sleep, bed-sores etc. must be looked to.

2. Try to raise patient's resistance by giving vitamin A and iron tonics by mouth.

3. *Blood transfusion:*— $\frac{1}{4}$ pint or even 1 pint may be given, especially for hæmolytic streptococcal infection, for its bactericidal properties.

4. *Drainage:*—Drainage is very important. This is done by raising the head of the bed or better still by propping up the patient in the Fowler's position. This is not necessary in hæmolytic streptococcal infection, especially where there is no discharge. Drainage can also be accomplished by introducing pure sterilized glycerine 40 c.c. at a time, twice or thrice a day, through a sterilized rubber tubing. This should not be done in hæmolytic streptococcal variety.

5. *Drugs:*—Ergot combined with Quinine may be given with advantage to stimulate uterine evacuation. Pituitary extract should be given morning and evening 0.5 c.c. But these should not be given in septic endometritis (hæmolytic streptococcal variety) as they may squeeze out the organisms into the blood stream.

6. *Serum therapy:*—Modern view is that it is useless. Some even think that it may even do harm by inducing serum reaction.

7. *Chemotherapy:*—The older set of drugs like Eusol, Mercurochrome, Iodine, Colloargenum etc., have all been given up as they are likely to injure the leucocytes and anti-bodies that are expected to destroy the infecting organisms. These have now been replaced by Sulphonamide drugs and their derivative products. They are plenty in number, Prontosil being one of the earliest. The others are,

Sulphanilamide, Streptocide, Proseptasine, Irgafen, Cibazol, M & B 693, Sulfadiazine, Sulfamerazine, Sulfamezathine etc., etc. All these are reduced in the body to Sulphanilamide. They have bactericidal action. They are specially useful in the most virulent form of infection i.e. hæmolytic streptococcal infection. The mortality rate has been reduced from 20% to 4 or 5% after the use of these drugs.

The dose of these drugs is $4\frac{1}{2}$ to 6 grams per day i.e. 9 to 12 tablets per day. In very acute cases, they can be given up to 16 tablets a day, in divided doses at regular intervals, so that the blood concentration is maintained. They should be continued until the temperature is normal for 2 or 3 days. These drugs are also available in the form of injections. It is better to give an injection in the beginning and then to continue treatment with tablets by the mouth.

These drugs are also used prophylactically, especially if there is evidence of contact with other patients suffering from sore throat etc., and also in forceps cases, abortion etc. Two tablets three times a day for three days will be quite sufficient.

8. Repeated intravenous injections of Glucose Saline will help to keep up the patient's strength in bad cases.

9. *Penicillin*:—More recently another invention has been introduced among the armamentarium—*Penicillin*. It is a very powerful anti-bacterial substance against streptococcus, staphylococcus, pneumococcus and gonococcus, which are some of the organisms responsible for puerperal infections. It is better to use it in injection with chemotherapeutic agents like Sulphonamides.

Symptoms of parametritis, perimetritis etc.—The onset of the symptoms is first noticed after several days of slight temperature. There will be a rigor and pelvic pain on one or both sides. In peritonitis (perimetritis), pain and tenderness are probably bilateral, and the patient lies with both knees drawn up. In pelvic cellulitis (parametritis) only one side is affected and only one leg is drawn up. In the latter condition a dense hard swelling usually on one side of the uterus may be felt. In severe cases, the swelling may suppurate, in which case a small incision should be made over the area of softening and enlarged by a pair of dressing forceps. In peritonitis, the effusion is usually posterior to the uterus, in the pouch of Douglas. These effusions rarely suppurate, and are usually absorbed.

White Leg.—SYMPTOMS:—There are two varieties in this infection:—(1) Femoral thrombosis. (2) Phlegmasia alba dolens.

Femoral thrombosis:—This condition is due to thrombophlebitis. It is more liable to occur in anæmic patients such as those who have suffered from ante-partum or post-partum hæmorrhage.

It is more common in the left leg. Symptoms begin about the middle or end of second week, by an abrupt rise in temperature and a slight rigor. In the beginning stiffness will be noticed in the limb and later pain is felt. The thrombosed vein is very tender and felt as a hard irregular line, running down the limb. Swelling begins in the foot and spreads upwards. Swelling pits on pressure. During the early stage the pain is severe, but subsides when the swelling increases.

Phlegmasia alba dolens:—This is a cellulitis which results in obstruction to lymphatic circulation. The groin glands are frequently enlarged and tender. The swelling of the limb becomes tense and hard and does not pit on pressure and the skin becomes white, smooth and glossy.

TREATMENT.—Movement of the limb must be prevented by raising the limb on pillows and keeping it between sand bags. Pain is relieved by hot boric fomentation sprinkled with lead and opium lotion. Glycerine Icthyol soaks and Mag Sulph paste also prove useful dressings. Limb should be wrapped in cotton wool and kept warm. Never massage the limb. Patient must stay in bed for at least two weeks after pulse and temperature are normal. Massages should not be started until six or eight weeks later. After recovery the affected limb may remain weaker for years. It feels heavy, tends to swell and ache, and gets cold, and toes are subject to chilblains in winter. This is prevented by wearing woollen stockings or bandaging with a crepe-bandage. Tell her to take plenty of exercises, but not to stand. Cycling is efficacious.

Recently a new drug Heparin has been tried for cases of thrombophlebitis. It is an ideal anti-coagulant. It is present in the mast cells which are distributed in the walls of the vascular and reticulo-endothelial systems. It is the normal physiological anti-coagulant of the human blood. It is prepared from ox blood. The aching of the acute phase will be appreciably relieved within 24 to 48 hours. Pyrexia, swelling and tenderness are also benefited. Injections are given by continuous intravenous infusions. Dose is usually 10,000 to 15,000 I. U. administered intravenously and may be repeated three or four times a day.

Acute Neurotoxic Reactions due to Streptomycin

Dumande *et al* published their observations in 10 cases of neurotoxic reactions to streptomycin. In 1 case there were epileptiform convulsions; in 3 cases tetany crisis occurred; in 4 cases fatal coma and in 2 cases nonfatal coma. The authors believe that these reactions are due to the use of too high dosage and stress the necessity for checking reactions in mice before clinical use.—(*Paris Medical*, cited in *J.A.M.A.*, 15-2-'50, page 502).

PROTEIN HYDROLYSATE FOR THERAPY*

U. P. BASU, D.Sc., F.N.I., P. K. GUHA, M.B.,
AND
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DURING the past few years the pharmaceutical industry has extended its frontiers and one such advance has been the production of many preparations for nutritional purposes. The processing of many food substances has facilitated nutritional therapy. It has even led to the preparation of solutions suitable for parenteral injection to prevent or correct protein deficiencies in various conditions of hypoproteinemia due to insufficiency, deficiency or non-utilisation due to diseases, local or systemic.

Role of Protein and Amino Acids

Approximately 20 per cent of the weight of the average human body is due to the presence of proteins. Protein molecules are huge and complex but they have certain definite properties in common, and could be broken down as in the normal digestive process by relatively simple procedure into a mixture of smaller organic molecules known as Amino Acids. These Amino Acids are each different but exhibit the same general characteristics in that they contain an amino group in alpha position to a carboxyl group. Most of the common proteins contain 20 to 22 different Amino Acids chemically combined in certain definite proportions but the exact knowledge as to their mode of linkage in the molecules is scanty. It has, however, been established that the body can synthesise or manufacture for its tissues certain Amino Acids if a certain group of Amino Acids, now known as essential Amino Acids, is present in the diet. These latter acids are Valine, Leucine, Iso-leucine, Phenyl Alanine, Threonine, Lysine, Methionine and Tryptophan, and usually cannot be made by animal tissues, at least at a sufficient rate to support normal growth and/or function. The free Amino Acids circulating in the blood stream are the chemical building blocks from which body proteins are being formed to nourish, repair and form all its tissues. They are obtained from our food protein on digestion in the stomach and small intestine, and diffuse through the intestinal mucosa into the capillary network of the portal circulation that carries the blood to the liver. Of course some protein fractions may also be absorbed into the lymph and thus enter the general circulation through the subclavian veins for subsequent synthesis of hæmoglobin, plasma protein, antibodies enzymes and the hormones. It is this chemical reaction of the formation and reconversion of Amino Acids in the various types of tissue proteins that is commonly known as protein metabolism.

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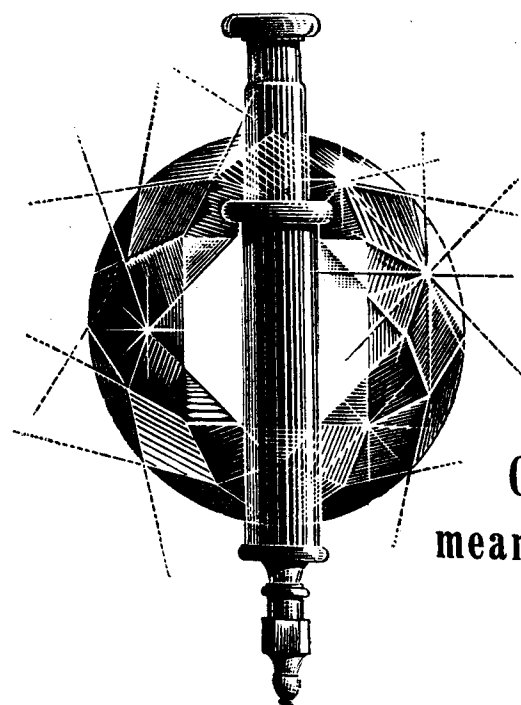
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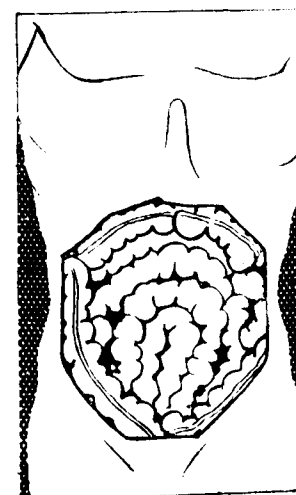
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Protein requirement

An average normal may require about 70 to 80 gms. of proteins of high biologic value. Infants and children require proportionately more proteins than do adults since protein is needed not only for their growth in addition to other normal functions as well. A dietary allowance for protein. (Cf. *Nutrition Review*, 1945, Vol. 3, p. 287) for various ages is as follows :

Individual	Protein requirement in gms.		
Man	70	—	80
Woman	60	—	70
Woman (Pregnancy)	85	—	100
Woman (Lactation)	100	—	112
Boys (13—15 yrs.)	85		
Boys (19—20 yrs.)	100		
Children (upto 12 yrs.)	3.5 per Kg.		

* 1 Kg = 2.2 lbs.

An adult receiving a sufficient amount of protein in his diet would eliminate in the urine and faeces a quantity of nitrogen derived from protein, equal to that ingested and the individual would be in nitrogen balance. In cases of children, in pregnancy and in persons convalescing from an illness, the amount of protein-nitrogen ingested should be greater than the amount of nitrogen lost from the body as they need extra protein to their tissues every day for growth. But if for any reason the loss of nitrogen from the body is greater than the intake, protein therapy is to be applied first to restore a negative nitrogen balance to a positive one, and subsequently to nitrogen equilibrium or nitrogen balance.

The amount of protein required to restore deficit may be found out if the percentage of plasma protein is known. The normal value is approximately 7 gm. per 100 c.c. and taking the average body weight to be 150 lbs. (70 kg.), the volume of blood plasma would be 3,500 c.c., as in the average the blood plasma is estimated to be about 5 per cent of the body weight. If one man be found to contain 5 gms. protein per 100 c.c. of his plasma, he has lost 70 gms. $(3,500 \times 7.5/100)$ of protein. It is now known that during protein depletion protein is lost not only from the blood plasma but also from the tissues of the body. Except in special cases like hæmorrhage, the loss of tissue protein comes to about 30 gms. for each grammè of plasma protein (Cf., Elman, 1942). Hence in the above case the man has lost from his body approximately 2,100 gms. (70×30) of protein. As not more than 50 per cent of food protein will be used up by the system for production of tissue proteins, we may offer 4,200 (2×2100) gms. of food protein to the man for restoration

of his deficit. To this must be added the amount (about 25 gms.) of protein that is lost daily through urine. If it now be assumed that protein deficit is to be restored within a period of 30 days, the daily protein requirement would come up to 165 gms. (4200 plus 25 into 30 whole upon 30). But the normal diet offers say 70 gms. when 95 (165-70) gms. of protein are to be supplemented in the form of easily available, assimilable, palatable and rich in essential Amino Acids. It is pertinent to note at this point that protein will be wasted for energy unless and adequate caloric intake of carbohydrate or fat is included in the diet for energy production.

Nutritional anaemia noticed in babies, girls during puberty, and women during pre- and ante-natal periods, is generally ascribed to the deficiency of iron. But iron is required for the synthesis of haemoglobin molecule and is derived from dietary salts and proteins. As such anaemia is one of the common manifestations of protein deficiency and many cases of simple anaemia respond if the protein intake is increased. Similarly, the importance of high protein diet in infectious hepatitis, in nephrosis, and in certain kidney disorders is being gradually recognised. In recent years it has also been shown that patients with peptic ulcer, severe burns and shock and during surgical operations recover more rapidly if the protein depletion be corrected promptly and properly.

Protein supplements

It is obvious that administration of large amounts of protein of high biological value is advantageous in many physiological and pathological disorders. But it is difficult for sick people to obtain the required amount of protein from their ordinary diets alone. Some supplement is, therefore, to be made. Utilisation of any dietary protein, however, depends considerably on the adequate amounts of essential Amino Acids present in the proteins. A slight change in the Amino Acids composition may alter the nutritive value of a protein or protein supplement, and accordingly evaluation by biological tests would be necessary for finding out the growth-promoting quality of the proteins, such proteins to maintain nitrogen balance and to replenish the depleted body stores. It is here that we come across with the modern therapy of protein hydrolysates or Amino Acids of the same optical rotation as noticed in natural products, but the available ones are still costly. As such a hydrolysate from different proteins is becoming popular among medical practitioners as a new armament to combat against various disorders.

Indications

A protein hydrolysate forms an important addition to nutrition and its use will lead to definitely beneficial effects, provided it is used when properly indicated and in conjunction with other nutritional requirements. Whenever there is a failure in normal ingestion,

digestion and absorption of food protein, various manifestations from the deficiencies in proteins, begin to develop unless protein is supplied in some other way. The wider use of the ready made Amino Acids will prevent deficiencies in proteins often noticed in clinical medicine. As a matter of fact now-a-days hypoproteinemia is found frequent in both medical and surgical wards of any hospital. Specific indications for clinical use would be found in :

(1) Patients unable to ingest protein because of severe gastro-intestinal disease or persistent vomiting from any other cause. In these cases a protein hydrolysate is to be given parenterally. They may include such conditions as intestinal obstruction, local or general peritonitis, acute cholecystitis and a severe pain or even vomiting. Krishnan and his co-workers (1944) showed for the first time that the intravenous injection of a solution containing hydrolyzed protein reduced considerably the mortality in cases where gastro-intestinal tract becomes incapable of function.

(2) Patients able to ingest protein but in whom the amount is inadequate or difficulty is often encountered in digestion or absorption. Here both parenteral and oral preparations would be helpful. Severe gastro-enteritis, ulcerative colitis, or regional ileitis, and/or certain types of intestinal fistulas would be better controlled by this therapy.

(3) Patients with allergy and other cases. In cases of extensive protein allergy, specially in infants, the use of protein hydrolysate will give a very favourable result. It is to be noted that a hydrolysate not only offers protein nourishment but often acts as a buffer and helps in neutralising gastric acidity (Levy and Siler, 1942).

The following conditions generally represent only a few of the many conditions that may be improved by the administration of adequate amounts of protein hydrolysate, either oral or parenteral or both :

(a) Severe haemorrhage ; (b) anaemia ; (c) nutritional and post-operative edema ; (d) intestinal obstruction ; (e) pathologic conditions of the gastro-intestinal tract ; (f) intestinal hypermotility ; (g) extensive burns ; (h) chronic protein depletion caused by vomiting or diarrhoea ; (i) severe infections ; (j) convalescence from infection ; (k) surgery involving loss of blood ; (l) peritonitis ; (m) hepatic cirrhosis ; (n) hepatitis, acute and chronic ; (o) peptic ulcer ; (p) ulcerative colitis ; (q) pregnancy specially in toxemias ; (r) lactation ; (s) renal diseases without high non-protein nitrogen as nephrosis ; (t) diabetes mellitus ; (u) hyperthyroidism ; (v) restricted diets as in typhoid etc. ; (w) food idiosyncrasies ; and (x) tuberculosis in all stages, where wasting has to be counteracted.

Standards

The protein hydrolysates are generally enzymatic digests of protein from casein, liver, yeast or other suitable proteins that

supply the approximate nutritive equivalents of the source of protein and contain at least half of the total nitrogen in the form of alpha amino nitrogen. It is suggested that for parenteral use 1000 c.c. of a 5 per cent solution administered in not more than two and a half hours must induce a positive nitrogen balance when used as the exclusive source of nitrogen and an absolute increase of circulating plasma protein in a depleted patient. When administered it would show no undesirable side effects, free from any undue toxicity and should have a very low ash content (*Cf.*, Basu, Bose and Sen, 1946). Cloudy solutions are always to be rejected. Every precaution is to be taken for cleanliness of the equipment for parenteral administration. The characteristic taste of the oral preparation is inherent and is due to the specialities of the active Amino Acids. The preparation is, however, suitably adjuvated for making it palatable. For the injection, attention is mainly drawn towards the pH, solid, heavy metal, residue on ignition sodium, total nitrogen, alpha amino nitrogen, ammonia nitrogen pyrogen, anaphylactoid reaction, and maintenance of the growth of healthy rats for offering an ideal protein supplement.

Administration and dosage

The protein hydrolysate should be regarded as a food, and therefore adequate amount should be administered if good results are desired. Further, the feeding of water, electrolytes, carbohydrate (glucose) and vitamins should be maintained so that the administration of an almost complete diet without recourse to the usual digestive processes might be possible in cases of necessity and emergency. Noting the nitrogen balance from the difference in the quantity of nitrogen eliminated in the urine and faeces, and that ingested into the system, it is possible to detect the nature of protein depletion and the dose of the ingredients should be accordingly adjusted. Considering the cases of low depletion, moderate depletion and severe one, the amount of protein in the form of Amino Acids to be administered may vary from 50 to 150 gms.

Preparations containing 5% protein hydrolysate are available as sterile solutions ready for intravenous injection. The rate of injection should not be too great as symptoms of nausea and vomiting may be produced. It may be 4-5 cc. per minute. In any case the rate be adjusted from noting the reactions such as a feeling of warmth, tendency to nausea, occasional slight abdominal pain or any other unpleasant symptoms from the patient. The solutions of Amino Acids (protein hydrolysate) is an excellent culture medium and as such special care must be taken to prevent contamination in its processing as well as in handling.

Preparations are also available for oral administration. These might be easily adjuvated with fruit juice, suitable drinks, salts and vitamins. The taste of the preparations is not very palatable. The unpleasant elixir. Larger amounts of protein nourishment

Protein Hydrolysate for Therapy

U. P. Basu, P. K. Guha and A. N. Bose

CHROMATOGRAM

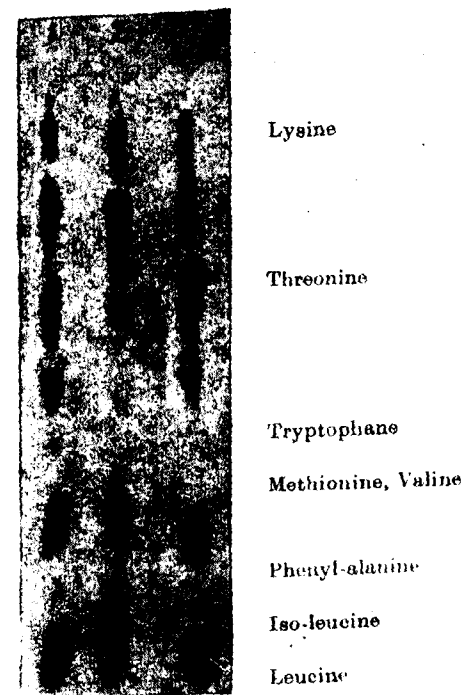


FIG. 1. From Protein Hydrolysate* (Injection).

FIG. 2. From a mixture of Amino Acids: Cystine, Lysine, Histidine, Arginine, Glycine, Aspartic acid, Glutamic acid, Iso-leucine, Alanine, Hydroxy proline, Threonine, Tyrosine, Methionine, Valine, Phenyl-alanine, Leucine and Tryptophane.

FIG. 3. From Protein Hydrolysate* (oral).

* The Protein Hydrolysate used was the "Hydro-protein" (oral and injection) of the Bengal Immunity Co., Ltd., Calcutta.

could be administered and more rapid correction of protein deficiencies be achieved in extremely undernourished patients from preparations containing about 20 per cent protein in the form of Amino Acids and peptides. In short it may be said that the protein hydrolysate is an ideal therapeutic agent and could be administered to practically every patient in almost any dosage desired.

Storage of the solution

It has been already indicated that a solution or elixir containing protein hydrolysate is an excellent medium for the growth of organisms and as such the preparations are to be specially packed so that no outside contaminations may take place. For parenteral purpose the solution be supplied in 25 c.c. ampoules or in 200 c.c. transfusion bottles. The oral preparation should also be supplied in 10 oz. bottles, but in all the cases caution is necessary that the preparation is not exposed to air and light. They should be carefully stored away from heat and light to ensure the maintenance of all the essential Amino Acids necessary for proper protein nutrition. Bottle for injection and any one showing turbidity or precipitate should be rejected.

Hydrolysed protein, protein hydrolysate, Amino Acid mixtures, or similar other preparations are now-a-days available in various forms and packing. Liquid preparation should not be preferably supplied with glucose (*Cf.*, Basu and Roy 1946; Esh and Basu, 1950; Friedman and Kline, 1950) as on long storage there is likelihood of alternation in the composition and it may not contain all the essential Amino Acids in their proper form for utilization. In the figures typical chromatogram (*vide picture*) from a mixture of known Amino Acids, and the Amino Acids from a protein hydrolysate (intended for both oral and parenteral administration) are being shown for comparison. The identical nature of the three preparations would be evident; only the tryptophan is not to be found in the hydrolysates as it is destroyed for processing during chromatography. The presence of tryptophan and other characteristics of the preparations might be easily found out by other means (*Cf.*, Basu, Bose and Ray, 1950).

Acknowledgement.—In conclusion the authors wish to express their sincere thanks to Mr. M. Sen Gupta, M.Sc., of this Institute for supplying the chromatogram as shown in the figure.

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MY PERSONAL CONCEPTION ABOUT THE NATURE OF SLEEP*

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SLEEP is very important in the perfect make-up of the body and brain. Periodic sleep is one of the prime necessities of life, and it has been conclusively proved that the animals deprived of sleep are killed far more quickly than those deprived of food. Man deprived of sleep for a prolonged period, either by compulsion or as a result of some morbidity, has been demonstrated to suffer from gross degenerative changes in the cerebral cortex as well as from a perfect psychic imbalance, culminating eventually in death. It was for this very result that forced deprivation of sleep was being practised for a very long period in China, both as a torture and as a form of punishment. Sleep, however, alternates with wakefulness with the same rhythmicity and periodicity as does night with the day; and the two are probably closely related to each other in Nature as its cyclic periodicity. Ever since the Universe is created, living beings have been sleeping and waking alternately and *instinctively*. Moracio says, there is no more important a subject of study than the one of sleep, for it concerns the highest question of physiology, psychology and medicine. And it is true, because it is sleep which prepares the tired organisms to regain the energy for the next day's wakefulness.

I. Introduction.—Literature is full of figurative definitions of sleep, e.g., "The death of every day's life", "The balm of the hurts' minds", etc. But what the poets wish to impress through these is to emphasise the constructive capacity of sleep; and it is the cerebral cortex, its psychic levels (the so-called 'highest levels of the cerebral cortex' by Hughling Jackson), that need the sleep the most.

The exact definition of sleep would be: "It is the restful component of the rhythm of life" (Dr. Shyam Narayan Mathur, M.B., B.S., Ph.D., Professor of Physiology, K. G. M. College, Lucknow). The so-called 'sleep' is the term designed by the physiologists to denote that period of rest during which the cerebrum makes sure of its own rest. In fact, every living cell has got two phases—periods of rest alternating with those of activity; each closely interrelated and interlocked with the other. No activity is ever possible without an antecedent rest, and that is why sleep is of more primitive importance than wakefulness. Rest is an essential component of the functional integrity of the entire living kingdom.

If we carefully look into the manner of working of the various organs of the body we would soon discover the fact that there is a

definite 'Division of Labour'—different periods being allotted to a different group of cells in any particular organ to observe alternate periods of rest and activity. As for example, if the heart is working, all the muscle-fibres of it are not active at one and the same moment; some are expanding and some are contracting rhythmically. Others lie idle; next, those which were idle till then now become active and 'work', while the former batch merges into the subsequent period of rest. This law holds good in all the organs, such as, liver, lungs, kidneys, brain, spleen, etc., irrespective of whether that particular organ belongs to the group of the voluntary or involuntary system. Were it not so, the aim of evolution would have been defied on its very face. Nothing would be left for the body to work in times of emergency. Any way, I leave these details here and come to the subject proper.

II. What is sleep?—Sleep, as it has already been pointed out, is a period of rest for the organism as a whole though it is used to imply for that period during which the brain takes rest. During this time the higher faculties of the brain and the body are in a state of partial or complete suspension. Human adults are known to have a 'biphasic' sleep, while the infants have got a 'polyphasic' sleep. But as we go down on the scale of evolution, we also find the dogs having the 'polyphasic' sleep. Animals of the invertebrate series have a longer period of sleep. Even the fishes, birds, and the reptiles have the periodic sleep. Thus, we see that sleep is a phenomenon of universal occurrence, the difference in the various animals being only in the quantity and the quality of the sleep. The horse sleeps standing.

III. Physiological changes during sleep.—There is an increased parasympathetic and a diminished sympathetic discharge during sleep. The vegetative nervous system is, therefore, still working, and it must, for the cessation of its activity would mean life quickly passing into death. This, however, does not mean that there is no period of rest for the Autonomic Nervous System, but then it takes its rest in 'piece-meal'.

During sleep the subjective feelings are a sense of drowsiness, general lethargy, and an inability to maintain or fix the attention, will and concentration.

1. Heart-rate slows down, thereby diminishing the total cardiac output. Vasomotor centre is slightly depressed, as a result of which the peripheral resistance of the capillaries is reduced, the skin-capillaries dilate, and the arterial blood pressure falls down a bit.

2. Cerebral circulation is definitely slowed down, as observed by Blumenbach and Durham. Intracranial tension rises somewhat during sleep.

3. Pupils of the two eyes are somewhat constricted, and the lacrimal secretion is comparatively less.

* Specially contributed to THE ANTISEPTIC.

4. The number of total R.B.C. during sleep, as noted by Keyes, is definitely diminished, and the total oxygen-carrying capacity of the blood is therefore also lessened.

5. Respiration becomes slower in rate but deeper, and there is a predominance of the costal and the thoracic types of respiration. CO_2 -tension in the alveolar air is definitely raised.

6. Body-temperature is lowered slightly because a relatively greater loss of heat takes place from the dilated capillaries during sleep. For this very reduction in the skin temperature, man is compelled to quilt in himself, and the animals sleep curled upon themselves in order to expose a less surface of their body to the outside air; and for the same reason, this feature is more marked in the winter than in the summer season.

7. Busch's experiments have clearly demonstrated that the movements of the G. I. tract are enfeebled, and the digestive juices are poured more in quantity and better in quality. Therefore, the best time to enjoy the supper (night-meals) is physiologically about 2 hours before retiring to bed.

8. Rate of excretion, like secretions, also increases during sleep. Sweat-glands function more vigorously, and the amount of nocturnal urination is comparatively more than the one of diurnal urination.

9. Threshold values of the sensory stimuli to arouse the specific sensation are also raised, and therefore the deeper the sleep is in its intensity, the less is the degree of responsiveness to the various stimuli—exogenous or endogenous. Consciousness is the first thing to disappear; and the sleep appears more readily in infants and children, in whom the psycho-physiological make-up is less intricate and perfect than in the adults. Power of vision is lost a bit earlier than that of hearing.

10. Sleep 'spreads' in the C.N.S. from above downwards. That is, just as we die from 'above downwards.' Similarly on exactly the same analogy, we sleep also from above downwards. Inferentially, the activity of the C.N.S. at any moment during the sleep is seen to diminish (only quantitatively) as we descend down from the highest level of the cerebral cortex to the lowest segment of the spinal cord.

The deep reflexes are not elicited, there is extensor type of plantar-response, and the cortical activity is diminished as evidenced by the presence of the L-waves of the E.E.G. (Electroencephalogram) taken during the sleep.

Memory and will are retained during sleep, and probably with the same intensity and force as on waking as just before going to sleep.

11. Skeletal muscles become relaxed and hypotonic. However, the movements during sleep are incidental and not consequential or

essential. Muscular tonus during sleep is relatively greater in the alert sleepers than in the non-alert ones.

12. Metabolism runs at a lower speed, and the serum-Ca is raised while the serum-P is decreased during sleep.

13. Closure of the eyelids is not an essential accompaniment of sleep, but is a protective phenomenon endowed by Nature to save the visual apparatus from the noxious and the harmful stimuli impinging from without over the unconscious eyeballs during sleep.

IV. Theories of sleep.—A large number of theories exist in the literature on sleep, which are either of academic importance or of historic interest. I shall refer to only the chief ones here.

1. *Local theories* :—

- | | |
|------------------------------|---|
| (a) Thyroid gland theory. | } These three are merely
of historic interest. |
| (b) Arachnoid plexus theory. | |
| (c) Corona radiata theory. | |

2 *Vasomotor theories* :—(a) Cerebral congestion theory :—It has been disproved, and therefore discarded.

(b) Cerebral anæmia theory (Durham and Tarachanoff theory) :—That there is a less blood supply to the cerebrum, and so there is a resultant anoxæmia of the cerebral cortex. This results in sleep.

3. *Chemical theories* :—(a) Henderson and Urlser theory :—It states that Acetylcholine (Ach) is produced in the midbrain, and when this exceeds its upper normal limits sleep sets in.

(b) Ivy and Pieron theory :—It postulates that there is a production of a cerebral depressant, the "Hypnotoxin," during the period of wakefulness; and this, on excessive accumulation, gives rise to sleep.

(c) Preyer and Obersteiner theory :—There is an accumulation of acid metabolites in the blood-stream during wakefulness which in their turn bring about a slight loss in the irritability of the brain-cells. This results ultimately in sleep.

(d) Zondek and Bier theory :—A bromine-containing 'chalion' is produced in the blood from the hypophysis cerebri. This chalion is then responsible for producing sleep.

COMMENTARY ON CHEMICAL THEORIES :—All these chemical theories point out that there is an accumulation of some chemical substance in the blood-stream during wakefulness, and this, when it exceeds its maximum normal limits of that particular chemical substance, sleep results. During the hours of sleeping an antagonistic chemical substance is elaborated in the blood, which slowly and steadily neutralises the sleep-producing chemical substance, and when complete neutralisation has occurred the person then wakes up.

Thus, these above detailed chemical theories, then, cannot explain the ability of a sleeping individual to wake up at a particular desired hour, nor does it explain as to how it is that the last hours of sleep are of more intense depth. Nevertheless, these chemical substances have not been isolated so far from the blood of a sleeping or of a waking person.

IV. Histological theory.—Ramar and Cael theory:—It suggests that there is a mechanical retraction of the normally contractile dendrites, and this results in the functional disconnection of the transmission of neural communication between the cerebral cortex and the extracortical portion of the nervous system.

COMMENT.—But so far no histological experiments have been demonstrated to support this theory.

V. Anatomical theory.—The idea that a definite 'sleep centre' exists somewhere in the III ventricle and in the aqueduct of Sylvius of the mid-brain close to the nucleus for the oculomotor (III cranial) nerve has been persistently put forward by several eminent physiologists from time to time in the past and in the present. Economo was the pioneer worker in this direction. Of late, some supporters of this theory have gone even to the extent of describing two sub-divisions of the sleep-centre, viz.: (a) a centre in the mammillary body of the hypothalamus, whose stimulation produces 'stupor,' and (b) a centre in the higher levels of the cerebral cortex of the brain, whose inhibition or destruction leads to sleep. The former has been designated as 'sleep centre,' and the latter as 'wake-centre.'

Classical experiments of Hess in 1927, who produced 'sleep' in rabbit by injecting Ergotamine in its III ventricle, and of Dr. Dixit of Bombay in 1934, who produced 'sleep' in cat by injecting Acetylcholine in its III ventricle have lent good support to the anatomical theory.

COMMENT.—These states of the so-called sleep produced in laboratory animals are far from the natural sleep, which is purely a periodic rhythm in human history.

VI. Pavlov's theory of conditioned reflexes.—According to Pavlov, the eminent Russian Physiologist, sleeping is merely an extension of the internal inhibition up over the entire cerebral cortex.

COMMENT.—This theory makes the sleep an acquired tendency rather than an inherited one. It labels the sleep a conditioned reflex than an unconditioned one, and this view would seem hardly tenable in the light of the discussions forthcoming.

DEPTH OF SLEEP:—Several methods have been devised to measure the depth of sleep, e.g., to estimate the degree of the sensory stimuli required to awaken the sleeping individual at past midnight. Moreover, very recently, motilogram—a graphic record of the movements made by the deep sleeper—has been used for this

purpose. E.E.G. (Electroencephalogram) is also made use of to measure the depth of sleep. But all these techniques are decidedly tedious and complicated.

Sleep, as has already been pointed out and emphasised, is essential for the proper rest of the highest level of the cerebral cortex and so the perception of dreams is purely due to an incomplete rest of these levels—the iso-cortex of Hughling Jackson. Therefore, naturally a dreamless sleep always means a deeper and more refreshing sleep.

My own conception of the nature of sleep:—The various classical theories described above about sleep are all more of an academic nature. While the cerebral anaemia in sleep is the cause or the effect of sleep is still uncertain, laboratory experiments have totally failed to support the chemical and the histological theories. The state of sleep that has been produced in experiments by Hess and Dixit individually is far from the natural sleep, the discovery of whose nature is the sole object of this article. I would call these sleepy states as "stupor." The sleep-like state that is consequent upon a disease or a destruction or drug administration is 'stupor' or 'hypnosis' but never the true 'sleep.' Sleep is a natural rhythm, and the most refreshing and conducive one. So far as the anatomical theory is concerned, my firm conviction is that sleep has got, really speaking, no necessity to require a nervous centre for its occurrence, because it is not a reflex at all. It is purely an instinct, and, therefore, like all other instincts, it is an inherited memory from the forefathers, which helps the organism to sleep. A drowning man instinctively catches at a straw; a newborn baby instinctively suckles its mother's breasts; and, exactly in a similar way, all the living beings sleep instinctively. Instinct, as defined in the Chamber's Encyclopædia, is an inherited, inborn and involutional prompting from within to act (unknowingly, in a purposeful manner).

Sleep is the most primitive instinct from its genetic point of view, oldest in its evolution. Sleep is an act which is performed like all other instincts without any preplanning or forethought, and therefore it represents a racial intelligence inherited by the new-born from its parents. It is for this reason that the sleeping hours of a new-born are much prolonged (about 20 hours a day). This proves quite clearly that sleep is decidedly an instinct and not a reflex at all, what to say of its being unconditioned or conditioned; sleep inducing factors are of course conditioned. Instincts differ from the reflexes mainly as shown below:—

INSTINCTS

1. These are extremely complex types of activities.
2. Intelligence used for them is inherited.

REFLEXES

These are quite simple and uncomplicated types of actions. Intelligence used is acquired and not inherited.

INSTINCTS—(contd.)

3. No complete nervous path is traceable for these acts.
4. They bear relations with the emotions.
5. They present the organismic problems.

REFLEXES—(contd.)

- Complete nervous path is traceable for these acts.
- They bear no relations with the emotions.
- They do not present the organismic problems.

Thus we see that the question of existence of the "sleep-centre" for the occurrence of sleep anywhere in the entire nervous axis does not arise at all. And, to assign and locate a centre for sleep in the hypothalamus or in the III ventricle, is extremely surprising, for, how can a subsidiary centre control the vitally fundamental activity of the *highest levels* of the nervous system. In fact, no anatomical or histological differentiation can be demonstrated for the so-called 'centres' in the nervous tissue; they are simply conventional and hypothetical sites representing the highest controlling stations in the particular reflex-arc.

The daily rhythm of sleep is a 'natural' instinct closely related with the rhythm of night and day existing in Nature. And the evolution of sleep is as old as that of life. If there were no sleep, evolution would have become impossible. Sleep is rest and wakefulness is activity; and, no activity is ever possible without a preceding rest. Therefore, no wakefulness is at all possible without a previous sleep. The whole of this Universe follows this *fundamental* "Law of Periodic Rhythmicity"—alternate periods of rest and activity. Just as sleep is the restful component of the rhythm of life, death is the restful component of the rhythm of Nature. No life is possible without death. Death is an eternal sleep. Thus we see that matter may be indestructible but never immortal. "Death is the wage of our sins". "God is sinless". Therefore, God alone is immortal.

Dedication:—This article is dedicated with a deep sense of gratitude to Dr. Shyam Narayan Mathur, M.B., B.S., Ph.D., Professor of Physiology, K.G.M. College, Lucknow (U.P.)—the Father of the Theory of "Harmony and Rhythm in Nature."

Author's note:—Views about the nature of sleep discussed in this article are entirely original and personal. Criticisms and elucidations are therefore most welcome.

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I TOO WAS A COP*

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I BELIEVE it would go some way to relieve the monotony and make interesting light reading, if our medical journals occasionally publish articles from medical men containing personal anecdotes, or short biographical sketches. Before commencing to publish some articles regarding some of my experiences as a medical jurist, it would not be out of place, if I make it known that I began life as a policeman. So here goes the story of my metamorphosis from a criminologist to a medical jurist.

I was born in a middle class family at Cranganore (Cochin State) in April, 1897. My father was looking after the ancestral properties and we were well off. Heeding to his advisers who promised lakhs in a short time, my father decided that he would go into trade and opened a cloth shop and provision stores in 1911. The importunities of my granny "take my word, son, be contented with what we have, I have never known a Brahmin thriving in trade" were of no avail. Her words came true and in 1913 when I completed my S.S.L.C., we were down and out.

From an early age I had decided to be a Surgeon and when the unexpected crash came, all my hopes of joining the Arts College at Ernakulam and later the Madras Medical College had to be dropped. The next career that attracted me was the Police. Sherlock Holmes was my hero, and though the salary in the Cochin Police was small, I thought I would make a mark there, if I get a footing. I unfolded my plans to my maternal uncle, the late Puthucode Mahadeva Baghavathar, a great violonist of his days, who agreed to take me to Mr. M. A. Chacko, B.A., the then Chief of the Cochin Police. Though I was only sixteen then, I could pass off easily for eighteen. Selecting an auspicious day, my uncle took me to the Police Superintendent and praising the Superintendent in his own inimitable way, with suitable interpolations about my good qualities, he requested the officer to take me as a Sub-Inspector. "Bhagavathar, there is no vacancy as Sub-Inspector now. If you insist I would enlist him as a second grade Head Constable on Rs. 15/-", and turning to me added, "I have already ordered that Sub-Inspector's uniform be given to all matriculates who join as Head Constables". Uncle and nephew were greatly elated by the concession regarding the uniform and left the august presence with a chit to the office opposite scribbled "C. H. Venkateswaran, S.S.L.C. passed. Take him as second grade Head Constable."

The next day I joined the force and was very happy when I put on my khaki uniform with a pink laced turban, shining brown

* Specially contributed to THE ANTISEPTIC.

boots and a Malacca cane. That was the proudest day of my life. For six months I learnt parade, the Cochin Penal and Criminal Procedure Codes and the Special Cochin Acts. Trichur Police headquarters had a finger print bureau and I also picked up some finger print deciphering unofficially from Mr. Pisharoty, the then finger print expert. Fifteen rupees was something in 1913 and I kept down my expenses to that amount. After six months the Headquarters Inspector, Mr. Achen, called me up for a written and oral examination and declared that I passed the tests creditably.

I was then posted to the Trichur Town Police Station as Head Constable, No. 132. My routine work was conducting the morning parade for the men, checking the town beats day and night, and bandobust at festivals.

After two months, Inspector Mr. Rice called me and said, "H.C. 132, I am giving you your first case for investigation. F.I.R. No. of your station, palming off a pocket watch from a merchant at the window of the opposite post office. I suspect Antony alias Karati (the bear). He has been eluding us for some months, net him within a week. You are on special duty in this case." I started in right earnest and was determined to show my detective skill. For two days in mufti I hunted all the dens which the bear was known to cave in. P. C. Gopalan Nair—I forgot his number—then informed me that Karati was last seen in Mattancheri Bazaar two days ago. I wandered about in Cochin and Ernakulam for two days unsuccessfully and was returning to Trichur in low spirits. Two Syrian Christians boarded the train at Pudukad and after a comfortable betel and tobacco chew began talking about the theft of a bicycle from a shop in South Bazaar, Trichur, two days ago. I also heard that the police were not informed, as the owner suspected one of his own relatives. I at once saw the hand of Karati in this bike-lifting and was certain that the bear was somewhere in his dens round about Havelock Market and Southern Bazaar. It was also clear that the bear had a cub or two to assist him. Resolved to ferret him out, I renewed my hunt cautiously. Through sheer luck, I saw a shadow disappearing into the drain beneath the causeway in front of the market at about 9 p.m. the next day. I quickly dived in and collared the boy. Taking him to the station, getting his confession that the bear was his chief, then clapping the irons on the bear and recovering the cycle and watch kept me awake all through that night. The next morning the Inspector congratulated me and I felt that my future was assured in the State Police. A few days hence the Sub-Inspector went on short leave and I had to assume charge of the station. My investigations in the Karati case disclosed that a certain coterie who had powerful influence with a high executive authority in the State had a side business of receiving stolen properties. I knew that I was treading on dangerous ground if I poke my nose into this affair and come

to grips with them as some women were in the ring. I resolved to act quickly and planned a coupe to recover the loot and expose the gang within the short time that I was in-charge of the station. Two days afterwards in my night rounds, I came upon a drunken brawl in the Kokala Bazaar near the Trichur Railway Station. Blows and abuses were freely hurled and when I came up with my men to quell the fray a woman rushed out of a house and joined the crowd heaping abuses on us. She was a lesser fry in the gang, and, from her outbursts, it flashed on me that I was betrayed and that there was no hope of recovering any loot from this gang and that the brawl was deliberate to provoke me to some action. I arrested the woman and three men and having got them behind the bars, hurried to my home as I had to go to a music party in connection with a wedding.

The next day, I was called up by the Superintendent and arraigned for torturing a woman in the lock-up. The chief was very cross and said that he had received information from the high source, that I personally directed this torture. I told him the background and my plans. He was convinced that I was betrayed by one of my own men and expressed sympathy in my plight. The allegation was that I personally directed the torture from 11-30 p.m. to 1 a.m. There was medical evidence of bruises in the persons concerned at about the time alleged. I had no difficulty in disproving this as Vakils and Officers testified that I was at the music party from 22-30 to 2 hours. In the end, I succeeded in getting a conviction against all the four persons for disturbing the public peace by drunken and disorderly behaviour. This case, though it ended in smoke, brought me to the limelight both in the official and in the underworld.

Nobody in the office cared to record my date of birth, height, girth etc., or send me for medical examination when I joined. It was now nearly a year and I had to be confirmed. My particulars were now called for service record, and then it was found out that I was only 16 years and 3 months at the time of enrolment. An office note was sent up quoting a Standing Police Order that no one should be enlisted unless he had completed eighteen. The Chief called me and said that he was sorry that my age should have been overlooked, and asked me to work as a clerk for one year, adding that it may be possible to take me as a probationary Sub-Inspector next year.

I returned home depressed that my hard work for nearly a year should go unrecognised. From the very first my mother was against my joining the Police. The news that I had created a flutter in Trichur with all sorts of exaggerations reached her also from my schoolmates at Oranganore. She was now firm that I should send in my resignation and assured me that funds would be found for my studies as a Hospital Assistant. Medicine was my first choice, and as the fees for the whole Hospital Assistant's Course was only Rs. 25

and Tanjore was a cheap place, I joined the Tanjore Medical School in July, 1914.

Looking back after all these years, I still fondly cherish the memory of my service as a policeman and feel that my job in the parade ground, clanking to attention, beat checking, bandobust and as an investigating officer was well done, and had a lot in shaping my character in that young age. Having gone through the mill, I know the difficulties and privations of a policeman and have always a brotherly feeling to the cop. I maintain that the cop has dignity, authority and charm all his own and when somebody tells me about corruption and black sheep in the Police, I retort that my wonder is that the vast majority are loyal and honest under the most difficult and trying living conditions. I firmly believe that my short service as a cop taught me frugal living discipline, sustained physical effort, quick action, and the courage to say a firm 'no' when occasions demand. I sometimes narrate to my children the events of my cop days and show them with justifiable pride the certificate given to me by the chief on my discharge, declaring that "his conduct and devotion to duty were exemplary". With all that, I sometimes hear my mother whispering "Oh! these hasty outbursts and obstinacy, you learnt it from the police."

Immediate Ambulation in Surgery

Altavas *et al* have continued their studies on early ambulation in surgery and review their observations on 412 patients who underwent appendicectomy and who walked from the operating table to their beds. Some of these were given assistance from the reclining to the standing position. A large majority of them were able to stand and walk without any aid. All were observed to be hesitant about taking the first steps, but they continued walking when reassured. There was rapid mental and physical rehabilitation; catheterization was found to be unnecessary and narcotics were avoided in 404 cases; purgatives or/and enemas were given only to 25 of the 412 patients. The psychological benefits were great. The majority of the patients got up to urinate and moved their bowels in the toilet unassisted as early as the second day after operation; coupled with deep breathing exercises, voluntary coughing and turning on the sides freely, this greatly lessened the necessity for nursing attention and the risks of pulmonary congestion, embolism and bronchitis. Stitches were removed on the fourth day and after that the patients were discharged. No wound disruption eventration or dehiscence was observed in any of these cases and no patient returned for late post-operative hernia and no wound sepsis was recorded. Postoperative wound pain with insomnia during the first postoperative night was however present in all cases and postoperative gas pains also in some. These were counteracted by the usual measures. The benefits to be derived from immediate ambulation are thus very great.—(Philip. J. Surgery, 4: 175-178.)

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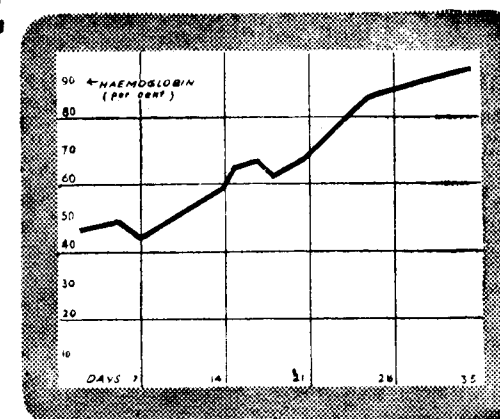
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CONCEPTION OF Rh FACTOR*

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A. History.—Amongst the emergency measures that are undertaken in modern medical treatment, blood transfusion may be regarded as one of the foremost. If we trace the successive stages of development of blood transfusion, the subject becomes an interesting one.

1. In very ancient times, the Egyptian princes practised blood baths for resuscitation.

2. During the middle ages, specially the Romans, used to drink blood with the idea of its health restorative property.

3. After the discovery of physiology of circulation by William Harvey in 1616 it was realised that transfusion of a fluid into the circulation was possible.

4. In 1654 Francisco Folli, and, according to some authors, Richard Lower, is supposed to have performed the first successful transfusion on animals by connecting carotid artery of one dog with the jugular vein of another dog.

5. In 1664 Professor James Denys successfully transfused animal blood into the human circulation. But later on this resulted in death of several persons due to ignorance of asepsis, coagulation, blood groups etc.

6. In 1818 James Blundell, the famous Physiologist and Obstetrician, again repeated this procedure very successfully, because he did not meet with any incompatibility reaction. His followers, however, were not successful because they had to face this reaction.

7. Finally in 1900 Landsteiner explained this incompatibility reaction by his discovery of the existence of blood groups "A, B, O," which removes mostly the dangers of blood transfusion.

8. The problem of ready coagulability of the blood was solved later on after the discovery of anti-coagulants.

9. Later on it was found out that group "A" sometimes contains 2 agglutinogens, A₁ and A₂, which have also to be considered in connection with blood transfusion.

10. Besides these, some other factors which are responsible for unfavourable reactions, though rare, have been discovered by Landsteiner and Levine in 1927. Those factors are 'M' and 'N'.

11. Still later on it was shown that hæmolytic reaction can occur in some cases even after matching properly, considering all the above factors. The question arose, what was that which was producing this reaction? Landsteiner and Weiner in 1940 answered

* Specially contributed to THE ANTISEPTIC.

this by discovering another factor in human blood which they named as Rh factor.

12. After this discovery Weiner again found out that Rh genes are multiple allelic genes giving rise to 8 phenotypes.

13. Lastly, Fisher and Race described another antigenic substance Hr genes present in R.B.C. which are linked with Rh genes.

What is Rh factor?—It is an antigenic substance present in all blood and tissue cells of about 85% of white people and more so in people of coloured races.

As we know the true antigens (not haptene or partially antigen) are always protein in nature, and when introduced in the body, gives rise to anti-body, these are also not exceptions to this rule. The Rh antigen is also protein in nature and when introduced into the body (as blood transfusion) of Rh (-) recipient, it gives rise to anti-body or anti Rh agglutinin in the serum of the recipient.

C. Why is it called Rh factor?—In 1940 Landsteiner and Weiner demonstrated that when the R.B.C. of Rhesus monkey was injected into the rabbit, an anti-body developed in the rabbit's serum. When the rabbit's serum containing those anti-bodies was collected and mixed again with R.B.C. of the Rhesus monkey, agglutination or clumping occurred. As R.B.C. was obtained from the Rhesus monkey, the antigen in R.B.C. was named as Rhesus factor or simply Rh factor.

They then showed that when this immune serum was mixed with R.B.C. of human being of white races, in about 85% of cases clumping occurred. So it is proved that those 85% of people have Rh factor in their blood and are called Rh positive (Rh +) people. In the remaining 15% people whose R.B.Cs. do not agglutinate the immune serum has no Rh factor in their blood and are called Rh negative (Rh-) people.

D. What is the danger of Rh incompatibility.—Rh (+) blood is not something poisonous. It is normal. But the only thing is that Rh + blood does not mix well with Rh - blood.

1. When Rh + blood (from donor) is transfused to Rh - recipient, anti-body or anti Rh agglutinin develops in the serum of the recipient. When this anti-body production is sufficient, and next transfusion of Rh + blood (antigen) is given, an antigen anti-body reaction sets in and severe hæmolytic disorder occurs.

2. Secondly, severe hæmolytic disorder of an infant may occur due to Rh incompatibility of father and mother.

Suppose the father is Rh + and the mother is Rh -, foetus in most of these cases becomes Rh +. At about the 3rd month, foetal R.B.Cs. acquire the Rh antigen. There is communication of blood of the mother and foetus through the placenta.

Here Rh antigen (of R.B.C. of foetus) is going to the mother and stimulating the anti-body (anti Rh agglutinin) formation. When sufficient anti-bodies are formed, these come to the foetus and antigen anti-body reaction occurs causing severe hæmolytic disorder.

(a) If this reaction occurs in a very severe degree and in the earlier part of pregnancy, the product of conception may become dead, which may cause abortion.

(b) If it is very severe and occurs late in pregnancy, foetus may be stillborn with generalised oedema which is called 'hydrops foetalis.'

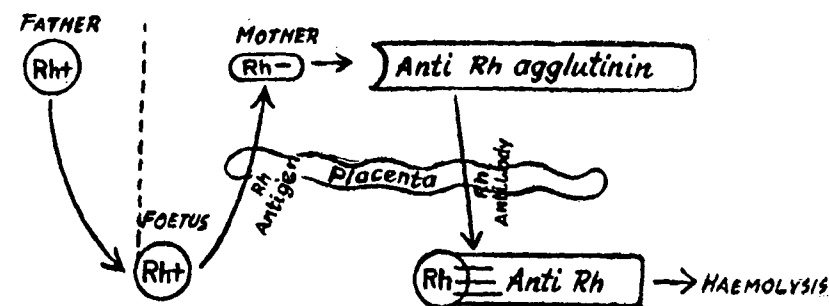
(c) If it is moderately severe, there may be extreme jaundice due to hæmolytic disorder, appearing immediately or a few hours after birth and causing positive indirect Van Den Bergh's test. This is called "icterus gravis neonatorum".

(d) If it is less severe, there may be only severe anaemia from hæmolytic disorder.

Unless these cases of anaemia and jaundice are promptly and efficiently treated, most of them die. Even if they escape this, other dangers await them. In some cases, as a result of severe anaemia, there is anoxia of the tissues, specially of cerebral tissues. For this reason, cerebral (mental) manifestation develops later on which is called "Kernicterus".

Progressive lenticular degeneration or Wilson's disease may also be related to Rh incompatibility.

As hæmolytic disorder is the main criterion of these types of patients (congenital anaemia, icterus gravis neonatorum, and hydrops foetalis), Nature tries to supply R.B.C. hurriedly and so immature nucleated R.B.Cs. (erythroblasts) appear in the blood and the condition is known as erythroblastosis foetalis.



3. Thirdly, hæmolytic reaction may also occur when Rh + blood is transfused to Rh - pregnant lady when her blood contains anti Rh agglutinin due to the presence of Rh + foetus in her uterus. Foetus acquires this factor from its father. If father is Rh + foetus

Thus we see that according to this composite gene theory of Fisher and Race, each chromosome of the cell nuclei contains one, two or all the three Rh genes linked with non-contrasting Hr gene or genes.

J. According to the "multiple gene theory" of Weiner, Rh (-) or rh gene is of recessive character and has no antigen. But according to the composite gene theory of Fisher and Race, rh is not true recessive gene, because it has got Hro, Hr' and Hr'' antigens.

K. Thus we can understand that one containing Rho antigen in his R.B.C. will also have Hr' and Hr'' and his pheno-type fully expressed will be Rho Hr' Hr'' or simply Rho. These fully expressed pheno-types and their short names can be put down side by side for convenience.

Rh antigen.	Full expressed name	Short name
(1) Rho	Rho Hr' Hr''	Rho
(2) Rh'	Rh' Hro Hr''	Rh'
(3) Rh''	Rh'' Hro Hr'	Rh''
(4) Rho and Rh'	Rho RH' HR'	Rho' or Rh ₁
(5) Rho and Rh''	Rho Rh'' Hr'	Rho'' or Rh ₂
(6) Rh' and Rh''	Rh' Rh'' Hro	Rh' Rh'' of Weiner or Rh'' or Rhy of Taylor and Race.
(7) Rho Rh' Rh''	Rho Rh' Rh''	Rho' Rh'' or Rh ₁ Rh ₂ of Weiner or Rh ₁₋₂ or Rh ₂ of Taylor and Race.
(8) Nil.	Hro Hr' Hr''	rh.

L. A few practical points:—(1) For avoiding the tragedy of hæmolytic reaction, Rh testing of donor's and recipient's blood should be performed before transfusing blood.

Transfusion of serum does not require Rh testing because serum does not contain Rh antigen. It is R.B.C. which contains this antigen.

(2) Transfusion reaction cannot occur unless the recipient's serum contains anti-body or anti Rh agglutinin, due to previous transfusion or previous pregnancy.

So transfusion of Rh (+) blood to a Rh (-) recipient can never produce this reaction at the first transfusion unless she is sensitized by Rh (+) foetus in the present pregnancy or in previous pregnancy.

(3) It is concluded that Rh (-) persons should be transfused only with Rh (-) blood.

(4) If Rh testing cannot be done, a simple practical test (biological test) can be carried out before undertaking transfusion:—Draw out 10 c.c. of recipient's blood into citrated and noncitrated tubes. Then inject 50 c.c. of donor's blood into the recipient very slowly.

After one hour, again draw out 10 c.c. of recipient's blood and compare with the former tubes for any change of colour indicating hæmolysis.

If hæmolysis occurs, don't inject further. If no hæmolysis, transfusion may be carried out as usual.

This test indicates the presence or absence of anti-body in the recipient's serum.

(5) All Rh (-) persons cannot be sensitized by Rh antigen. It may be due to low antigenicity of Rh gene contained in R.B.C. or low anti-body forming capacity of the recipient.

(6) For minimising the complication in babies, blood of husband and wife should be tested for Rh incompatibility.

If husband is Rh (+) and wife is Rh (-), serum of the latter should also be tested in the later months of pregnancy for the presence of anti Rh agglutinin. If it is present, then the physician must be ready to meet with an erythroblastotic baby. If the baby becomes erythroblastotic, early treatment should be undertaken to save the baby by transfusing Rh (-) blood.

(7) Transfusion of Rh (+) blood to the erythroblastotic baby will be in vain, because these will be hæmolised by the anti Rh agglutinin present in the serum of the baby.

Blood should preferably not be taken from the mother but from another Rh (-) non-pregnant woman because anti Rh agglutinin present in mother's serum will only enhance the reaction.

(8) Blocking anti-bodies are always of Rho specificity.

(9) According to the latest classification only Rho, Rh₁, Rh₂ and Rh₁ Rh₂ subjects are Rh (+), while subjects rh, Rh' (now rh'), Rh'' (now rh'') and Rh' Rh'' (now rh' rh'') are Rh negative (I.M.G., August, 1948).

(10) Iso-immunization among the various Rh (-) types is possible. A subject RH' (now rh') may be isoimmunized against Rh'' (now rh'') and vice versa.

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INTERPRETATION OF SOME OF THE AYURVEDIC PREPARATIONS IN THE LIGHT OF MODERN SCIENCE*

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HERE is an attempt at interpretation of the pharmacological and therapeutic action of some of our indigenous preparations in the light of modern medical science.

Dhatryarista (धात्र्यरिष्ट).—This preparation has been found to be very effective in anæmia, jaundice and other liver troubles. Its main ingredient is *Emblia officinalis* (अमलकी) whose chief constituents are Gallic Acid, Tannic Acid, Albumin and Vitamin C. It has diuretic and laxative properties which, by the flushing of the system, help proper digestion and metabolism and thus indirectly contribute to the formation of blood. But its action is mostly due to the rich vitamin content (Vitamin C). Among the substances containing vitamin C this again is of the highest order as the vitamin C in it is thermostable. The action of vitamin C on the gastric mucous membrane is well known. Thus it can be said that by stimulating the gastric mucous membrane it promotes the secretion of the intrinsic factor and thus helps the formation of blood. Lastly, vitamin C itself is a necessary factor in the formation of blood. Thus this preparation stimulates the hæmopoietic system and takes part in the blood formation both directly and indirectly. The response of this preparation to catarrhal jaundice is probably due to the fact that it corrects the secretion of liver-cells.

Mrganka (मृगांक), Rajamrganka (राजमृगांक), and Mahamrganka (महामृगांक).—Indicated in tuberculosis of the lungs. These preparations contain in general gold chloride, organic calcium, arsenic and a few others. Calcium therapy in T.B. is a time-honoured practice based on the assumption of calcification of tuberculous lesions. The reticulo-endothelial response of the system to the administration of gold and arsenic is now an established fact. The speciality and advantage in these preparations are that calcium in it (*mukta prarala* etc.) is organic and of the highest order and it has been found that the percentage of absorption is more and that of elimination less in treatment with these preparations. About gold it can be said that besides bio-physical and bio-chemical purifications it goes through a number of other pharmaceutical processes due to which it seldom gives rise to those reactions which we commonly come across in gold-injection therapy. Any-way these preparations have certain definite advantages over calcium and gold injection therapy in tubercular cases.

Brhat Kasturibhairav Rasa (बृहत्कस्तूरीभैरव रस).—This reputed Ayurvedic preparation is of great help to the practitioners in such

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emergencies as shock, collapse or other acute conditions. Its chief constituents are musk, camphor, copper, gold, *mukta* (highest variety of organic calcium) iron, arsenic-abhraka—*Emblia officinalis* (अमलकी) and a few others.

The pharmacology and therapeutics of most of these are not unknown to the medical men. Musk, camphor and copper are cardiac stimulants. Calcium has direct action on the heart muscle. Gold and arsenic stimulate the reticulo-endothelial system. Vitamin C and iron stimulate the hæmopoietic system. Thus it is not at all difficult to understand how these preparations act upon the system so quickly and effectively.

Vyaghri Haritaki (व्याघ्री हरितकी) indicated in cough.

Chief constituents:—*Solanum xanthocarpum* (कण्कारी), *terminalis chebula* (हरितकी) and *guda*.

Solanum xanthocarpum is diuretic and expectorant. *Terminalis chebula* is laxative and diuretic.

Arka lavana (अर्क लवण), Abhaya lavana (अभया लवण), Apamarga lavana (अपामार्ग लवण). All these are various forms of alkalies indicated in liver troubles (especially painful enlargement of liver). **Mahamrtyunjaya Lauha (महामृत्युंजय लौह), Mahamrtyunjaya rasa (महामृत्युंजय रस), Lokanath rasa (लोकनाथ रस).**

These preparations contain in common alkalies and calcium (both of which, best safeguards against, and remedies for, deranged liver), iron, arsenic and a few herbal drugs like *Piper Lougum* (पिप्पली) which act directly on liver. This पिप्पली alone in increasing doses has the power of relieving symptoms arising out of obstruction of the liver and spleen.

Shiva Guggulu (शिवा गुग्गुलु).—Indicated in rheumatism, gout, sciatica, lumbago and other nervous disorders.

Ingredients:—(1) Guggulu containing Salicylic Acid. It has definite action on nervous affections.

(2) *Trifala* and } Both of these are laxatives; the former is castor oil } diuretic also.

The very ingredients suggest how this preparation acts on nervous disorders indicated and mentioned above.

Ketogenic diets are held to be of great efficacy in epilepsy. Various preparations of medicated ghee (like *Mahachaitas Ghrta*, *Mahapaisachika Ghrta*) which have been mentioned in the ancient texts and indicated in insanities and epilepsy very well explain the efficacy of ketogenic diet under such nervous affections.

This is only a haphazard and incomplete sort of an article but it is only a pointer to the medical profession. I have only tried to explain the worth of only a limited number of Ayurvedic drugs in the light of modern science so that medical men who are not as a rule biassed can themselves see into and understand them, interpretation of pharmacological and therapeutic action of some of the Ayurvedic preparations in the light of modern science.

Cases and Comments

VALUE OF FOLIC ACID IN THE TREATMENT OF PREGNANCY ANÆMIA

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I INTEND to discuss here about pregnancy anæmia in tea gardens and the treatment adopted. A great number of cases die in these localities due to this complication.

- TYPES.—1. Macrocytic hypochromic type i.e. iron deficiency due to: (a) low intake of food; and (b) extra demand by foetus.
2. Macrocytic hyperchromic—Blood picture like tropical macrocytic anæmia.
3. Normocytic erythrochromic type.
4. Megaloblastic type.

In the above 4 types of anæmia, most of the cases of anæmia of pregnancy in these localities fall in No. 1 type and in my opinion it is only due to hook-worm infection. Now I wish to cite below the treatment given in 2 cases in this Hospital.

CASE 1.—A female, labourer, aged 20 years, admitted on 13-5-'50 with the following complaints:—(a) Pregnancy—6 months' duration and is primipara; (b) extremely anæmic; and (c) œdema foot extending up to knee and œdema face. Hb. value on admission 5 gm. per 100 c.c. (Sahli). Stool contains ova hook-worm in a fair number.

She was put on the following hæmatinic drugs for a month in different stages: (1) Liver Extract with vitamins 2 c.c. (T.C.F.) parenterally on 6 consecutive days and then bi-weekly for a month. (2) Proteolysed Liver Extract 1 dr. b.d. for 3 weeks. (3) Marmite (4) Tab. Fersolate t.d.s. for 3 weeks.

After a month she was given whole blood 5 c.c. I.M. bi-weekly for 2 weeks.

On 2-7-'50 Hb. value $4\frac{1}{2}$ gm. per 100 c.c. So, it is found lowered than in the initial stage at the time of admission inspite of vigorous treatment.

On 8-7-'50 she was treated very cautiously for hook-worm infection with Tetrachlorethylene. After the course she was again put on the above hæmatinic drugs together with Glucose 25% 25 c.c. I.V. daily, for 10 days. But no remarkable effect was noticed, as Hb. value rose only to 5 gm.

On 18-7-'50 she was put on Folic Acid (Folvite Brand) 4 tabs. of 5 mg. each daily for 8 days and then 2 tabs. twice a week for a month. After 10 days of Folic Acid treatment Hb. value increased

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to 7 gm. per 100 c.c. Her general condition improved very markedly and she delivered a male child on 6-8-'50. She was discharged cured with her child on 3-9-'50 and advised outdoor treatment.

CASE 2.—A female, labourer, aged 20 years, admitted on 31-8-'50 with pregnancy of 6 months' duration. Patient was extremely anæmic with œdema foot and face. Blood—Hb. value 3 gm. per 100 c.c. (Sahli). Stool contains ova hook-worm+ Ova ascaris lumbricoids++.

On 2-9-'50:—Treatment was done for hook-worm infection with Tetrachlorethylene. She was then given Liver Extract 2 c.c. daily I.M. for 9 consecutive days and Glucose solution 25% 25 c.c. I.V. daily. But no remarkable response in Hb. percentage was noticed with the above treatment.

On 11-9-'50:—She was given Folic Acid 4 tabs. 5 mg. each daily for 8 days and then 2 tabs. bi-weekly for a month and tab. Fersolate t.d.s. for 3 weeks.

On 19-9-'50:—Hb. value $3\frac{1}{2}$ gm. per 100 c.c.

On 1-10-'50:—Hb. value 5 gm. per 100 c.c.

On 8-10-'50:—8 gm. per 100 c.c. Patient was discharged and advised outdoor treatment.

In the above 2 cases we find that treatment for hook-worm infection in a pregnant anæmic woman is essential.

Moreover, Liver Ext. parenterally or Iron by mouth is of very little effect in the above cases. Folic Acid is the drug of choice in these 2 particular cases. Anæmia in these cases is refractory to all usual forms of hæmatinic therapy. In conclusion, I may say here that cases of macrocytic anæmia which do not respond to Liver Ext. even in massive doses, may eventually improve hæmatologically with Folic Acid by mouth. Of course, more elaborate findings with Folic Acid in sustained cases are essential. I shall be glad to know further findings from my colleagues in this direction.

I am grateful to Dr. T. M. Ghosh, B.Sc., M.B., G.M.O. of this Estate for the valuable suggestions he gave in the above 2 cases and for his kind permission to publish this note.

90 Cases of Pulmonary Tuberculosis Treated by Streptomycin and Pneumothorax

Drs. Hyman and Hoffman treated 90 consecutive cases of pulmonary tuberculosis at the General Hospital, Denver, Colorado, by a combination of A. P. induction and streptomycin. 54 were advanced cases, 25 far advanced and one was minimal. Streptomycin was given intramuscularly and A. P. was induced in every case. In 16 A.P. was unsatisfactory; other collapse therapy was also tried in some. Of the 90 cases, the final result was good in 70 (78%). There was a definite correlation between the adequacy of the pneumothorax and the final therapeutic result. The authors consider that in the majority of cases the optimum treatment of pulmonary tuberculosis with cavitation consists of a course of streptomycin started several weeks before the induction of A. P., and continued for 1 to 2 weeks after induction.—(*Am. Rev. Tuberculosis*, 59, 539-553, 1950).

TYPHOID TREATED WITH CHLOROMYCETIN

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THE following case of typhoid, was treated with Chloromycetin successfully by me with a few peculiar symptoms and signs, which may give rise to a wrong diagnosis: (a) Young man, aged 20 years, Mohammedan, male, was having high continuous fever with rigor with intense headache, and pain all over the joint. He was treated by an unqualified doctor as a case of malaria, and was given Quinine in capsule 8 gr. doses. t.d.s. for 10 days together with Soda Sulph mixture 3i. t.d.s. to clear his bowels.

I was called in after 10 days, when I noted the following clinical condition:—Temperature 103.5°F. Pulse 99 p.m. The patient was very much emaciated and dehydrated. He was delirious. Tongue was coated.

On examination:—Lungs—N.A.D. Heart—normal. Abdomen—gurgle in the right iliac fossæ. Lower part of the colon—tender.

He was having pain in the throat, and difficulty in swallowing. No sleep for one week.

His blood slide was taken for differential count, which was 92%. Polymorph—He was straightaway put on Penicillin 2 lacs units thrice daily, Diaphoretic mixture 3i t.d.s. Vitamin C. 2 tablets t.d.s. and Chloromycetin 25 gm. 2 caps. stat, and one capsule every 2 hours.

His mouth was cleaned with dental powder and Boroglycerine was painted. Next day sponge was done, and he was kept only on barley water, fruit juice and Horlicks. Bi-Agarol was given at bed time. He felt very much better, his temperature began to drop and on the fourth day it was normal for 24 hours.

Discussion.—(1) Fever with rigor, with high leucocytic count, leads one to believe it to be a case of septic fever.

(2) Malaria can very easily be mistaken, for unless the physician is very careful the Quinine therapy after 2 days medication must be stopped.

(3) Saline purgative should be given with great caution. Fortunately in this case no bowel complication arose.

(4) Superimposed septic throat was responsible for the rigor and high leucocytic count.

(5) Vitamin C tablets in high doses helps a lot in neutralising the toxins, thus aiding in healing of the ulcers.

(6) Gurgle sensation in the right iliac fossæ and slowing of the pulse is present in almost all the cases.

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Mahatma Gandhi Road,
Kanpur.

A CASE OF HÆMOPTYSIS

HARIDAS DE,

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Chatmohor (Pabna) Pakistan; Medical Officer, Ballarpur Colliery Hospital,
P.O. Ballarpur (Ohanda), M.P.

IN hæmoptysis, the patient often experiences a tickling in the throat followed by a gust into the mouth with a salt taste and on expectoration notices blood. The very symptom of expectoration of blood causes alarm and anxiety to the patient, so much so that he thinks himself doomed to death. Such was the case, when in the early part of December last, I was called in to see an unhealthy adult of about 41 years suffering from cough, irregular fever increasing by exertion, poor digestion, gradual anæmia and night sweat for the last 3 or 4 months. The patient was a rich man and took several injections by his attending physician and took many patent medicines as prescribed by his physician. But despite the best attempt and treatment by his attending physician he was gradually going downhill and suddenly one evening he noticed blood during the time of cough and became nervous and sent for me for consultation in the case. From the history of his previous illness I gathered that about 3 years back suddenly he fell down while riding and got pain and inflammation of his right chest for which he was bed-ridden for about 3½ months and underwent treatment of traumatic pleurisy and he was fully cured. No family history of T.B. could be gathered. He is married and has got no issue. I examined him thoroughly and very carefully and could detect nothing in his lungs save a fine crepitation audible on the frontal and lower aspect of his right lungs. I gave him every consolation and hope and advised him absolute rest in bed both physically and mentally.

Spleen—slightly enlarged below the costal margin. Liver—not palpable. Heart—both sounds were feeble and rapid. Temp. 99.6°F. under tongue, and pulse—106 p.m., resp. 20 p.m. Bowels—constipated and the patient got anorexia for food. He was also suffering from insomnia and palpitation of heart on slight exertion. He was found acutely anæmic, exhausted and depressed. I examined the sample of sputum containing blood which was kept for my examination and found that it was actually a case of hæmoptysis and not hæmatemesis. The patient was always complaining of tickling sensation in his throat. I at once injected him Sandoz Calcium Gluconate 10%, 10 c.c. intravenously and gave him a plain sedative and expectorant mixture containing. Tr. Camphor Co. and Syrup Codein Phos. and gave him one 'Medomin' Tablet (Geigy) to be taken at bed time for sleep and left the place assuring the patient again and asking him not to worry about the blood. Next morning again I was sent for and found the patient a little bit cheerful and he said that with my injection and mixture and the 'Medomin' tablet

at night he passed a good sleepful night and such kind of good sleep he had never experienced for the last two months. I gave him again the same mixture and tablet to be continued and advised absolute rest in bed and liquid cold diet such as orange juices, milk in plenty, vegetable soup, Glucose water, for his anæmic condition. I advised him to take hæmatinic pastules with Folic Acid (John Wyeth and Brothers) one pastule three times a day after meal and Vitamindon Syrup (B complex liquid) (IndoPharma) one teaspoon thrice daily. I began to inject him Calcium Sandoz and Redexon (Roche) intravenously twice a week till 6 such injections of Redexon and Sandoz Calcium each.

When bleeding absolutely stopped within 3 days I gave him liberal nutritious diet and advised his relations that whatever diet he should take, the diet whether hot drinks and soups or rice should be allowed to cool before being given to the patient, otherwise no dietetic restrictions were necessary. I still advised him to take complete rest in bed and allowed him $\frac{1}{2}$ mile walking early in the morning and in the evening and advised him not to walk in the Sun and not to apply anything hot over his chest. Thus after a month his weight increased by 12 lbs. and the general outlook of the patient was much improved, but the low temperature up to 99°F. (under tongue) every evening still continued. So I sent him to the Sadar Hospital for examination of his sputum, blood, urine and to have his both lungs X-rayed. When he returned with the X-ray plates and reports of the Radiologist with cheerful heart, I again was sent for and found the report of the Radiologist read as follows:—“Both lung fields appear clear. Bronchial markings are increased in size and density. Both hilar shadows are exaggerated. Right diaphragm shows irregular outline. Costophrenic angles clear. There is no evidence of cavity and account for hæmoptysis. It is a case of old pleurisy of the right lungs with slight eosinophilic condition of both the lungs.”

Sputum—A.F.B. not found; Blood differential count: Hb:—65%; Poly.—59%; Lymp.—38%; Mono.—3%; Eosin.—9%; Urine—Sp. gr. 1015; Albumin—nil; Sugar—nil; other abnormalities—nil. B. coli—nil on culture.

No M.P. in blood. Both Aldehyde test and Chopra test—ve for K.A.

At this report of the X-ray and finding the sputum negative, I began to treat the patient all the more cheerfully and adopted the following line of treatment:—Absolute rest in bed still was advised; good nourishing diet such as plenty of milk, green vegetables, eggs, butter, ghee, sandish, meat at least thrice weekly, fish everyday, at least 4 oranges or Musambi and 2 plantains daily after food. I advised the patient to sleep in open air and walk in the open air every morning and evening and using umbrella wherever he goes. I gave him 10 injections each of

Calcium Gluconate 10 c.c. + Vitamin C-Redexon (Roche) intravenously twice a week along with injection of 10 amp. of Acetylarsan (M & B) 3 c.c. each with 3 c.c. of autoblood intramuscularly. For cough I advised him to take Pertussin (Infa) and for general nourishment Vitmol (Sharpe & Dohme) and Syrup Trical with Vitamin D (Sigma). After 2 months with this line of treatment his weight gained by 45 lbs. and his general health was much improved and low temperature absolutely subsided. After this he was pulling on well and taking regularly Elixir Vitamin B complex (A.P.W.) and Siotrat liquid (Albert David). The patient who thought himself doomed to death is now leading an active life with sounder health than ever before.

My heartfelt thanks are due to Mr. G. Sreenivasan, M.A. the Manager of the Ballarpur Colliery (M.P.) for his kind permission to publish this case note in the leading journal, the 'ANTISEPTIC'. I am still at a loss to account for the hæmoptysis of the patient for 3 days. I invite comment from my fellow practitioners.

AN INTERESTING CASE OF ACUTE RHEUMATIC FEVER

P. L. CHOUDHURI, L.M.F.,
Kotowali Road, Berhampore, West Bengal.

I WAS called in to see a Muslim boy of 10 years, on the 15th November '50, in the rural area. The boy had been suffering from high rise of temperature for the last 4 days, and was treated by a village quack. I was told that 5 grs. of Quinine injections were given on the 2nd and 3rd day of fever with no result.

On examination:—The boy complained of severe headache and some sort of pain on the back. The temperature was 101°F. in the morning and rose up 103°F. in the evening. The pulse was 120 p.m. and respiration 40 p.m. in the morning. Bowels constipated for the last two days, and tongue heavily coated and dry. No liver and spleen palpable. Heart and lungs showed nothing abnormal, except that the patient complained of palpitation.

TREATMENT:—15-11-'50.—Firstly I thought it to be a case of continued fever and prescribed him Glycerine enema stat, and alkaline and diuretic mixture 3p every 4 hourly. One Genasprin tab/ twice daily. Advised for tepid water sponging once daily and cold watering on the head during high rise of temperature.

16-11-'50.—I was again called in to see the patient in the morning and found that both the upper and lower limbs were red and swollen and the patient could not move the limbs. Patient complained of severe pain on the affected limbs and they were very tender on pressure. The other signs and symptoms were as before. I was rather

confused in diagnosing the case. Thinking it to be a rheumatic infection, I examined the throat and found the tonsils red and enlarged. I put the patient on Sodi-Salicylas as a therapeutic test. I prescribed saline purge stat and the following mixture:—

R Sodi-Salicylate	...	gr. v
Sodi-Bicarb	...	gr. v
Ext Cas Sag Liquid	...	℥ xx
Tr. Belladonna	...	℥ iii
Syrup Tolu	...	3 p
Aqua Chloroform ad	...	3 p

Mft. mist. one dose to be taken every 4 hours for 24 hours.

Advised to put the limbs in a suitable position on a pillow and covered the limbs by cotton wool after gently rubbing them with the following liniment:

R Oil Gaultheria	...	℥ ss
Oil Olive	...	℥ one oz.

Prescribed the Mandl's pigment to paint the throat after gargling with the saline water.

17-11-'50:—I again went to see the case in the morning and found the miracle action of the Sodium-Salicylate. The swelling and redness of the affected limbs were on the way of decreasing. The patient was better and the temp. 99°F in the morning. I was confirmed by therapeutic test that it was a case of acute rheumatic fever. Then I put the patient on the routine treatment and subsequently the patient was cured.

Discussion.—(1) No involvement of the heart except slight palpitation complained by the patient.

(2) No fleeting painful arthritis.

(3) No rashes appeared.

(4) No previous history of rheumatic fever.

(5) With one positive sign of sore-throat and enlarged tonsils the diagnosis was confirmed by the therapeutic test of Sodium-Salicylate.

P.A.S. (Aminacyl) in the Treatment of Tuberculosis Empyema

Oeconomopoulos and Leacacos of the Athens Hospital Sanatorium, Greece, treated 17 cases of empyema 11 of whom had A.P., complicated by sero-fibrinous effusion which later became empyematous. In 4 of these eleven cases, the empyema was reabsorbed in a short time, (one to 3 months). In 2 the pneumothorax pocket was preserved allowing the continuation of insufflation. In 2 other cases following resorption of the empyema the lungs re-expanded and adhesions developed.

The effect of PAS on closed empyemata can be considered as satisfactory, though it differs in degree from one case to another. The effect on fistulae is not satisfactory as judged by the results in three of their cases which should be considered abnormal cases. They consider that better results may be obtained when the drug is available for larger and more frequent doses.—(*Dis. of Chest.*, 17, April 1950, pp. 423-425).

A CASE OF CEREBRAL MALARIA

N. P. SHRIVASTAVA, M.B., B.S.,
Govt. Medical Officer, I/c., Purnahia Anti-Malaria Centre,
Public Health Department, Govt. of Bihar.

P. S., a Hindu male, aged 20 years, was admitted on 2nd November, '50 at 7 a.m. in an unconscious state with gasping type of respiration.

History of present illness:—The patient was feeling out of sort and getting 3 to 4 stools a day. He had no appetite also for the last three days.

On the morning of 2nd November, 1950 at about 6-30 a.m. he was getting his hair cut. After finishing it, he got up and walked about 2 to 3 steps and fell down in a semi-unconscious condition; thereafter, the patient was taken by the friends to the centre.

EXAMINATION.—The patient was unconscious and corneal reflex was absent, pupils moderately dilated not reacting to light. Pulse 70 per minute, tension and volume weak. Respiration 10 per minute, irregular, shallow and failing. Rectal temperature 96°F. Heart sounds muffled and distant. Spleen and liver not palpable. Other organs normal.

After this hurried examination, it was noticed that the respiration had stopped.

Artificial respiration was given for about five minutes before the patient could be given Coramine subcutaneously. Then the respiration restarted and 100 c.c. of 25% Glucose solution were given I.V. and 1 c.c. Adrenalin solution was given subcutaneously.

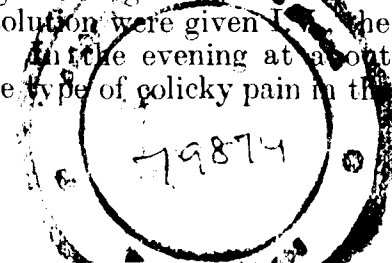
After that the patient went into a condition of stupor with vacant look. His head was moving from side to side, eye balls rolling up and down. He was weeping at intervals and asking for his friends, though he could not recognise anybody.

When this particular type of stupor, which I term, 'as restless searching type of stupor' was noticed, I thought of the provisional diagnosis of 'Cerebral Malaria,' a few cases of which in this particular stupor had been seen previously. Thereupon four tablets of Paludrine after powdering were given to the patient to swallow with an ounce of stimulant mixture.

Blood film was examined. M.T. rings were detected and the diagnosis was confirmed.

Quinine (6 grains in 1 c.c.) was injected intramuscularly and the patient was put on further three tablets four hourly.

At about 10 a.m. patient showed signs of regaining consciousness. Though 100 c.c. of 25% Glucose solution were given the patient maintained 99.2°F. temperature. In the evening at about 4 p.m. the patient complained of severe type of colicky pain in the



abdomen with great nausea. Nothing could account for this and the patient was fully conscious.

Thinking it to be due to an overdose of Paludrine the drug was discontinued till next morning, when he was given one tablet t.d.s. Next morning the temperature was 101.2°F. and finally the patient settled down on 5th November, 1950, and he was discharged cured on 10th November, '50 with the advice to continue prophylactic treatment with one tablet of Paludrine twice weekly for three months.

Summary of the case.—1. Typical type of cerebral malaria, with no rise in temperature.

2. Peculiar type of stupor which is termed as "restless searching type of stupor", the key point in the diagnosis.

3. Cases of cerebral malaria are not uncommon in the tropical countries where the diagnosis is not difficult, provided one keeps in mind this entity and this type of picture.

The type should be given priority even over blood film examination in a country like ours where facilities for microscopic work are very meagre in the urban areas and nil in rural areas.

The peculiar stupor mentioned above was also seen by me in some other cases of cerebral malaria with hyperpyrexia.

My thanks are due to Dr. H. Prasad, Civil Surgeon, and Dr. P. N. Sanyal, M.B., D.P.H., D.T.M., Assistant Director of Public Health Department, North Bihar Circle, Muzafferpur, for kind permission and advice to report this case.

Antibiotics in the Treatment of Amœbiasis

McVay *et al* recently suggested that aureomycin may be of value in the treatment of amœbiasis (Science, 109, 1949) from the good results they obtained in a small series of cases. Penicillin was used first by Hargreaves in 1945 for treating refractory cases of amœbic dysentery, but it was later found that the effect of penicillin was due primarily to the action on the secondary bacterial infection; a significant clinical improvement followed the use of penicillin but the *E. histolytica* persisted and were eradicated only by treatment with the usual amœbicidal drugs. McVay and his coworkers claim that treatment with aureomycin results not only in clinical improvement but also in the disappearance of the parasites. This suggests an important point of difference from that of penicillin, namely that aureomycin has some direct lethal action on the amœbæ. The successful use of penicillin and aureomycin in the treatment of amœbiasis raises the question whether or not organisms exist which may, under natural conditions, produce substances inhibitory to *E. histolytica*. It is possible that the intestinal flora or fauna may provide a source of some specific anti-amœbic agent. The work of Stewart, Jones and Rogers in 1948 showed that an enterococcus can inhibit the growth of this amœba by the production of lactic acid, under certain conditions. —(Nature, 22-4-1950, pp. 649-50).

A CASE OF SIDEROSIS BULBI

S. C. ROY, M.B. (gold medalist),

Ophthalmic Surgeon, L. M. Hospital, Asansol,

Formerly House Surgeon, Eye Infirmary, Calcutta,

Medical Officer-in-charge, Travelling Eye Dispensary, Bengal.

PENETRATING injuries of the eye are fairly common in industrial areas. Generally the eyes are found in such a condition that enucleation remains the only treatment to be done.

Sahebjan, a Mohammedan male, 30 years of age, came with the history of an injury in the right eye about 8 months back. He received the injury while chiselling an iron instrument. He came to me two days after the injury.

There was slight circumcorneal injection, a scar mark on the cornea involving all the layers near the centre and the anterior chamber was normal. There was a dimple on the iris at 9 o'clock position midway between the free and the ciliary margins. The pupil was acting well excepting at the point of the dimple which contained a glistening particle.

He was advised immediate operation but he escaped of observation; probably he disbelieved that a foreign body might remain inside the eye without much discomfort. His vision was normal and fundus healthy in both the eyes.

Recently he came back with the complaint that his vision is failing gradually for the last 2 or 3 months. The vision is now less than 6/60. The cornea and the anterior chamber are in the same condition. The foreign body is in the same position. There is greenish discoloration of the iris surrounding the foreign body. The lens shows areas of oval-shaped dot-like opacities in the anterior surface (iron particles in the cells of the anterior capsule). In addition to this there is a ring of dense opacity of the lens oval in shape starting at the spot of the foreign body and extending obliquely deep into the posterior cortex of the lens. Probably the opacity is caused by the trauma of the injury. The fundus is haz and so the details of the interior of the eye cannot be studied. The other eye is normal in all respects. This is a typical case of siderosis bulbi. There is no inflammation as the muscle was sterile due to the heat generated during cutting of the iron instrument.

He has been again advised operation to avoid sympathetic ophthalmia in the other eye.

Therapeutic Value of Aureomycin in Dermatitis Herpetiformis

Robinson *et al* describe the treatment of 5 cases of dermatitis herpetiformis with aureomycin administered orally. Relief from the itching and involution of the vesicles were obtained in about 10 days. The results appear to be superior to those from other methods of treatment. With a proper adjustment of the dosage, the minor toxic reactions (noticed in the small series of cases) may be obviated and even better results obtained —(Jour. Invest. Dermatol., 13, 9-12-'49).

AN INTERESTING CASE OF ASCARIASIS RESEMBLING ENTERIC

K. R. ZAINI, L.S.M.F., P.S.M.S.,
M.O. I/c., Dispensary, P. O. Gauriganj, Dt. Sultanpur, U. P.

ON 14-8-'50, a young Muslim girl, aged 15 years, attended the out-patient department with the following chief complaints:

- (1) Rise of temperature (103°F. mouth).
- (2) Constipation for the last 3 days.
- (3) Tongue coated and distaste in the mouth.
- (4) Nausea, vomiting and severe headache.

The father of the patient told me that he has brought her the other day from a distant village after he got information of her illness.

I examined the patient and found the following:—

(a) Temp. 103°F. mouth; (b) tongue highly coated but margins and tip moist and reddish; (c) liver and spleen impalpable; (d) lungs and heart normal; (e) pulse corresponding to the temperature; and (f) knee jerks normal.

Due to want of laboratory facilities blood examination could not be done and I prescribed her simple diaphoretic mixture t.d.s. and a dose of Calomel powder at bed time. Cold packs of Eucalyptus on the forehead for remission of temperature and liquid diet. On the same evening I was informed that she is having severe headache and gastric pain. I advised Turpentine Stupes Menthol powder.

On 15-8-'50.—No motion, condition same, temperature persisting and the patient restless with low muttering delirium.

Thinking it to be the first week of the disease I continued diaphoretic mixture and gave one ounce of Castor oil to be given immediately with milk (warm), a night dose of Castor oil was again repeated, diet as usual with fruit juices.

On 16-8-'50.—No motions. Temp. 103°F. persisting. Epigastric pain dull, nausea and vomiting with excessive salivation enhanced.

Strong dose of carminative mixture with half ounce Mag Sulph t.d.s. was prescribed with usual Turpentine Stupes and liquid diet.

On the same evening I was called to see the patient when the family was much upset due to intense and continuous retching and nausea of the patient which could only bring mixed bile in every effort. The patient was gasping and cold drops of perspiration were seen on the face. The temperature was the same and on examination of the throat I noticed one cord-like thing just below the uvula slightly

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moving. I focussed the torch well in the throat and after getting confirmed that it was not the enlarged uvula caught hold of it with the ordinary dissecting forceps and to my wonder and amazement after a slight pull I found that it was the head of a "round worm", and then confidently I pulled it all stealthily. It was fairly big. The worries of the patient and the family came to an end, settling the diagnosis from enteric to ascariasis. The roundworm was obstructing the passage giving a foreign body reflex irritation resulting in tingling and vomiting. The very night I gave her a full dose of Santonin with saturated solution of Mag Sulph next morning. A dose of Bromide and Chloral Hydras was given at bed time which gave the patient sound sleep.

On 17-8-'50 patient got much relief but felt weakness and usual vomiting and salivation, temperature dropped to 102°F. and 2 more roundworms were purged out in the motion. Slight gastric pain still continued with anorexia. I continued Santonin and Mag Sulph with the diet as usual and Mist. carminative t.d.s.

On 18-8-'50 temperature dropped to normal but shot up to 102°F. at night, other conditions more or less the same.

On 19-8-'50 one roundworm was found in the morning stool, and general condition all subsided, temperature touched normal throughout the whole day and night. Salivation and nausea stopped and the patient began to relish solid diet.

The Santonin was stopped after 20-8-'50 and simple carminative mixture was continued t.d.s. till 24-8-'50 and then the convalescence was hastened by ordinary diet, restricting excessive intake of meat for some time.

Point of interest.—In this case it is only this: the beginning picture of the disease resembled quite that of typhoid fever, e.g. high rise of persisting temperature, condition of tongue tips and margins, severe headache, and delirious condition, patient restless and apathetic.

I am thankful to my chief, Dr. K. D. Malaviya, M.B., B.S., D.P.H., District Medical Officer of Health, for allowing me to report this case for publication.

Aureomycin in Ophthalmology

Apart from its value in bacterial and virus ocular diseases, it has proved valuable in those conditions which are resistant to the sulphas, penicillin and streptomycin. In ocular infections local administration of aureomycin has been used with great success in a variety of forms of conjunctivitis and keratitis. A solution of 0.05 to 10.0 per cent of aureomycin borate in normal saline is to be used. One to two drops are placed in the infected eye every two hours until clinical response is obtained.—*(Eye, Ear, Nose, and Throat Monthly, Sep. 1950, p. 506.*

TWO INTERESTING CASES

S. A. SAJJAD JAFRI, M.B., B.S.,
Assistant Surgeon, I/c. N.W.R. Hospital,
Pakpattan, Punjab, (Pakistan).

CASE 1.—A young male of about 26, was suffering from impotence and no treatment had done him any good. He once suffered from herpes facialis. The treatment given for it cured his impotence for ever. He was given Pituitary injection 1 c.c. with Benerva 100 mgms. daily for 7 days along with Bromide mixture and Lotio Calamine as local application in herpes. After the patient had received 4 injections of Pituitary with Benerva, his power of erection became normal and after 7 injections were given his sexual urge became uncontrollable. He married and got 3 children in the course of 4½ years.

CASE 2.—A lady of 29 years came for treatment of sterility. She was given Vitamin E in form of Viteolin capsules, 1 capsule daily. She was also suffering from a severe type of spasmodic dysmenorrhœa. She got all her periods without pain after she had taken only one phial of the drug. She is still continuing the treatment.

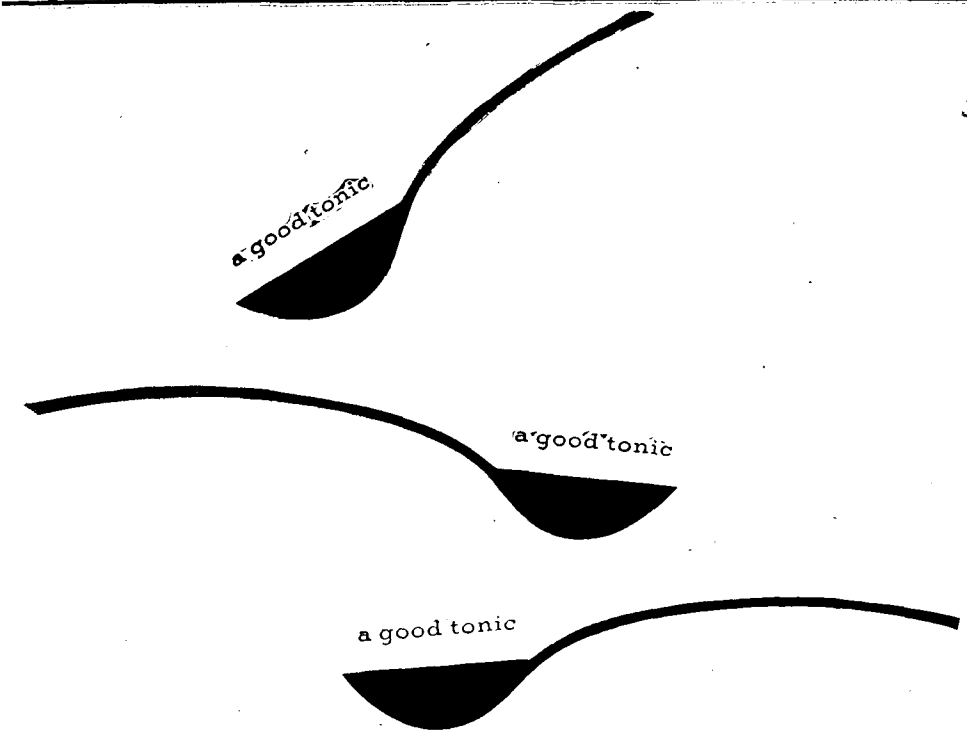
I request my brother practitioners to throw further light on the subject and try the above two treatments. It is difficult to come to any definite conclusion on the case. Pituitary acts directly on the muscles increasing its power of contraction. It is possible that it might have also affected the gonadotropic hormones.

Treatment of Combined Tuberculosis and Syphilis

In cases of combined infection of tuberculosis and syphilis the treatment for tuberculosis must be given priority. Moore in his "Modern Treatment of Syphilis" (written in the pre-penicillin era) states that "energetic treatment for syphilis may not only precipitate general dissemination of the infection in an individual with an acute tuberculosis but may also cause activation of an apparently quiescent focus". Iodides should be strictly avoided at all times. Arsenic should not be given or given only in small doses.

The treatment of choice is two to three weeks of an intramuscular preparation of bismuth, preferably the salicylate. This can be followed by penicillin (crystalline procaine penicillin 6 in oil with 2 per cent aluminium monostearate) intramuscularly in a dose of 600,000 units every other day for 10 injections. Further treatment would obviously depend on the stage of the syphilis.—(*South African Med. Jour.*, 8-4-1950, p. 264).

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THE CRISIS AND THE WAY OUT

THE affairs of the Government College of Indigenous Medicine, Madras, have taken a serious turn that it is the duty of the well-wishers of the students and of the institution to use their good offices to bring about a rapprochement between the Government and the students in a manner which, while not deviating from the fundamental and basic principles for which this institution was founded, would, at the same time, satisfy, as far as is practicable, some of the reasonable demands of the students. We have been one of those who have consistently supported the development of the indigenous systems of medicine which have had a glorious past and which still commanded the confidence and catered to the needs of a good section of the people of this country. But we have ever been pressing upon the Government that such a development should be carried out on their own lines so as to enable them to stand the scientific test. Had this advice given by us and by many other well-wishers of these systems been heeded to and steps taken for their development on their own lines, it would have considerably helped in the development of these systems. But the Government of Madras toyed with the idea of an Indo-Allopathic mixture and later with a so-called plan of synthesis, that it has created in the minds of the students a belief that graduation from this College would entitle them to become the proud possessors of a recognised qualification in both the systems of medicine, indigenous and allopathic. It is this that has brought about the present crisis.

We have before us a booklet issued by the students of the Government College of Indigenous Medicine detailing their grievances. They have gone on a strike to secure the redress of these

grievances. The Government, on their side, have also issued a Press Communique, contesting the demands put forward by the students and explaining why it is not possible for them to accept these demands. The demands of the students are nine in number. They are: (1) The postponement of examination in Modern Medicine, Surgery and Midwifery from the fourth year to the end of the fifth year; (2) the inclusion of Special Pathology in Modern Pathology and the postponement of the examination in the same from the third to the fourth year; (3) the holding of an examination in Organic Chemistry at the end of the first year; (4) the establishment of separate classes for the college students in subjects of Modern Medicine; (5) the registration of the graduates of this College under the Medical Registration Act of 1914 and their placement on a par with the graduates of other medical institutions with respect to status, privileges, appointments, scales of pay, etc.; (6) the grant of a graduate diploma in conformity with the curriculum, syllabus and the knowledge of the modern system of medicine, viz., G. I. M. S. (Graduate of Integrated Medicine and Surgery); (7) the provision for house-surgeoncy in the indigenous and modern Medical Hospitals; (8) the provision of facilities for admission into various post-graduate courses instituted by the Government; and (9) the changing of the name of the Institution into Government College of Integrated System of Medicine.

The first four of these demands relate to changes in the curricula which, as the Government say in their Press Communique, "amounted practically to giving greater emphasis to training in Modern Medicine and also asked for a separate diploma being awarded to them in Modern Medicine and for their being given instruction in Modern Medicine in classes separate from the students of the Licentiate Course in Indian Medicine." The main object of starting this institution was to give an impetus to the indigenous systems of medicine, and if this basic object is given up and greater emphasis laid on the teaching of modern medicine, the purpose for which this institution was established would be defeated. The object of the Government in introducing courses in modern medicine, much against the views of the true well-wishers of the indigenous systems of medicine, was to give a mere grounding in modern medicine so as to aid them, with the full knowledge they possess of the indigenous systems and the superficial knowledge they have acquired of the allopathic system, to diagnose and treat cases under their care. Besides, the fixing of the curricula is purely an administrative matter which can be decided only by Government in consultation with experts and they cannot abdicate this function to satisfy the demands of the students. If in this particular matter they yield, there is no knowing where it will lead to and the Government cannot, consistent with this action of theirs, reject such demands if they emanate from the students in other professional or arts colleges. We have been one of those who

have consistently fought against the caste system in the profession tooth and nail, and it was only after a hard struggle that the Government agreed to give in. We were therefore surprised that the Inter-Provincial Health Ministers' Conference held at New Delhi last year should have re-introduced the caste system among the practitioners of the indigenous systems of medicine. The students not only want it, but also seem to seek pleasure in making it patent. They are thereby neither serving themselves nor the cause of the indigenous systems of medicine. We would therefore appeal to the students to abide by public opinion and give up these unreasonable demands which are unjustifiable from every point of view.

The other demands may be clubbed together for examination. So far as registration of the graduates of this College under the Medical Registration Act of 1914 is concerned, there is, even according to the opinion of the Honorary Director, legal difficulty. He says that the Government have promised to get legal opinion on his scheme suggesting an amendment to the Madras Provincial Registration Act. The Act lays down: "Subject to the provisions of Sec. 14, every person who (a) is for the time being registered under the British Medical Act, or (b) is possessed of any of the qualifications prescribed in the Schedule, shall be entitled to be registered on furnishing to the Registrar proof of such registration or qualification, whether or not such person practises or intends to practise the Allopathic or any other system of medicine; provided that the Governor-in-Council may, after consulting the Council, permit the registration of any person who shall furnish to the Registrar proof that he is possessed of a Medical Degree, Diploma, or Certificate of any University, Medical College or School approved by the Council, other than those described in the Schedule." The Government of Madras, in their Press Communique, state that, "considering the objective of the G.C.I.M. course and the fact that it provides only a grounding in Modern Medicine, the Indian Medical Council and the Central Government will not agree to the grounding being treated as a registrable qualification. Nor can the Madras Government recommend the grounding as a sufficient qualification for registration." There is already the demand of the licentiates which has so far not been accepted. The Central Health Minister has already made it plain that the minimum qualification should be the M.B., B.S. In the circumstances, the demand for registration appears to us to be a far-fetched one, made without a clear understanding of the basic requirements. The demand for the grant of a graduate diploma on the basis of the number of hours allotted in the College for imparting instruction in Modern Medicine is equally untenable. The very comparative statement furnished by the students shows that they are receiving less instruction in Modern Medicine than the students of the M.B., B.S. course. The latter's present course is 5½ years, but the course in the Government College

of Indian Medicine is only 5 years for the study of both systems. To say that this is sufficient to justify the grant of a graduate diploma in Modern Medicine is unreasonable in the extreme. They can be treated on a par with L. M. Ps. and like the L. M. Ps. can take a further course of 2 years and qualify themselves for the M.B., B.S. Degree either in Calcutta or in Madras. In regard to the demand for facilities for admission to various post-graduate courses, the students themselves should admit that the best among those who have come out successful in the M.B., B.S. examination and who have a real aptitude and capacity for research work have to be selected for post-graduate training. They cannot claim that, within the period allotted for training in Modern Medicine, they have acquired such a thorough knowledge of Modern Medicine as to equip them for the post-graduate course. The last demand also falls to the ground because, as the Government say, separate instruction in the two systems cannot by any stretch of imagination be called an integration of the two systems.

In fine, we would make an earnest appeal to the students not to forget the basic fact that the institution was started mainly for the purpose of developing the indigenous systems of medicine which, though they had had a glorious record in the past, had remained static for long. If, in addition to instruction in those systems, instruction is imparted in Modern Medicine also, it is because the authorities thought that at least a grounding in that system is necessary to enable them to utilise the knowledge they have acquired in the indigenous systems to the advantage of the people. If the students insist that, with the grounding in Modern Medicine they have, they should be considered as experts in Modern Medicine also and should be granted the privilege of practising Modern Medicine, the very object of the establishment of the College of Indian Medicine would be defeated. If they attach the greatest importance to a Diploma in Modern Medicine, the best course for them would be to join the Colleges of Modern Medicine and obtain a thorough knowledge of the system. Merely because instruction is imparted in the two systems separately, it cannot by any stretch of imagination be called an integrated system. To the Government also, we make an earnest appeal. It is because they attempted a mixture of the two systems the students have been led to believe, rightly or wrongly, that they are intended to practise Modern Medicine also. While sticking fast to the fundamental purpose for which this institution was started, they should, at the same time, do everything possible to make them feel that they have not been let down badly, by placing them on a par with licentiates in regard to privileges, appointments, scales of pay etc. The country badly needs the services of qualified medical men and women to cater to the needs of ailing humanity. Let the Government, therefore, do everything possible to make them feel that no inferiority attaches to them. Let them not stand on

prestige. That way alone lies the resuscitation of the indigenous systems of medicine to which they stand committed.

Since writing the above, the students have called off the strike and rejoined their classes after tendering, according to the Honorary Director, an apology for their action. The students, on their part, state that they would continue to agitate for the achievement of their demands. If both sides bear in mind the main purpose for which this institution has been established, it should not be difficult for them to come to an amicable understanding. Neither a sense of frustration on the one side, nor a sense of prestige on the other, should be allowed to stand in the way of such rapprochement.

PROBLEMS FACING THE PROFESSION

THE Seventeenth Andhra Provincial Medical Conference held at Rajamundry in the first week of March was, from all accounts, a great success from every point of view. The attendance was large, the subjects thrashed out were all important, and the discussions were interesting and instructive. It is but natural that the food problem which is assuming serious dimensions every day and on the satisfactory solution of which depends the health, well-being and prosperity of the nation, should have received considerable attention at the hands of both the Chairman of the Reception Committee, Dr. R. JAYARAMASWAMI NAIDU, and the President, Dr. G. V. HANUMANTHA RAO. Not only is the quantity allowed in the statutorily rationed areas quite inadequate but the quality is also of such a low standard, that the health of the nation is likely to be seriously endangered, affecting considerably the progress of the nation in its onward march. It is the fundamental principle of sound budgeting that the Finance Minister should first find out the total likely expenditure and then look out for ways and means to meet the requirement. The same principle applies with equal, if not greater, force in regard to food also. The Government must first of all estimate the minimum requirements and then set about the task of augmenting their resources by imports from other parts of the country, wherever surplus is available, or from abroad. It is because the position has been reversed, i.e. the quantity available locally and from other places is taken into account and the available quantity is attempted to be divided amongst the people that all the troubles and uncertainties have arisen. And, as rightly pointed out by the Chairman of the Reception Committee, the role of the sole arbiter of the dietary problems of the nation assumed by the Civil Supplies Department has, unfortunately, led to the worsening of the position considerably. It is, as he pointed out, the Public Health Department that should determine the quantity and the quality of the food that should be offered for public

consumption. It is therefore the bounden duty of the Government to consult and take the considered opinion of Public Health and Nutrition experts and not decide this question of national importance at a purely ministerial level.

The problem of rural medical relief was assigned the next place of honour by the President in his address. The scheme of subsidised rural medical relief inaugurated by the late the RAJAH of PANAGAL and on which high hopes were then entertained by the Government, failed of its purpose owing to the miserly attitude adopted by the Government. We read in the Press daily of reports of the closure of such institutions everywhere. The Government explain that it is due to the lack of personnel and the unwillingness of even those available to serve in rural areas. How can the small subsidy which failed to attract medical men even in pre-war days, be attractive in these days when the cost of living has risen enormously and adequate provision is not made to equip these institutions to suit modern requirements? The President therefore suggests that the subsidy should be increased considerably, that these institutions should be fully equipped and that primary health centres should be started in other areas, if at least the outer fringe of the problem is to be touched. The profession also can, for its part, help in the solution of the problem, if necessary and adequate help is given to them.

The President very rightly deplored the fact that while there were more than 2,000 qualified medical men and women in the Andhra Desa, only 600 or 30% should have thought it fit so far to join the Indian Medical Association. Times have changed and are changing fast; the problems in which the medical profession is very much interested and which are awaiting solution, are many and manifold. It is only the combined and united voice of the profession that can compel the Government to look at things in their proper perspective and arrive at correct decisions. It is from this point of view that we have consistently and persistently pleaded for the amalgamation of the A.I.M.L.A. and the I.M.A. While there may be still some licentiates clinging firmly to the separatist creed, we are glad that many among them have begun to realise the utter folly of continuing a separate existence and are steadily veering round to our point of view. The President of the Conference is himself a licentiate and he is strongly of opinion that the A.I.M.L.A. has outlived its usefulness long since, that it has neither the encouraging support of the Government nor of the profession at large. And we believe it is only a question of time for the much-needed amalgamation to come about. The question of the accumulated funds of the A.I.M.L.A. need not stand in the way. Its funds, as the President has pointed out, may profitably be set apart as Welfare Fund and utilised for the education of the deserving children of the licentiates who have helped to swell it or for such other noble causes. While thus

the amalgamation of the two Associations is only a question of time, there is no justification whatsoever for medical graduates to keep away from the Association. It is not the question whether membership of the I.M.A. brings anything in return that should weigh with them, but it is the national interest that should be given the foremost place. And national interest demands that all qualified medical practitioners should, by joining the I.M.A., strengthen it and make it the mouth-piece of the profession, whose voice should be respected by the Government and acted upon by them. We trust that the President's appeal will meet with a ready response from the members of the profession in the Andhra Desa and that when the Conference meets next the President would be in a position to report a record increase in the strength of the Association in that area.

The country needs the willing and devoted services of every one of its citizens not only in the matter of reconstruction but also in its onward march towards perfection, on a par with other advanced countries in the world. The medical profession has a great and noble part to play. Let it rise to the occasion and show the way to the rest of the country and thereby earn the lasting gratitude of the people of this great continent.

Acute Acetyl-Salicylic Acid Intoxication

Lipman and his co-workers report 5 cases of acetyl-salicylic acid poisoning in 3 infants (5 to 6 months old) and in 2 adults aged 54 and 21 respectively. One of the infants who had swallowed 40 grains in 14 hours died and one of the adults died after taking nearly 100 grains (20 tablets of 5 grains each) in 3 hours. Most of the symptoms and signs of acetyl-salicylic acid poisoning are the result of damage to the brain, kidneys, liver and concomitant change in the electrolyte balance.

Treatment in the early stages consists of the cessation of the use of the drug and gastric lavage with tap water. It is essential to give 5 or 10% glucose intravenously in sufficient amounts to maintain fluid balance and provide carbohydrate. In the later stages of acidosis and ketosis alkalizing solutions of sixth-molar sodium lactate or 5% sodium bicarbonate in sufficient amounts to counteract and correct the deficit of base should be administered. Vitamin K and ascorbic acid should be given in all cases. Oxygen is extremely useful and blood and plasma transfusions also may be essential.

Safe dosage for children:—For adequate antipyresis or analgesia 0.09 gm. (1½ grains) of acetyl-salicylic acid per kilogram (2 1½ lbs) of body weight need not be exceeded as the daily (maximum) dose for infants and young children.—(*Am. J. Dis. Children*, Chicago, 78, 477-484, 1949).

Gleanings From Medical Press

OPHTHALMOLOGY AND DERMATOLOGY

Alopecia areata and its treatment.—(*Med. Press*, 25-5-'50, pp. 497-500).

Bigham, in a modern survey of alopecia areata and its treatment, states that the treatment should be designed to cause an increased blood supply to the denuded area and thereby give the damaged hair papillae the best possible circulatory supply of blood. He uses the local rubefacients only on patients whose lives would be disrupted by frequent hospital attendance. Local applications are most suitable for use in children if the parent is sensible and understands the essentially slow nature of the response. In some cases he used with success:—

1. Lotio catharides B.P.
2. R Glacial acetic acid 2.0, Phenol 2.0, Methyl alcohol 8.0 and water q.s. ad 30.0. These are applied with brisk friction, and according to the reaction obtained the frequency is determined. Daily applications are as a rule necessary.

Local ultra-violet radiation applied twice a week will cause first or second degree erythema reaction in the bald patches. The high-frequency current apparatus is of use in certain cases. Superficial X-ray therapy is not advisable.

Thorium X has been applied to areas of alopecia areata which have resisted all other measures of treatment. In several of these stubborn cases hair has grown. This preparation, however, needs further trial and investigation.

Aureomycin therapy of multiple verrucae.—(*New York State Jour. Med.*, 50, 705, 15-3-1950).

Since aureomycin has been found effective in other virus diseases, it appeared indicated in the treatment of multiple verrucae. Accordingly when a man, aged 40, presented himself before Dr. Joseph Dollin with a history

of "warts in his nose for the past one year" aureomycin was tried. One year previously the first wart had appeared above the upper lip, and it was removed by radium therapy; within the next 4 months, 4 more warts had appeared at the mucocutaneous junction of both nostrils. There were surgically removed by an E.N.T. surgeon. New growths appeared again during the succeeding six months until by the time he came to Dr. Dollin, there were 12, all situated at the mucocutaneous junction of both nostrils.

4 grammes of aureomycin were prescribed and administered within a period of 36 hours. When the patient appeared again before Dr. Dollin 7 days later all the warts had completely disappeared.

Aureomycin in the treatment of intestinal amoebiasis.—(*Science*, 109, 590, 1949).

McVay, Laird and Sprunt treated a number of cases of intestinal amoebiasis with uniformly successful results. Dosage used was approximately 2.25 gm. per day. Total dose averaged 21 gm. Systemic blood levels averaged 8 micrograms per 100 c.c. The authors suggest that aureomycin may be useful for extra intestinal amoebic infections also.

Differential diagnosis and treatment of fungus affection of nails.—(*Czechoslovenska Dermatologia*, 24, 217-226, 1950, *Abst. W. Med.*)

Dr. J. Obrtel, a leading dermatologist of Czechoslovakia, furnishes valuable information on the differential diagnosis and treatment of mycotic infections of the nails, which constitute about 20% of cases of diseases of the nails.

Fungi proper, and yeast like (oidium) organism cause these infections. The clinical aspects of infections due to fungi and oidia (yeast) differ.

Fungus infections start at the top-edge of the nail and slowly spread to the base. The skin surrounding the nail is free from infection. The affected nail gets dry, loses lustre, becomes brittle, and peels off in flakes. It affects one or more nails.

Oidio-onychosis begins at the base and spreads towards the top of the nail; surrounding skin shows subacute inflammation, which is often the primary seat of infection. Nail and skin around are painful on pressure and a small drop of pus appears under the cuticle. Nail later becomes discoloured and brittle and separates from the matrix, finally thins out and disappears. Histologically yeast is found in the pus and culture confirms diagnosis.

TREATMENT.—Unsatisfactory in *Onychomycosis*, when only iodine is used or the nail surface alone is removed. Dr. Obrtel removes the affected portion of the nail with a burr attached to a dentist's drill, and then removes the newly growing nail daily for 2 weeks or longer. When nail thins down to the thickness of paper, twice-weekly treatment is enough. The operator should have mask protection. In addition to mechanical removal as stated above, iodine dissolved in xylol is applied locally. Strong whitfield ointment (Benzoic and Salicylic acid) twice daily appears to give better results. Therapeutic doses of X-rays may be given in addition.

Oidio-onychosis:—Sodiumperborate paste is applied at night and the nail is bathed in a warm solution of concentrated solution of sodiumperborate.

An alternative method is by daily application of a ten per cent solution of Salicylic acid in methyl alcohol or painting with 10% chrysarobin in chloroform. A 1 or 2% solution mercury bichloride in alcohol may also be applied.

Rational use of antibiotics in dermatology and venereology.—(*Lockwood, J. H., Med. Dig.*, 18, 9, Sep. 1950, 548-551).

Lockwood deprecates the growing tendency to use the antibiotics as panaceas, for treating all maladies, diagnosed or undiagnosed, consequen-

tial or not. It would be wise to hold on to many of our older and proved remedies rather than summarily discard them for the new antibiotics. The more the antibiotics are used the more frequent are toxic and allergic reactions to them noted.

The antibiotics have, no doubt, revolutionized the treatment of venereal diseases, and in the field of dermatology too, outstanding success has been noted in the therapy of certain dermatoses. Penicillin is now considered the drug of choice in the treatment of syphilis. Many treatment schedules have been advised. An adequate one would be to use from 4.8 to 6 million units over a period of 7 to 14 days. There is no doubt about its superiority in neurosyphilis in 6—10 million unit courses. It is also the drug of choice in yaws, and smaller doses suffice.

In pyodermas with secondary lymphatic involvement, penicillin is helpful only when given parenterally. Local treatment of pyodermas with penicillin (or for that matter any dermatosis) is not advisable at all.

Bacitracin is too toxic still to be used parenterally. In dosages of 500 to 1000 units per gram of ointment, it is found effective by some clinicians in impetigo and furunculosis.

Streptomycin is the most promising of the antibiotics in the treatment of some of the tuberculoderms. Such drawbacks as its toxic effects on the seventh nerve and the vestibular apparatus and the development of streptomycin resistant strains do often occur. In doses of 1 gram per day for two months it has been found effective in lupus vulgaris. It is used satisfactorily in draining cutaneous tuberculous sinuses. It is most effective in the treatment of granuloma inguinale. The effective dose is 20 grams administered over a period of 5 days.

Aureomycin is very effective in treating granuloma inguinale and a cure is obtained with a total dose of 20-25 grams in 500 mg. doses every 6 hours over a period of 10-12 days. It appears to be effective in chancroid and in furospirochaetosis. The side effects following this drug are fewer than the

others. Chloromycetin is very effective against rickettsial infections, brucellosis and typhoid.

New trends in the treatment of primary glaucoma.—(*Med. and Surg. Jour.*, New Orleans, July, 1952, pp. 36-40).

Irrespective of other treatment, all glaucomatous patients should be made to understand that they must think calmly, act calmly and remain always calm to retain their sight. The patient with glaucoma must learn to practise order and moderation in his daily physical and mental living habits.

A new drug having great possibility is *Furmethide*, a 10% solution of furfurylmethylammonium iodide. It resembles pilocarpine but is more powerful. In higher intra-ocular tensions, i.e. 35 mg. of mercury or more, it is instilled at 15 minutes intervals for 2 hours, after which it is instilled 3 to 5 times a day. In lower tensions furmethide is instilled 3 to 5 times daily with or without auxiliary drugs. During more than 6 months Dr. Bahn, Ophthalmic Surgeon of New Orleans, has used Furmethide in 20 patients, all poor surgical risks, whose glaucomas were not controlled by other miotics. It has been successful in reducing tension and/or retarding progress of the disease in most cases. Furmethide is best reserved for patients in whom other miotics are partially successful and as an emergency aid in acute glaucomas. It is not irritating and it may be used with other miotics.

Another promising new drug *D.F.P.* (Di-isopropyl fluorophosphate) is five times stronger than a 0.02 per cent solution of eserine. It is however unstable in aqueous solution and so it is manufactured as a 0.1% solution in pea-nut oil. It does not irritate locally but should be used infrequently from twice daily to twice weekly. Blurred vision from spastic accommodation and transient myopia as well as occasional headaches may follow its use. In the 20 cases in which Bahn used this drug, tension was at first reduced promptly but its tension-reducing qualities in 4 cases materially diminished during the first 3 months.

There have been few basic advances in glaucoma surgery during the past 10 years. More than 60 per cent of all operations for glaucoma are unsuccessful in reducing tension to normal and maintaining central and peripheral vision for over 2 years. Operations do not cure glaucoma. They may reduce tension to normal but they do not correct the abnormal qualities of the intra-ocular fluid.

Among promising techniques are:—Anterior chamber air injections and goniotomy. The former is used routinely at the end of all glaucoma operations to facilitate filtration. The latter is of great value in specific types of infantile glaucoma.

Treatment of deafness and tinnitus with parenteral vitamin A in massive doses.—(*Eye, Ear, Nose, and Throat Monthly*, 29, 75).

Anderson *et al* treated 53 cases of hearing impairments and tinnitus with parenteral vitamin A in massive doses, after subjecting them to a complete examination, which included X-ray of the sinuses, audiometric and tuning fork tests.

50,000 units of vitamin A were administered intramuscularly in the gluteal or deltoid region twice a week for six weeks; at the end of this, they were re-examined completely and the audiogram rechecked.

Of the 30 persons with hearing impairments 15 reported subjective improvement demonstrable by audiometric study at the end of 6 weeks. Treatment was continued in those cases for a further 20 to 22 weeks or until no further improvement was noticed.

Seventeen of the 23 patients having tinnitus reported improvement varying from minimal to complete remission during the six week period.

Antro-choanal polypus.—(Dingley, A.R., *J. Laryng. Otol.*, March 1949).

Antro-choanal polypus is a separate clinical entity differing widely in behaviour, organ and pathology from the more common nasal polypus. The presence of such a polypus may not be visible without posterior rhinoscopy. It

can cause severe breathing difficulties and obstruction. The polypus is usually single and has its origin in the maxillary antrum, where it is attached by a stalk on the posterior wall behind the accessory ostium or on the outer antral wall. The polypus may be firm and solid, or partake of the nature and structure of a cyst. A mild catarrhal state is often present. Suppuration is rare. There is unilateral obstruction in the nose gradually becoming more complete. A fairly large polypus may obstruct both nasal

passages. Simple removal by snare through the nose *without* opening the antrum, may be followed by recurrence. The Caldwell-Luc operation is to be preferred. The point of attachment is detached in this operation and other antral diseases if any can be dealt with. Total denudation of the nasal mucosa is not necessary. An antro-nasal opening may be made when necessary for subsequent drainage. If the accessory ostium is large, as it often is, this will not be necessary.

PEDIATRICS

Sulphonamide dosage in early infancy.—(*Jour. Paediatrics*, May, 1950).

It has been shown that there is immaturity of renal function in the newborn infant. Sulphonamides depend predominantly on renal function for elimination. In order to re-assess and fix the dosage schedules of sulpha drugs in the light of this new knowledge, Richmond *et al* have presented data on blood sulphonamide levels following the administration (orally and subcutaneously) of sulpha drugs in 57 infants, of ages ranging from 4 days to 8 months. The following facts were revealed in the study:

(1) Infants under 2 months maintained satisfactory blood sulpha levels with single 24 hourly doses of 0.032 gm. per pound of body weight, of a 5% mixture of equal parts of sulphadiazine and sulphamerazine in distilled water given subcutaneously.

(2) That age is a factor in the maintenance of the level was proved by contrasting this group with infants over 2 months of age, none of whom had levels as high as 5 mg. per 100 cc. 24 hours following the administration of the same dosage.

(3) A dose of 0.048 gm. per pound of body weight every 24 hours subcutaneously gave higher blood levels in infants under 2 months of age.

(4) Infants receiving oral doses of 0.13 gm. Sulphadiazine per pound of body weight as initial dose followed by 0.1 gm. per pound of body weight every 24 hours generally had lower blood

levels than those receiving subcutaneous medication.

(5) No evidence of gross or microscopic hæmaturia occurred.

(6) Fæcal loss of the drug tends to be greater in infants than in older individuals.

Poisoning due to excess vitamin A: Its relation to infantile cortical hyperostosis.—(Caffey, J., *Proc. Amer. Paediatric Soc.*)

Dr. John Caffey of New York presented the clinical, X-ray and chemical findings in 4 infants who had poisoning due to ingestion of large amounts of percomorph liver oil. The long incubation period of about six months is emphasised as well as the rapid subsidence of the clinical manifestations after the withdrawal of the percomorph liver oil.

The similarities and differences between poisoning due to vitamin A and infantile cortical hyperostosis are as under:—The absence of mandibular and scapular involvement, the later onset, the dramatic relief of symptoms after a few days' withdrawal of all types of vitamin A preparation and the history of chronic ingestion of vitamin A are the chief features of vitamin A poisoning which differentiate it from the true infantile cortical hyperostosis. The similarity of the soft tissue swellings and X-ray findings in the skeleton in the two conditions is to be remembered.

Dr. Caffey raises the question whether a preparation of vitamin A, potentially as dangerous as percomorph liver oil and other vitamin A concentrates should be marketed without more precautions than are used at present:

Note:—Percomorph oil is obtained from the fresh livers of the percomorph fishes and not more than 50% of other fish liver oils. It has a potency of not less than 60,000 U. S. P. units of vitamin A and not less than 8,500 U. S. P. units of Vitamin D per gramme. It is marketed under the trade mark of "Oleum Percomorphum". (a fish of the order of Acanthopteri—which includes the perch, mackerel, scomber, etc). In view of the above findings of Dr. John Caffey regarding percomorph liver oil, it would perhaps be wise to note any such effects following the use of shark liver oil by children in large amounts.

Sustained summer heat and fever in infants.—(*Jour. Paediatrics*, 35, 24-42, July 1949).

During a five day heat wave in August 1948, in New York, Dr. H. M. Cardullo carried out an investigation on the temperature conditions on 88 infants under 2 years of age who were inpatients in the Bellevue Hospital. In some cases the temperature of normal infants rose to 103° F., and of new born infants up to 105.4° F. without other abnormal signs. Fever was more readily provoked in infants with infectious diarrhoea or cerebral defects than in healthy children. The liability of infants with cerebral defects to develop uncontrollable hyperpyrexia was striking:—Out of 24 such infants (mostly suffering from congenital forms of cerebral disease) 6 died, for it was found that, once established, hyperpyrexia was irreversible. There were no deaths apart from this group. The addition of 1 gramme (15 grains) of Sodium Chloride to the diet seemed to benefit those infants with diarrhoea and pyrexia but did not affect the pyrexia of the other infants.

SURGERY

Intravenous procaine in burns and traumatic injuries.—(*U.S.A. Armed Force Med. Jour.*, Jan 1950).

Procaine is believed to act peripherally, crossing the permeable, capillary membrane and bathing the terminal axone endings, its use in the treatment of traumatic injuries, burns, and other conditions in which the pain stimulus is superficial seems almost specific. In the early part of the Second World War, Gordon found procaine could be used intravenously with excellent results in the care and treatment of burns and that solutions of 0.1 and 0.2 per cent procaine started as an infusion immediately before the change of surgical dressings and debridement provided adequate analgesia for these procedures even though no morphine or other agent was used. This analgesia lasted for several hours so that the patients were able to rest comfortably. The use of procaine intravenously is not associated with the respiratory depression so frequently

seen in deep sedation with morphine. Its possibilities as a valuable agent in the management of burned patients who have inhaled an irritating smoke or gas can therefore be readily appreciated. Captain R. J. Zeluff has recorded his experience with the use of procaine intravenously in a large number of cases of burns and other traumatic injuries which required daily surgical dressings.

New operations for the relief of mitral stenosis.—(Leading articles, *The Med. Jour.*, Australia, 6-8-1949, *Lancet*, 29-10-'49).

Two new surgical operations for the relief of mitral stenosis have been devised with such brilliance and carried out with such significant success that the background, possibilities and limitations of the operations have all been discussed in a leading article in the *Medical Journal of Australia* issued on 6th August 1949. Mitral valvular stenosis

is such a common affection of the heart damaged by rheumatism.

The first of the new surgical procedures has been described by Dr. C. P. Bailey, Associate Professor of Thoracic Surgery in the Hahnemann Medical College, Philadelphia. He calls the operation "Commissurotomy" (*Dis. of Chest*, April, 1949). It consists in enlarging the orifice of the mitral valve by cutting its commissures with an instrument attached to the surgeon's index finger, introduced through an opening in the auricle of the left atrium. It is nearly 50 years since Sir Lauder Brunton first suggested that mitral stenosis might be surgically cured and it is nearly 25 years since Dr. Souttar in London performed the first successful operation which consisted of a digital dilatation of the mitral orifice by way of the auricle of the left atrium.

Bailey's own operation is based on the idea that by cutting the commissures of the stenotic mitral valve well out into the tissues of the mitral ring he might possibly allow the two halves to be separated by the current of blood during diastole, yet to come together and prevent regurgitation of blood during systole. This idea occurred to him from his observation that in the stenosed mitral valve the thick fibrotic plaque is surrounded by a margin of fairly normal valvular tissue. Before operating on human subjects, Bailey performed the operation on the mitral valves of sixty dogs—a method of preparation and precaution usually practised by American Surgeons. Up to the time of this report, Bailey had performed his operation of 'commissurotomy' on eight patients. In these cases the operation was successful, one died about 3 months after the operation and the other four died as a result of the intervention. Digitalis and Quinidine were administered before the operation and an intravenous procaine was given during the operation to prevent arrhythmia. Antibiotics were given to prevent infection of the wound and of the cut valve surfaces. Anticoagulant therapy was considered dangerous and unnecessary. In 1932, Dr. Evarts Graham of St. Louis, had devised a

cardioscope which was introduced into the left atrium through its auricle and lowered till it was in contact with the mitral valve; the valve could then be seen just as one can see one's finger in a glass of milk if one presses it against the inside of the glass. This cardioscope carried a cutting instrument with which the valve could be cut. Graham's *valvulotomy* did not offer sufficient relief of the stenosis but indicated that *valvulectomy* should be tried. This proved also a failure. But the experimental work of Graham, Cutler, Levine and Beck showed that the auricle of the left atrium (while appeared to have little physiological function) could stand considerable manipulation without harm to the heart.

Dr. Gordon Murray of Toronto, Canada, described another operation for the relief of mitral stenosis which he has successfully performed. This is to remove the lateral cusp of the stenosed mitral valve with a punch under endoscopic vision and immediately to replace it with an artificial valve. This is made from a section of the cephalic vein, turned inside out, so that its intima lies in the blood stream; it is stiffened and reinforced by a piece of the tendon of the *palmaris longus* muscle and it is inserted from before aft through the heart on the ventricular side of the site of the original valve, so that on systole it is jammed into the opening left by the resection of the valve while in diastole it floats out of the opening so that it does not obstruct the filling of the ventricle. He had operated successfully on 2 human subjects up to the time of reporting.

In a leading article, the *Lancet* (London) of 29-10-'49 pays a great tribute to the skill and assiduity of Bailey, Harken and Murray who have done pioneer work in mitral valve surgery; after discussing the details and limitations of the operative procedures outlined by these pioneers and their enthusiastic co-workers, the *Lancet* has some very important remarks to offer relating to the dangers in the surgical treatment of mitral stenosis.

Among the causes of failures of some of the ten cases operated by Bailey, were (1) cerebral embolism on the 6th

day after operation; (2) an error in technique by cutting across the valve leaflet; (3) post-operative obliteration by fibrin deposits of a small calcified mitral orifice which did not admit of adequate cutting; (4) post-operative intrapleural hæmorrhage attributed to the unnecessary use of heparin and incorrect fluid administration; (5) severe hæmorrhage due to friability of the auricular wall. To these five may be added Harken's two *viz.*, tachycardia and dislocation of the heart from its natural position. Thus the risk of mitral valve operation is still great even in the hands of expert cardiac surgeons familiar with precautionary measures. These include permanent electrocardiographic control and the administration of procaine drips to combat tachycardia and myocardial irritability.

The article concludes with the following statements:—"Certainly direct mitral valve surgery is still a formidable undertaking fraught with great technical difficulties and dangers and the cardiac surgeon will always have to remember that even after the most brilliant technical achievement on the mitral ostium, the ultimate result rests with the myocardium of the left ventricle which has become accustomed to receive and eject a reduced amount of blood."

Tuberculous peritonitis treated with streptomycin.—Wichelhausen and Brown present the results obtained with streptomycin in the treatment of 26 patients with tuberculous peritonitis. A favourable response was obtained in all except one of the patients, who had a co-existing pulmonary tuberculosis and died.

Four of the improved patients had a relapse. Two of them responded to a second course of streptomycin; one failed to respond. One patient was not retreated and died following a relapse.

A majority of the patients had been seriously ill and many were chronically ill. The uniformity and rapidity of response, the subsidence of fever and abdominal symptoms, the general improvement, the objective improvement, observed in three follow-up laparotomies and the fact that six patients

have returned to work are indications of the effect of the drug. In most instances streptomycin therapy changed the trend and shortened the disease process. The duration and type of peritoneal involvement did not influence the response to therapy. Tuberculosis of the peritoneum responded as well as or better than co-existing tuberculous lesions elsewhere, but streptomycin did not prevent the development of new lesions.

Daily dosage of streptomycin varied between 1 and 3 gm. given intramuscularly in two to six divided doses. Total dosage per patient varied from 42 gm. to 254 gm. for a single course. One of the four patients treated with two courses of streptomycin received a total of 349.2 gm. of streptomycin. With these doses streptomycin blood levels between 1.25 and 40 micrograms were obtained. It is of interest that in one patient whose blood levels varied between 3.2 and 15.2 micrograms an ascitic fluid streptomycin level of 11.7 micrograms was obtained, indicating that there is adequate diffusion of streptomycin into the abdominal cavity. Duration of therapy varied between 21 and 137 days but one of the patients who received two courses of streptomycin had a total of 164 days of treatment.

Although immediate improvement following streptomycin therapy was excellent in most cases, continued observations will be necessary to determine the efficacy of streptomycin in the ultimate control of the disease. The development of new extraperitoneal lesions during and after therapy and the persistence of histologic evidence of tuberculosis in two cases make the prognosis extremely guarded. (Wichelhausen, R. H. and Brown, T. McP., Washington, D. C.: *American Journal of Medicine*, 8:421-444, April 1950. The authors are connected with the Department of Medicine, Veterans Administration Hospital, Washington).—*Medical News Letter, U.S.I.S.*

Renal injuries.—Sargent and Marquardt say that at a meeting at which "Traumatic Rupture of the Kidney" was discussed many supported the general thesis that surgical intervention

was commonly indicated in renal injuries. Faced with opinions so contrary to those they had held for many years, they determined to re-examine their own experience critically.

The combined experience of the two authors herewith reviewed consists of cases of renal injury cared for by them in the Johnston Emergency Hospital during the past quarter century, cases admitted to their services in the Emergency Unit of the Milwaukee County General Hospital since its opening in 1934, those cases seen by one of them in a military hospital during the war years and in a veterans hospital since the war, and the occasional case seen by each as a part of his private practice. All told their cases of renal injury number well over 200. These are divided into the following three groups: minor fractures existed in an estimated 120 cases, major fracture in 72 cases and shattered kidney in 14 cases.

All cases in which renal injury was of a minor degree, were treated conservatively and the authors found that contusions and minor parenchymal fractures always heal spontaneously and without notable consequence to the patient.

Of the 72 cases suffering major parenchymal fracture but with pelvic architecture reasonably preserved, only two were subjected to prompt surgery. This was many years ago, before they had learned to have proper regard for shock when contemplating major surgery. One of the authors removed a somewhat fractured kidney from an adolescent lad and saw him die within the hour. The second of the two surgical cases recovered nicely after simple drainage of a perirenal hematoma done, at the insistence of a physician father.

The other 70 cases of demonstrated parenchymal fracture were treated expectantly. These included two cases of gunshot injury in which only the bowel perforations were repaired. Also included in the series were four cases presenting massive perirenal hematoma, one of which extended to the point of threatening exsanguination. There were no deaths among these 70 patients. Sixty-one recovered nicely from their

kidney injury and 27 of these have been followed from three to 17 years to know them to be free from disability.

Nine of the 70 cases of major parenchymal fracture treated conservatively are known to have suffered important sequelae. In four cases, perinephric abscess developed, requiring drainage, one with nephrectomy. One case of severe hypertension developed within three months after injury and was nephrectomized (with an amazing recovery). A large traumatic cyst threatened the life of an injured solitary kidney and had to be dissected free and removed. One giant renal capsule hydrocele occurred and was drained.

One veteran remained on disability pension, having demonstrable architectural distortion of the injured kidney and claiming disabling pain though he steadfastly refused nephrectomy. And finally, one patient who had suffered a renal pedicle injury was examined a year later in connection with an insurance settlement and was found with the kidney atrophic and completely functionless. Of these nine instances of sequelae following parenchymal fractures managed conservatively at the time of injury, seven came to surgery and two were advised nephrectomy but refused. All nine patients, the pensioned veteran excepted, ultimately regained perfect health.

There were 14 cases in which the kidney was so completely shattered as to have lost all recognizable pelvic outline in the pyelogram or at autopsy. Six of the 14 cases of shattered kidney were diagnosed at autopsy. In none of these was there opportunity for other than expectant treatment or even for careful diagnostic studies. There were two other cases of shattered kidney that were treated expectantly. One, a shrapnel injury, had to be nephrectomized months later to get rid of a urinary fistula. The other was nephrectomized seven days later when well out of shock.

Six of the 14 cases of shattering injury were operated upon at once. Four of the six were of that classical type about which there is agreement: the patient known to have a kidney shattered

beyond hope of saving, presenting signs of progressive bleeding, yet ready for operation before shock has set in. Each of these four patients recovered. Both of the remaining two had been shot and had to be operated upon in emergency to close bowel perforations. Despite considerable shock, the temptation of the situation was great and a nephrectomy was added. One died on the table; the other within hours.

The authors admit that occasionally a patient is seen in whom nephrectomy not only is clearly indicated, but in whom the usual adverse circumstances are lacking. They describe such a case.

They believe that no renal injury can be managed intelligently without certain knowledge as to its type and degree. Among other things, that means a clear pyelogram, usually a retrograde pyelogram. Surgical treatment should be withheld unless and until a clear-cut indication for it arises. And finally, they regard renal surgery to be unwise, even when intended to control hemorrhage, if the patient is in profound shock.

(Sargent, J. C., Milwaukee, Wisc., and Marquardt, C. R., *Journal of Urology*, 63, 1-8 January, 1950.—*Surgical News Letter*, U.S.I.S.).

Streptomycin in the treatment of tuberculosis of the rectosigmoid region and anus.—The cases reviewed by Martin and Sweany were treated during the last 18 month period, at the proctologic service of the Municipal Tuberculosis Sanitarium of Chicago. All the patients had pulmonary tuberculosis. Eighteen were males and five were females. Five types of lesions were present in various combinations: (1) anal or perianal ulcer; (2) anal fissure; (3) external and internal anorectal sinus the so-called "blind" fistula; (4) true fistula with both external and internal orifices; (5) superficial ulcers of the mucosa of the rectum and sigmoid.

Most of these patients were given 0.5 gm. of streptomycin intramuscularly divided into 2 daily doses for period of two weeks to 120 days, depending upon the pulmonary as well as the anorectal

disease, and whether contraindications developed. Dihydrostreptomycin was given to a few of the patients, generally in 0.75 gm. doses a day given in two daily doses intramuscularly for 45 days. Either course was repeated if necessary. There were no untoward results, labyrinthine or otherwise.

Fifteen cases of perianal sinus with or without abscess healed without radical measures although surgical measures were consistently required for their cure before the use of streptomycin. In five of these cases no form of surgery whatever was used, in nine a simple incision and drainage, and in one a fistulectomy. One anal ulcer healed completely within eight weeks.

Two fistulas with minute internal orifices healed without surgery in 11 and 12 weeks respectively. That anorectal fistula especially could be healed without fistulectomy was a most surprising event. These two patients were treated nine and six months ago, and thus far the wounds have remained healed.

In the concluding summary the authors stress that tuberculous perianal sinuses, that is, sinuses with external, but no internal, orifices, heal without surgery as a result of the use of streptomycin. Perianal abscesses, however, still require incision and drainage.

Although two small fistulas in this series healed without surgical intervention, complete or true fistula in ano, that is, those having internal and external orifices, generally require surgery before complete healing takes place.

Superficial lesions such as anal ulcers, fissures, and ulcers in the mucosa of the rectum and sigmoid heal promptly and completely following streptomycin treatment.

A most important observation was that the patients treated with streptomycin have far less severe subjective symptoms, both before and after surgery. Almost always distress and pain were relieved within a few days after streptomycin treatment was begun.

In a certain small percentage of cases, abscesses formed during streptomycin treatment perhaps due to the development of resistance in some of the tubercle bacilli in the local lesion.

(Martin, C. L. Chicago, Ill., and Sweany, H. C.: *Surgery, Gynecology and Obstetrics*, 90: 681-685, June, 1950. The authors are connected with the

Clinical and Research Departments of the City of Chicago, Municipal Tuberculosis Sanitarium, Chicago, Ill.)—*Surgical News Letter*, U.S.I.S.

MEDICINE AND THERAPEUTICS

Effects of ACTH in gout.—(*Amer. Jour. Med.*, Vol. ix, No. 1, July, 1950).

Drs. Gutman and Yu of the Columbia University College of Physicians and Surgeons, made accurate observations in acute gouty arthritis. ACTH was usually given for four days in dosages of 100, 55, 30 and 20 mg. per day in 4 divided doses each day. Of 11 cases of acute gouty arthritis seven showed a satisfactory response to ACTH. One of these was refractory to colchicine.

In many of these ACTH was not convincingly superior to colchicine, and in four cases colchicine terminated attacks not responding to ACTH. Unlike colchicine, ACTH is not suitable for prophylactic use in the prevention of acute gouty attacks. Discontinuance of ACTH caused exacerbation of symptoms in 4 patients. The conjoint and continued use of colchicine seems rational in patients subject to frequent recurring attacks. The available evidence does not justify the view that the pituitary and/or the adrenal glands play a central role in the pathogenesis of gout.

Effects of cortisone and ACTH.—(Editorial: *J.A.M.A.*, 11-3-1950).

The striking observations by Hench, Kendall, Slocumb and Polley in their report to the Mayo Clinic staff meeting, on the alleviation of symptoms and abnormalities of rheumatoid arthritis by the daily administration of cortisone (compound E) and of A.C.T.H., led them and others to inquire whether long continued treatment with these hormones would give rise to *undesirable effects*. In a recent paper (*Arch. Int. Med.*, 85, 199) Sprague, Power, Mason, Albert and Mathreson jointly with Hench *et al.*, above mentioned have published significant clinical and metabolic data of studies on 38 patients who, because of rheumatoid arthritis,

rheumatic fever, or other diseases, were given cortisone or A.C.T.H. or both for periods of a few weeks to many months. Their observations as well as those of others, confirm the supposition that these hormones are powerful agents which influence a wide variety of physiological functions. The undesirable effects observed by the Mayo Clinic workers bore a direct relation to the size of the daily dose and the duration of the treatment. Some of their patients showed little or no intolerance to fairly prolonged administration of the hormones while several others showed one or more of nearly all the clinical and metabolic features encountered in *adrenocortical hyperfunction* and in varying combinations. These included rounding of the facial contour, hirsutism, acne, keratosis pilaris, muscular debility, edema, amenorrhoea, pimple cutaneous striations, impairment of carbohydrate tolerance, negative nitrogen balance and hypochloremic, hypopotassemic alkalosis. Excretion of creatine and uric acid was increased in most cases. There was evidence of secretion of compound F when the adrenal cortex was stimulated by A. C. T. H. Further, the function of the adrenal cortices in man was depressed by cortisone, at least transiently. This would be a disadvantage for a patient confronted with a surgical operation or other stress such as that imposed by an acute infection. Overstimulation of the adrenal cortices by prolonged use of large doses of pituitary adrenal corticotropic hormone conceivably might lead to their exhaustion and thus to adrenal insufficiency.

The Mayo Clinic workers offer the suggestion that these several undesirable effects of cortisone and A.C.T.H. ought not to be regarded as *side effects* or *toxic reactions*. Preferably they should be called "*physiologic alterations*". In

other words, they represent the effects of the biological activities involved. The reports of the Mayo Clinic workers as well as those of the other authors cited do not provide any grounds for arresting further exploration of the undesirably great benefits obtainable from use of these hormones in patients crippled with arthritis or suffering from certain other diseases, *provided* always that dosage and duration of administration continue to receive the closest scrutiny. Search likewise must continue for a procedure to obviate undesirable effects without loss of therapeutic effectiveness. Testosterone, insulin and indeed all hormones when used for purposes other than replacement therapy may provoke disturbances which can become alarming.

Hormones are two-edged swords and their use as drugs demands discrimination between what is most desirable for control of the disease in question and what is best from the standpoint of the over-all welfare of the patient.

Deoxycortone with ascorbic acid in rheumatoid arthritis.—(*The Lancet*, 29.4.1950, pp. 830-831).

Excellent results were reported in the columns of the *Lancet* in the treatment of rheumatoid arthritis with deoxycortone and ascorbic acid by different workers since February 1949. Similar results are claimed also by various others in Poland, Cyprus, Naples and Bagdad. It is noteworthy, however, that such an experienced investigator as Spies (*Lancet*, 1949, ii, p. 1219) and some others also in England have published results at variance with those of the previously mentioned workers. A team of twelve distinguished doctors (all members of the *Empire Rheumatism Council*) each of whom has had considerable experience in the assessment of "cures" in rheumatoid arthritis have *unanimously* found this treatment to be of no significant benefit in rheumatoid arthritis.

The total number of cases treated by them was 172. Of these some limited improvement was noted in 14 cases (subjective only in 11 and objective in 3). Many of these 12 doctors have had the opportunity of treating cases with

adrenocorticotrophic hormone (ACTH) and of observing in the U.S.A. the therapeutic effects of "cortisone" and they were convinced of the very great value of these substances. In contrast, when cases are adequately studied under controlled and standardised conditions treatment with deoxycortone and ascorbic acid produces no more improvement either subjectively or objectively than can be observed to follow from other forms of treatment by injections e.g., procaine or even normal saline.

In view of the widespread publicity being given to the use of deoxycortone and ascorbic acid in the treatment of rheumatoid arthritis, the above mentioned 12 doctors have thought it desirable to report their failure to obtain any significant benefit and to record the unanimity with which these twelve experts are agreed on this.

Cortisone-Compound E.—(Johnson R. W., *Jour. Bone. Joint Surg.*, July, 1950, pp. 475-489).

In his presidential address at the annual meeting of the American Orthopaedic Association, held in May 1950, Dr. Johnson the renowned Orthopaedic Surgeon of Baltimore, dwelt at length on arthritis, illustrating his address with numerous slides and photomicrographs. He reported briefly the early findings in a small investigation he had in progress since he became "the proud possessor of a few grammes of cortisone in January 1950". The investigation covered only three subacute chronic rheumatoid cases—one child, one man and one woman. Without going into clinical details he reported only that each case showed definite improvement in general well-being, greatly increased mobility in affected joints, diminution in swelling and almost complete cessation of pain. In fact the clinical response was so magical that it is most disconcerting to have to report that biopsies of the swollen joints revealed *no appreciable change in the cellular picture*. He illustrated by photomicrographs the essential similarity of the pathological pictures shown in pre-treatment, mid-treatment and post-treatment

biopsy material. The cortisone (compound I) in daily doses of 100 mg. was given for three weeks to the two adults and in 50 mg. doses for six weeks to the child. As far as possible, symmetrically involved joints were used, preferably the multiple Haygarth's nodes. The dense infiltrations of lymphoid cells in large masses could scarcely be expected to melt away in such a short time, but *neither could we see any change* in the smaller perivascular collections. These latter he interprets to be the early and active lesions which should be more sensitive to the action of the hormone."

From these pathological findings and the rapid recurrence of symptoms following the discontinuance of cortisone treatment, he justifiably concludes that the administration of the cortisone keeps the inflammatory process simply in a state of "suspended animation" and does not cause a reversal of the process towards true healing. *Perhaps that is the best we can expect of any hormone therapy just as in diabetes insulin does not cure but simply temporarily restores normal carbohydrate metabolism. If this be so, we certainly do not have in cortisone the type of 'cure' for arthritis that we have been hoping for.*

Chloromycetin in urinary infections.—(*Jour. Urology*, Baltimore, pp. 771-790, 62, 1950).

Chittenden and his co-workers review their observations on 50 cases of both acute and chronic urinary tract infections by the bacillary group of organisms treated by chloromycetin. It has the advantage that it may be administered orally and is devoid of gastro-intestinal, neurotoxic, cutaneous or allergic reactions. Their observations indicate that there is a much higher percentage of multiple infections than hitherto considered. Likewise the cocci groups are more important than hitherto realised. Adjunct therapy with penicillin and sulphonamides is necessary when cocci are present along with bacillary forms. The removal of calculi, obstructions, carcinoma, and focal sources of infection are necessary for the ultimate and complete control of urinary infections.

Streptomycin therapy in 400 cases.—(*Eng. Abst.*, 17, 23-42, June 1949, *Abst.*, *W. Med.* p. 216).

Misiewicz carried out post-treatment observations on 400 (out of 600 cases of tuberculosis treated by him with streptomycin only) patients for periods of 6 months to 1½ years. 26 of them died during this follow-up period. Streptomycin was found to have given excellent results in 50% of cases of pulmonary tuberculosis and in 90% of cases of laryngeal tuberculosis. The improvement in cases of meningitis was striking but not permanent. Clinical cure is encountered in cases of bronchial tuberculosis and in cases with lesions of small nodular type; in cases of advanced pulmonary tuberculosis clinical cure is not observed and improvement is slight and that too, not permanent.

Neurotoxic secondary effects of streptomycin.—(*Schw. Med. Wochenschr. Basel.*, *Eng. Abst.*, 79, 793-799, 1950).

Dr. Graaf studied the relationship between dosage levels of streptomycin and secondary neurotoxic effects (particularly on the auditory apparatus) on 50 adults and 20 children, who received a constant streptomycin dose by intramuscular injection for at least 30 days.

By adaptation of the dosage to the body weight of the patient it was possible to avoid impairment of hearing and disturbances of the vestibular apparatus. In adults the daily dose for intramuscular administration should never be in excess of 24 mg. per kilogram of body weight, as higher doses produce serious irreversible vestibular disturbances. A dose of 20 mg. per kg. divided into 2 injections per day is a dose of adequate therapeutic effect, produces vertigo, but rarely irreversible disturbances. It is advisable temporarily to interrupt administration of streptomycin if vertigo should appear. When the daily dose is 16 mg. per kg. of body weight, vestibular disturbances are usually never produced, unless there is kidney impairment. If there is no kidney trouble, 16 mg. per kg. of body weight may be continued with impunity

regardless of vertigo. Larger doses are tolerated better by the children than by the adults. Hearing troubles usually develop only with rather high dosage and that too with intrathecal administration. An intramuscular dosage of less than 24 mg. per kg. of body weight, seldom produces disturbances when kidneys are functioning normally.

Distaste for smoking—An early sign of virus-hepatitis.—(*Rev. Gastroenterol.*, N. Y., 16, 721-742).

Lebowitzky found in patients with acute virus-hepatitis, a marked distaste for smoking. The distaste was quite

abrupt in its onset. Smoking which was a great source of pleasure became all of a sudden distasteful and is associated with an unpleasant "musty" or bad taste. This symptom differs from the rather common reaction on the part of many smokers who refrain from smoking when "colds", sore throats, or other respiratory infection develops. In the latter instance, the reason for ceasing to smoke is either the irritation of the sore throat or a decreased ability to taste or smell the tobacco and not a newly acquired positive distaste of an unpleasant nature. The author noticed this symptom in 16 of 24 regular smokers during their early stage of acute virus hepatitis.

OBSTETRICS AND GYNÆCOLOGY

Treatment of gonorrhœa in women by local submucous injection of penicillin.—(Debray, J. R. *Presse Medical*, 57: 1134. *Abst. S. A. Med. Jour.*, 22-4-'50; p. 291).

As the standard treatment of gonorrhœa by penicillin was much less effective in women than in men, Dr. Debray developed a new technique which has yielded markedly better results than the standard treatment.

Using a fine dental needle, six to eight sub-mucous injections of 1.5 c.c. penicillin solution (500,000 units in 20 cc. saline) are made round the cervical canal. Four injections are made round the urethra, a surface anæsthetic being used previously. If there is evidence of infection of Skene's or Bartholin's glands local injections are made. In the first instance treatment is given every other day for four visits but it may be continued if the results are not then satisfactory; 400,000 units penicillin in aqueous solution (in 2 doses morning and evening) are also given intramuscularly on the first and last days of treatment and thiazamide 3 gm. daily for three days at the start. The results were controlled by cultures and found to be definitely superior to the standard treatment alone.

Vasodilators in the treatment of functional dysmenorrhœa.—(*South Med. Jour.*, 42, 1082; 1949, Dec. '50. Also *Med. Times*, June, 1950).

Griffith and Little treated 22 patients with very severe dysmenorrhœa who had not responded to other forms of treatment by using vasodilators. Etamon (Tetraethylammonium) was given to 4 of them in a dose of 400 mg. intravenously; only one showed complete relief of pain. 18 patients were treated with oral doses of 25 or 50 mg. tablets of priscoline. The 25 mg. dose was as effective as the 50 mg. dose and produced less nausea. Amongst those who received the 25 mg. dose the relief of pain was complete to partial in 96 per cent. A combination of a gastro-intestinal antispasmodic or aspirin or both with priscoline improved the results with those who had partial relief. By using intravenous priscoline or a combination with nicotinic acid (intravenously) complete or nearly complete relief was obtained in 97% of the cases.

An explanation of the mechanism of the action of vasodilators is not known. But all produce peripheral vasodilatation. One possible explanation of the pain of dysmenorrhœa may be a stimulation of pain endings in blood vessels as a result of vasospasm.

Erythroblastosis foetalis-Exchange transfusion of female donor's blood.—(*New. Eng. Jour. Med.*, 241, 799-806, 1950).

Allen and his co-workers treated 208 cases of erythroblastosis foetalis by exchange transfusion. Though the mortality was a little over 15 per cent, in the whole group, it was significant to note that there were no deaths in a group of 42 babies who happened to have received blood from female donors exclusively. [This could not have been accidental]. They also observed that female babies with erythroblastosis foetalis did significantly better than male babies, particularly with regard to the incidence of kernicterus. Since they made the observation of the superiority of the female donor's blood they deliberately chose women as donors for 13 babies with erythroblastosis foetalis and all 13 recovered. 150 c.c. or more of the blood was however required to produce beneficial results. The authors have reason to consider that the potential value of a beneficial component of blood from female donors is probably not limited to babies with erythroblastosis foetalis.

[Note:—One would like to have been furnished fuller information about the other cases, not treated with female donor's blood, and about the use of controls with reference to the second set of 13 babies deliberately treated with such blood. It would perhaps have added greatly to the value of their findings if estimations had been made and recorded simultaneously of the Rh factors in mother and infant.

T.N.S.R.]

Streptomycin in gynæcological therapy.—(*La streptomycine dans la thérapeutique gynécologique*). R. V. Piton, Hopital Brugmann, Brussels, Belgium. *Bruxelles med.*, 30: 579-97, March 12, 1950.

The treatment of 21 cases of gynæcologic infections of various types other than tuberculosis with streptomycin is reported. In all these cases streptomycin was given by intramuscular injection twice a day. Those treated included 4 of acute pyosalpinx in which strepto-

mycin was employed after operation, the total dosage varying from 3 to 8 Gm; in 2 cases penicillin was also employed. In 3 of these cases the temperature fell to normal in two days, and in one case after the fourth day. In 4 other cases of severe pyosalpinx in which both penicillin and vaccine had failed to control the infection, streptomycin was given preoperatively in a total dosage varying from 5 to 14 Gm. In 3 cases operation was done with good results when the infection was well under control; in the fourth case, there was temporary improvement, but a month later there was recurrence with generalized peritonitis. This is the only case in the series in which streptomycin was not effective. In 4 cases of infected abortion with infection due to the colon bacillus, streptomycin was given before or after the necessary operative procedures; all the patients made a good recovery. Streptomycin was also used post-operatively in one case of peritonitis following retention of the placenta after delivery. In 3 cases streptomycin was used in the treatment of postoperative complications following gynæcologic operations: the total dosage varied from 4 to 17 Gm. In 2 cases the temperature became normal by the sixth day; in one case the patient showed improvement by the fourth day, but because there was a recurrence of fever, the temperature was not permanently normal until the eleventh day after operation. Streptomycin was also employed postoperatively because colon bacillus infection complicated the Wertheim operation for cancer of the uterine cervix or fundus in 3 cases. In all of these cases the infection was promptly controlled and the temperature became normal in two to six days. None of the patients treated with streptomycin showed any untoward reaction such as vertigo, deafness or cutaneous eruptions. In some of these cases penicillin had failed to control the infection because the infecting organism was not sensitive to penicillin but was sensitive to streptomycin. The dosage that gave the best results was 1 to 2 Gm. streptomycin daily, in two injections, to an average total dose of 10 Gm; in some cases treatment could be stopped before this dosage was reached

because there was prompt response to the therapy; in a few cases a higher total dosage was necessary.—*Obstetrics and Gynaecology*.

Premature labour.—(*Med. Jour., Australia*, Feb. 25, 1950).

Lawson discusses the various factors involved in the causation of premature labour and groups them under three main headings: (1) disorders due to pregnancy e.g., toxæmia, antepartum hæmorrhage, multiple pregnancy; (2) disorders incidental to pregnancy e.g., hypertension, diabetes, anaemia; (3) intercurrent infections e.g., pneumonia, pyelitis of pregnancy. These causes account for about one half of all cases of prematurity. The aetiology of the other 50 per cent is not quite cut and dry but there is ample evidence to show that the want or inadequacy of ante-natal care is an important predisposing factor. The judicious combination of adequate rest, adequate activity, and adequate diet, is the essence of ante-natal care. Baird of Aberdeen, the experiments in Toronto, the work of the Peoples' League of Health in London have all produced conclusive evidence to show that an adequate diet will reduce the incidence not only of premature labour, but also of the factors such as toxæmia which make a premature labour necessary in the interests of the mother. Adequate weight control is another important factor. We should aim to have patients weighing 21 to 28 above their normal weight, at the end of the pregnancy. A weight gain which is difficult to control in spite of the full and intelligent cooperation of the patient often suggests impending toxæmia, or a multiple pregnancy which also carries with it a great risk of both toxæmia of premature labour. The use of large doses of diethylstilbæstrol (*Am. J. Obst. Gyn.*, 56, p. 821) will either avert the toxæmia or delay its onset and so allow the birth of a more mature baby. It is a wise measure of safety to give large doses of stilbæstrol to all patients with hypertension or diabetes who become pregnant.

Nervous tension, resulting from domestic worries and difficulties, is also responsible for inducing premature labour in a few cases.

The other points of importance in dealing with premature labours are summarized below:

- (1) A premature infant runs the maximum risk of damage when it is born of the breech and in so far as we do not know which particular patient will come into labour prematurely always attempt external version whenever a breech presentation is diagnosed.
- (2) Reduce analgesia and anaesthesia to a minimum; premature babies are particularly sensitive to depressant drugs.
- (3) Give the mother vitamin K, to reduce the risk of cerebral hæmorrhage, to which premature babies are specially liable.
- (4) Do not hesitate to perform an episiotomy if the perineum is even slightly rigid. Patients do not expect stitches after a tiny baby but the reduction of the strain on the foetal skull is achieved by episiotomy.
- (5) Have at hand ready oxygen, a warm receptacle and a clear airway.
- (6) Minimum of handling the baby.

A report of 133 consecutive cesarean sections.—(Herbert J. Andrews, Los Angeles, Calif. *West J. Surg., Gynec. and Obst.*, 58: 71-76, Feb. 1950).

Cesarean sections are shown to have been done since 1610, however, the mortality remained very high until about fifty years ago. Prior to fifty years ago cesarean sections were done only as a last resort and only for high degrees of fetopelvic disproportion. In the past forty years the incidence of maternal mortality and morbidity and foetal mortality has been gradually and markedly reduced. This has been due to several factors including the development of antiseptics and aseptic technic; improved diagnostic procedures; improved surgical procedures; the definite trend of a larger percentage of deliveries by trained obstetricians; and a reduction of the hazards of infection by the use of sulfonamides and antibiotic drugs.

Cesarean section by the properly trained operator has become a relatively

safe procedure, and therefore, the indications for cesarean sections have broadened to include certain elderly primiparas, some cases of diabetes mellitus, selected cases of cervical dystocia, patients who have undergone extensive rectal surgery, some with history of previous difficult delivery, and some of those cases of one or more stillbirths of unknown cause. It is felt that the inclusion of such a variety of indications for cesarean sections has also contributed considerably towards the reduction of maternal morbidity and mortality and foetal mortality.

This was not considered to be an unusual series, but an average. A careful study of which demonstrated the trend in modern obstetrics toward a more liberal viewpoint toward cesarean sections. This series includes 133 consecutive cesarean sections which were performed in private practice during 1946 to 1948. They are a part of 1,793 deliveries in this period of time—an incidence of 7.4%. Cesarean section was performed in approximately two-thirds of the cases because there was cephalopelvic disproportion and a history of previous section. The other one-third was divided with a gradual reducing incidence in the following order; elderly primiparas; placenta previa; partial premature separation of the placenta; fibromyomata uteri; primary uterine inertia; toxæmia of pregnancy;

diabetes mellitus; previous extensive vaginal plastic surgery; cervical dystocia; foetal distress; previous stillbirths; soft parts dystocia; acute polyhydramnios; and previous difficult deliveries. Associated factors, often of equal importance, were frequently present in addition to the primary indication. In cases of previous cesarean sections no attempt was made to deliver from below regardless of the reason for the first cesarean section. The reason for this is to obviate rupture of the uterus which does occur. There was one maternal death from a fulminating pre-eclamptic toxæmia. There were 4 foetal deaths—2 from moderately severe and fulminating pre-eclamptic toxemic mothers and 2 from premature separation of the placenta.

In recent years the tendency has been to employ cesarean sections, not as a late necessary procedure on patients already infected by prolonged labor, but much earlier when the patient and fetus are still in good condition. Spinal anesthesia was the anesthetic of choice and during the latter part of this series the transverse abdominal incision was used when there was no previous midline scar. The transverse incision in the lower uterine segment was used in all of these cases. Steel wire for the fascia, subcutaneous tissue and skin were used with results felt to contribute to a much thinner scar and less tissue reaction.—*Obstetrics and Gynaecology*.

BOOK REVIEWS

Principles and Practice of Surgery—By JACOB K. BERMAN, A.B., M.D., F.A.C.S., Associate Professor of Surgery, Indian University School of Medicine &c., &c., Director of Surgical Education and Surgical Research Indianapolis General Hospital, 1950. 1378 pages, 429 illustrations, C. V. Mosby Company, St. Louis.

This book is written with the idea of correlating the basic sciences with the fundamental principles of surgery. This in our opinion is the correct approach, for it is only on such a foundation can the superstructure of clinical surgery be well and truly built. Part I of the book deals with general considerations of surgical principles and discusses the history of surgery and pathology. Part II deals with local response and general body reactions to

injury. Part III discusses general reaction to injury. In this section the chapters on body fluids and shock are well written. Part IV deals with reactions of tissues and organs to trauma of unknown origin. Part V deals with diseases and injuries of specific organs and systems. The various systems of the body and their diseases are thoroughly discussed in the eight chapters forming this part. The sections on diseases of the breast, congenital malformations of the heart, vascular surgery, spinal cord injuries, asphyxia and anoxemia, inflammation of the pleura, neo-plasms of the lung and bronchi, diaphragmatic hernia, treatment of injured organs of the abdomen, peptic ulcer, intestinal obstruction, diseases of the gall bladder, diseases of the thyroid gland, are well written. The book

is written in a simple language and the printing is satisfactory. The illustrations and general get-up are also commendable.

The Souvenir of the 23rd Annual Conference (1951) of the Madura Medical Association.

The souvenir contains many good articles which will be useful to the general practitioner. Dr. R. Subramaniam of Madras writes on lung abscess; Dr. T. H. Somervell writes on the closure of fistulae; Dr. Kalyanam writes on radiology in surgery. There are other interesting articles on burns by Dr. Joseph, advances in general medicine by Dr. T. V. Venkatesan, recent trends in traumatic and orthopaedic surgery by Dr. Annamalai. The twenty-third annual report of the Madura Branch of the Indian Medical Association and a statement of accounts of the Association, together with the names and addresses of the members are given at the end of the book. An appeal for donations to the Building Fund is made in the pages of the souvenir. Dr. Vadmalayam, the President of the Association for the past year, and the other office-bearers deserve to be congratulated on the good work done by the Association during the year just over.

Eyes and Industry—Formerly Industrial Ophthalmology—By HEDWIG S. KUHN, M.D., Second Edition, 1950, illustrated 151 with 3 colour plates, The C. V. Mosby Company, St. Louis.

The visual problems in relation to industry are so numerous, diverse, and peculiar, that they have, with the growth of industry, come to be a special field in ophthalmology. Various types of industry demand different standards

of visual acuity, and their determination requires a special study by the ophthalmologist of the working of the various machinery. Needless to say that such an intimate contact is necessary to conduct premedical examination of workers in industry so as to maintain efficiency and economy. This book gives in detail the problems confronting an industrial ophthalmologist so as to make every workman, see, have eyes, and use them effectively: What facts about eyes are important? How are these facts to be interpreted? How could they best be used in a rehabilitation effort? How could they be used in an effort to step up production? How could they be harnessed to reduce accidents? These are the various factors that are described very vividly in this book.

Broadly dividing the nature of work it may be mentioned, (1) selecting adequate pre-employment tests; (2) providing periodic re-checks of special groups; (3) conducting a practical visual survey of the plant. Under these headings we are able to study a man's visual skills, as visual acuity, muscle balance test, visual performances at near point distances, facts which are important both to the medical department and management of the industry.

Chapter V deals with industrial eye injuries caused by solid bodies. The use of protective goggles is well discussed and is very informative. Discussions on illumination, some medico-legal aspects in handling eye cases, problems of radiation, welding and flashes and the utilisation of the 'blind in the industry' are worth reading and knowing. This is a very informative book lucidly written and well worth an addition in all book-shelves. We recommend it to all our readers.

CORRESPONDENCE

The Plight of Licentiatees

To The Editors, THE ANTISEPTIC, Madras.

Sirs,

I need hardly remind you of the sorry plight in which the licentiatees find themselves in our present-day national set-up. The Government is showing an increasing tendency to encourage ignorant pretenders by giving official recognition to the so-called Vaidas, Hakims, Homeopaths, and Naturopaths who freely trade on the common man's gullibility by advertising their "Wonder Drugs." Their approach to the medical problems is completely divorced from the spirit of scientific inquiry. Their so-called systems are only a jumbled mass of old, antiquated, mutually contradicting theories whose hollowness it is not difficult to expose. To treat these persons at par with duly qualified medical men is to commit an outrage on justice and enlarge the

scope for quackery. It is the bounden duty of every licentiate to check this rot which is threatening to infect the whole of our body politic.

On the other hand, the high and mighty Indian Medical Council is bent upon undermining the prestige of the Medical Licentiatees, by treating them as pariahs. It is high time, Dear Doctors, to give a befitting reply to this body that is still riding a high horse.

The ranks of the licentiatees are full of distinguished men. Some of the leading physicians, surgeons, eye-specialists and protozoologists of the world have sprung up from this class of medical men. Licentiatees have always offered their unstinted co-operation in peace and war. During the last war they made their mark in the Army Medical Corps officers. But now they are being given a

step-motherly treatment in the army. They are not only being debarred from the ranks they held creditably during the war, but are being deprived of the benefits of pensions and gratuity of the ranks they held in service. Nor are they being given the chance to serve on the reserves of the A.M.C.

On the civil side too, they are receiving an equally shabby treatment. The grades that are offered will be unacceptable even to the labourers. The graduates are already enjoying the privileges of an aristocratic class. The licentiatees are not adjudged competent to work as medical examiners to schools and factories. The insurance companies are a close preserve of the medical graduates.

Thus there is no end to the humiliation and the privations which the licentiatees have to suffer. There is an unholy alliance between bureaucracy and vested interests. The time has come for us to start a crusade against it. We have to fight for sheer existence. Now or Never. So it has been decided to

hold an All-India Medical Licentiatees' Convention at Ambala on 7-4-'51 and 8-4-'51 to impress upon the individual licentiate the gravity of the situation and to devise ways and means to secure a place of honour for the licentiatees in the present day set-up of the country. The Hon'ble the Minister for Health Raj Kumari Amrit Kaur, has very kindly consented to inaugurate the Convention on 7-4-'51.

It is our duty to muster strong on this occasion to present a united front to those who seek to eliminate the Licentiatees from the life of the country. Accordingly the Members of the Reception Committee earnestly appeal to you to lend your co-operation and support to this Convention by making it a point to attend it.

Ambala Cantt. }
12-2-'51.

Yours sincerely,
DALIP CHAND BAHL,
Secretary, Reception
Committee.

NEWS AND NOTES

Penicillin Factory near Poona.—The Government of India, it is understood, have finally decided that the erection, operation and maintenance of the new penicillin factory near Poona should remain the sole responsibility of Government or of a statutory authority that may be appointed by them.

Recent reports had suggested that the WHO and UNICEF had offered the setting up of a factory in India for the production of penicillin.

It is stated that neither of the organisations had expressed at any stage any intention to take charge either of the work of erecting the factory or of running it. The proposed assistance offered to the Government of India is likely to take the form of a loan of the services of expert international staff from the WHO to advise and guide the Government of India, provision of adequate training abroad for Indian personnel in order that they should be able to give the necessary technical assistance to their own Government, as soon as possible, and supply of essential equipment and materials.

Three conditions are stated to have been attached by these organisations to their offer of assistance and include: (1) The Government should provide free supply of penicillin for children in India of a value equal to the UNICEF contribution; (2) there should be no restriction on technical information concerning processes of manufacture; and (3) that the factory should operate on accepted international methods and should accept periodic visits from experts mutually agreed upon with the WHO.

Extension of BCG Vaccination to Rural Areas. - BCG Vaccination against tuberculo-

sis now being carried out by the International Tuberculosis Campaign in India, in collaboration with the Central and the State Governments, will be extended to rural areas in the near future, was disclosed to pressmen by Dr. Johannes Holm, Director of the International Tuberculosis Campaign on March 4. "BCG vaccination is being carried out only among the school children in big cities and it is their intention to gradually extend it further into towns and villages," he said. "We want to start a programme to cover the whole population," he added.

Referring to criticism against BCG, he said 17 million people who were vaccinated with BCG were very closely watched and so far not a single case where it had an adverse effect had been reported. He reiterated the view that BCG was an effective weapon in the fight against tuberculosis. In the fight against tuberculosis they had to adopt several methods such as the improvement of the environment, raising the standard of living, affording facilities for treatment, etc. "You should do everything possible and adopt every possible method," he said, and added BCG is one of the methods.

Special Rehabilitation Centre for Disabled Children.—A rehabilitation centre for children who have emotional problems in addition to serious physical disabilities is being established in the United States. It will be supported jointly by the New York University - Bellevue Medical Centre in New York City and the Association for the Aid of Crippled Children, a private service agency. Designed to help children from 2 to 8 years old, the new unit will be able to treat about 1,000 boys and girls each year.

The project is said to be the most comprehensive and intensive programme of rehabilitation now being provided in the United States. It will include educational work as well as evaluation of the various techniques to help crippled children] approach a normal life.

A team of specialists provided by the Medical Centre, will take care of the patients. The team will include persons trained in pediatrics, psychiatry, psychology, social service, physical therapy, occupational therapy, speech therapy, education, recreation and nursing services.

About one-third of the children to be treated will be those with neurological disorders, such as cerebral palsy and poliomyelitis. Another third will be those who have orthopedic problems, for example congenital malformations and amputations. The remaining group will include children with medical problems, one being rheumatic heart disease.

Special efforts will be made to provide a setting unlike that of the usual hospital. —*USIS Extract.*

[It is needless to state how great the need is in India of such a centre. Much has been spoken recently on the subject and the time has come when something tangible has to be done. —*Eds.*]

Machine Determines Amount of Allergen that will cause Asthma.—American scientists have developed a machine that tells how much pollen or other allergens it takes to give a person an attack of asthma. With this information doctors are able to find remedies for the ailment.

In the new technique the allergen or pollen is first mixed with a harmless acid called para-amino-hippurate (PAH). This combination is then reduced to a spray and dried. The resulting fine powder is mixed with fresh air, which the patient inhales through a tube in his mouth. Part of the mixture is routed through a special filter to determine how much allergen is in the air that is inhaled.

The allergen content of the air that is exhaled is measured in a similar way. The difference between the amount inhaled and that which was exhaled shows how much allergen remains in the lungs—about 47 per cent during ten minutes of breathing. As all the PAH is excreted through the kidneys, tests of the urine further show how much allergen entered the body through the lungs. —*U.S.I.S. Ext.*

New Discovery.—The Indian Institute of Science, Bangalore, has extracted a substance from the roots of the common drumstick tree which is an effective antidote to the growth of various micro-organisms that cause typhoid, pneumonia, dysentery, tuberculosis etc. This substance is non-toxic when given to experimental animals and in this and some other aspects it resembles penicillin closely. It is hoped that the discovery will prove invaluable along with streptomycin and para-amino salicylic acid in effectively combating various manifestations of tuberculosis.

Marmite in Medicine and Dietetics (booklet) published by the Marmite Food Extract Co. Ltd., Walsingham House, Seething Lane, London, E. C. 3.

In the first part of this booklet, which has been brought up-to-date, a few general details about the vitamin B complex and short notes on the individual factors and tables showing the chemical composition and vitamin content of marmite are given.

The second part outlines the dietetic and therapeutic uses of marmite and indicates its value in some of the many deficiency conditions which are prevalent in the tropics. Reference is made to vitamin B₁₂ complex deficiencies including retrobulbar neuritis and to megaloblastic anemias. Mention is also made of its special use in maternity and child welfare which is of such importance in every part of the world.

The booklet appears to be of interest to the medical profession, particularly to those in tropical countries.

Radioactive Iodine.—Radioactive iodine, taken orally, is now being used to combat inoperative cancer of the thyroid gland. This iodine loses its radioactivity relatively quickly, and so does not injure normal tissue.

Synthetic Forearm.—A life like synthetic forearm with a simulated blood supply is being used to teach U. S. medical students how to give hypodermic injections or to withdraw blood from the human body. The "skin" of the arm is a flesh-coloured plastic material, under which are a series of light and dark latex tubes that duplicate the arm veins.

Diseased Limbs.—A simple operation to increase the restricted flow of blood to diseased arms and legs was reported recently to the American College of Surgeons. Symptomatic nerves near the spine are cut, resulting in enlargement of the blood vessels to these parts of the body. —*U.S.I.S. Extract.*

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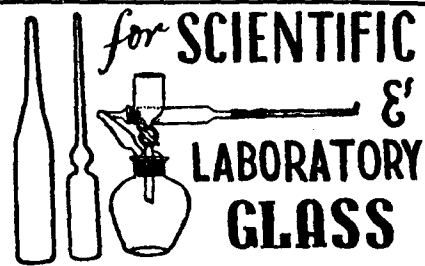
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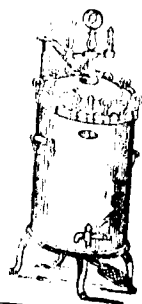
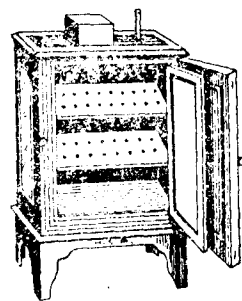
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* Washing and disinfecting surgeons' and nurses' hands.

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HÆMOSAN

Hæmosan Tablets containing Iron in combination with sulphates of copper and manganese are recognised as effective for the administration of iron. They are indicated in all forms

of anaemia associated with a low colour index—chlorosis, anaemia resulting from hæmorrhage, anaemia of pregnancy and the nutritional anaemia of infancy. A major advantage is the small dosage required. In Hæmosan with liver extract and vitamins the physician has the additional advantage of prescribing Vitamin C together with iron. In bottles of 25, 100 or 1,000 tablets.

HÆMOSAN

with
LIVER EXTRACT & VITAMINS

A *Stanisstreet* PRODUCT

IN TUBERCULOSIS + TIOCARONE



(UNION CHIMIQUE BELGE S.A.)

TIOCARONE is a recently developed synthetic product known chemically as Paraacetylaminobenzaldehyde thiosemicarbazone. It shows a powerful action against Koch's bacillus both vivo and in vitro, and clinical results obtained with it are most promising.

TIOCARONE can be used in conjunction with Dihydrostreptomycin or P. A. S., and it is reported that this association improves the activity of each drug separately.

TIOCARONE—supplies will shortly be available in this country, but owing to the limited imports, distribution will have to be restricted to T. B. Sanatoria, Government Institutions and a limited number of T. B. Specialists and Physicians.

Manufactured by:
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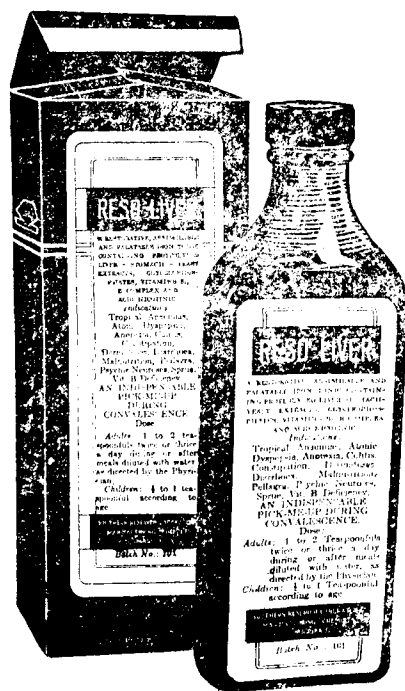
A Strictly Personal Reminder

ASOKAVIN, combines the anti-haemorrhagic Vitamin K and provides an ideal medicament. ASOKAVIN regulates uterine trouble of all descriptions, particularly the menopause or change in life.

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RESO-LIVER

(An Ideal Haematinic and Restorative Tonic)

..... is a well balanced combination of Proteolysed Liver-Stomach and Yeast extracts, fortified by the incorporation of pure Crystalline Vitamins of B Complex, Glycerophosphates of Minerals and Iron (in Organic form) in a very palatable base that even fastidious take it freely.

Excellent clinical results have been reported by administering Reso-Liver in all types of Anæmias like Macrocytic, Pernicious, Tropical, Hyperchromic and Pregnancy type.

Reso-Liver gives miraculous effects in a week's time while indicated in all conditions of mal-nutrition, Sprue and anæmias due to Beri-Beri and Pellagra.

Reso-Liver is an indispensable Pick-me-up during Convalescence.

Also Reso-Liver with Folic Acid (5 mgms. per fluid oz.) (Excellent for Sprue, Addisonian Pernicious Anæmia and all types of Nutritional Macrocytic Anæmias).

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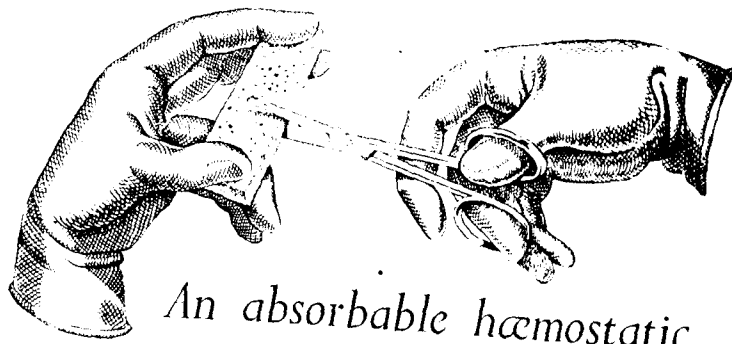
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- Easily absorbed.
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Bottles of 250 enteric-coated tablets



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An absorbable hæmostatic

Gelatin Sponge A & H may be used to control hæmorrhage when ligature is inadequate or impossible. It hastens the normal clotting mechanism, provides support for the blood-clot, and does not retard the process of wound repair. It is completely absorbed without foreign-body or antigen reaction, and it does not inactivate penicillin or streptomycin.

Gelatin Sponge A & H provides an effective hæmostatic for use in many surgical procedures ranging from the first-aid treatment of surface wounds, especially those involving large veins, to the control of operation hæmorrhage from oozing surfaces or of massive hæmorrhages when the bleeding-point cannot be easily identified.

By minimizing blood loss, the use of Gelatin Sponge A & H will increase the safety, and may widen the scope, of operative surgery in many fields.

It is supplied sterile in three sizes:

- No. 1. Strips 2 cm. $\times$ 6 cm. $\times$ 0.7 cm. in glass tubes each containing one piece; packages of six.
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GELATIN SPONGE A & H

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(Procaine Penicillin G and Penicillin G, Crystalline-Sodium Lilly).

BUFFERED, FOR AQUEOUS INJECTION

'Duracillin Fortified,' Buffered, for Aqueous Injection contains 300,000 units of procaine penicillin and 100,000 units of sodium penicillin--G per cc. This combination provides immediate, sustained, and intensified penicillin action. A penicillin blood-concentration of unusual magnitude is produced within the first hour in addition to a sustained and intensified effect. 'Duracillin Fortified,' Buffered, for Aqueous Injection is supplied in a dry, crystalline form for preparing aqueous suspensions.

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P. A. S. "WB"

Sodium Para-amino Salicylate

In the Ambulatory Treatment of
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Containers of 100 and 250 g. Sodium Powder
 Containers of 100 and 250 tablets of 0.41 g. sugar and enteric-coated.

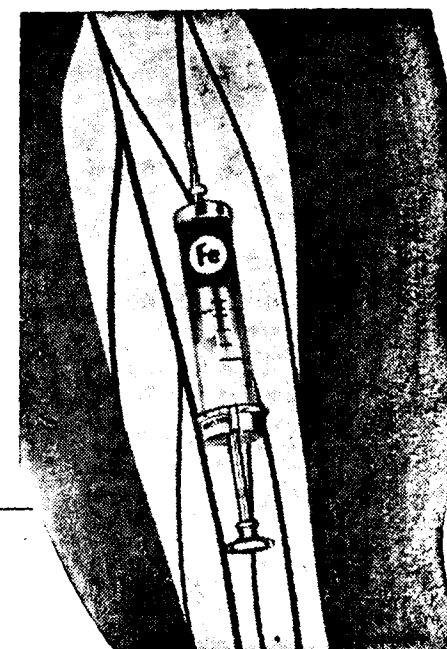
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STERAMIDE	"WB" Sulphacetamide 10% & 30% solutions 1 drachm... Eye Ointment. 15 g. Skin Ointment.	Ocular infections. Blepharitis, conjunctivitis.
STIMULIN	25% Nikethamide 2 cc. ampoules 15 cc. liquid oral	Skin infections. Impetigo contagiosa, keloid acne etc. Circulatory and cardiac stimulant.



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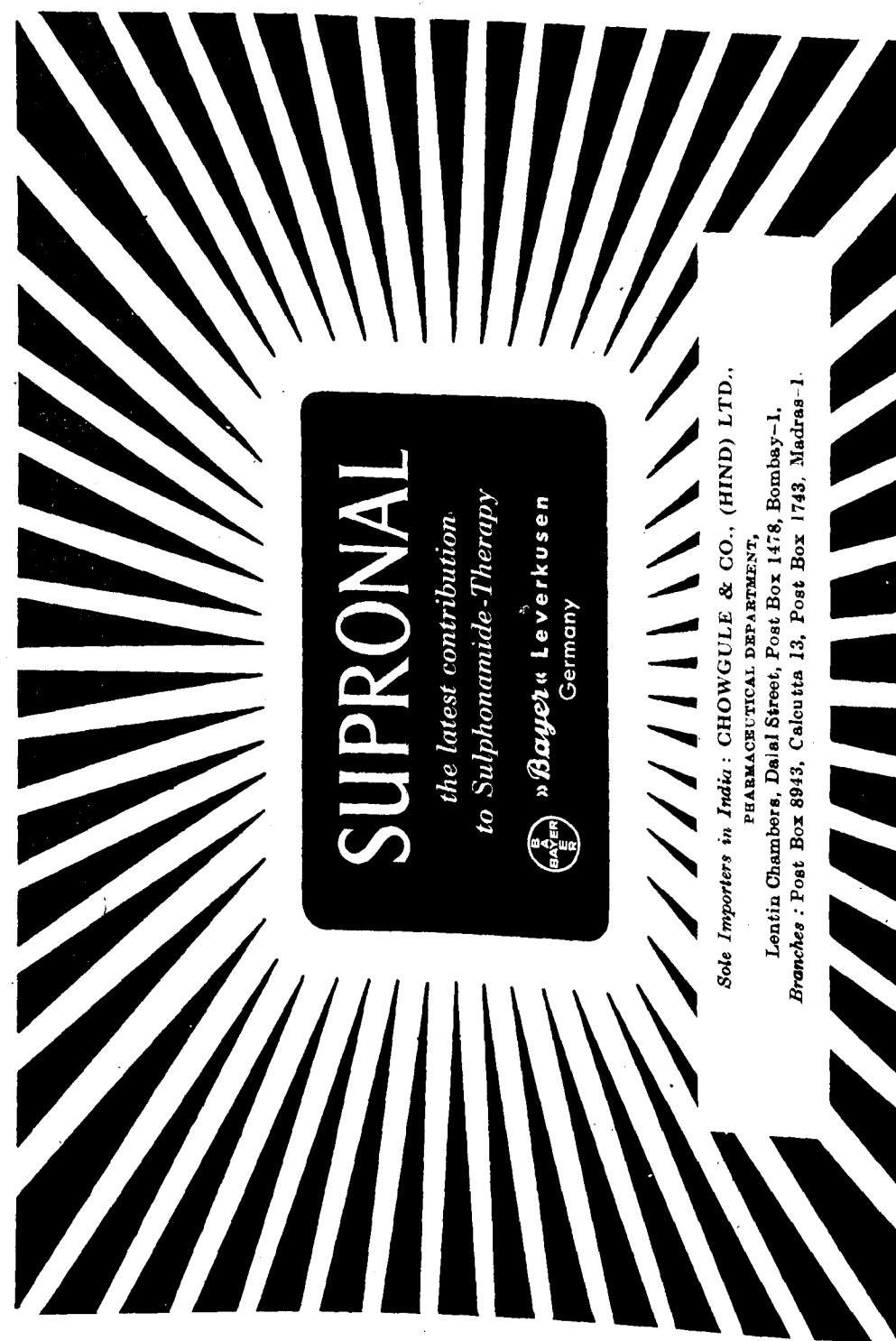
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*Against the
Anaemias of
the Tropics*

*In
Liver*

VITAMIN B12

IS NEVER MORE EFFECTIVE THAN
WHEN GIVEN IN NATURAL COMBINATION
WITH OTHER IMPORTANT FACTORS IN A RELIABLE LIVER EXTRACT

PERNÆMON FORTE

A new highly refined liver extract
concentrated to assay at 20 micrograms of
Vitamin B12 in each 1 c.c. ampoule
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Also in 5 c.c. vials.

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A new whole liver extract in 2 c.c.
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Vitamin B complex. (Boxes of 3, 6, 12, 50.)
Also in 10 c.c. vials.

Literature on request



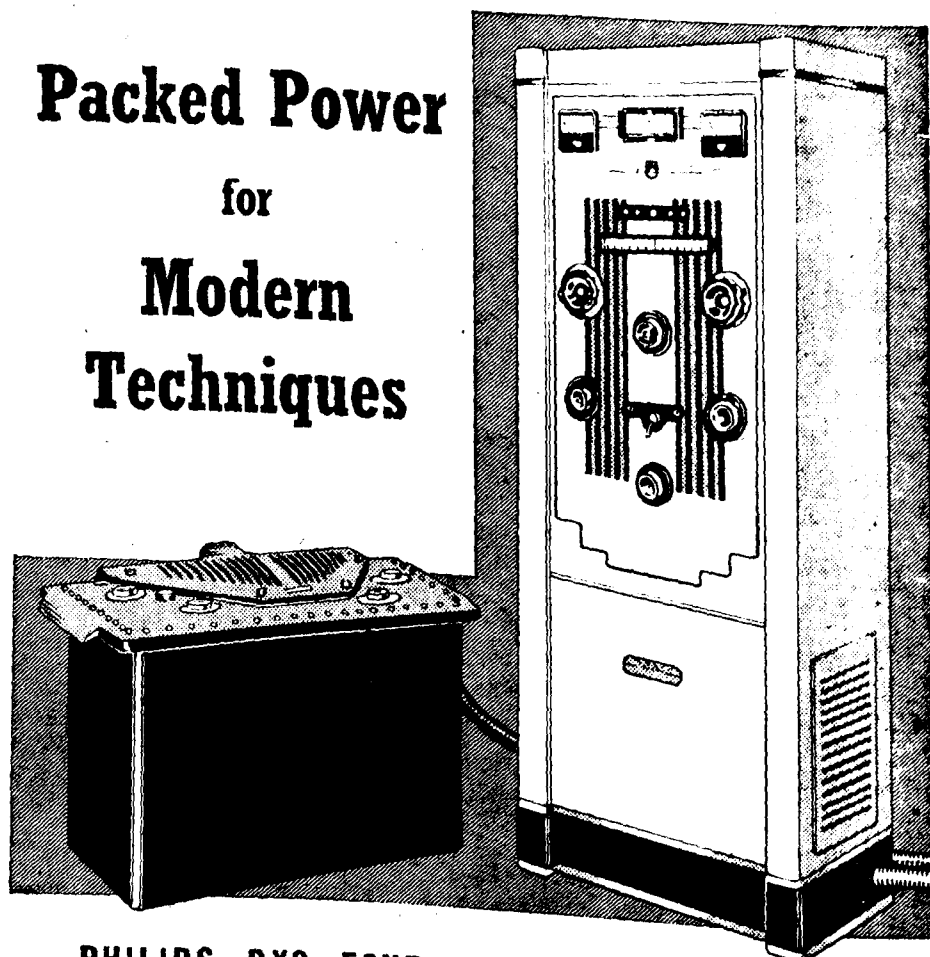
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PHILIPS DX3 FOUR-VALVE DIAGNOSTIC UNIT

This four-valve diagnostic unit by Philips positively compels attention. Its fine engineering features, its guaranteed performance and proved reliability place it unmistakably in the distinguished class. Proof that in the 'DX3' progressive radiological opinion has been very well interpreted is evident from the enthusiasm with which it has been received. Users praise the linear kV scale of which the reading remains valid irrespective of the load. They like, also, the elec-

tronic timer, the completely independent choice of exposure times and the precision now possible with repetitive techniques by the introduction of mains frequency compensation. They endorse, too, the 'Quantic' automatic control which exercises constant vigilance in the 'safe maximum' region and protects the tube against over-load. The 'DX3' is of medium output—100 kVp and up to 275 mA fitted with oil immersed valves and arranged for two tubes—stationary or rotating anode.

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Bottles of 4 ozs. & 1 lb.
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Vit-B complex in addition
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25, 100 & 1000 Tabs.

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CO. LTD., BARODA

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P.B. No.
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Acid Crysophenic oz. 3-8; Acriflavin 5 gm. 2-1	Easton Syrup 1 dr. 100 2-8; 1000 "	21-0
Adhesive Plaster U.S.A. 1/2 x 5 yds. doz. 6.0	" 1 dr. 100 3-8; 1000 "	35-8
" P.D. 1 x 5 yds. " 11 8	Ephedrin Hydro 1 gr. 25 1-0; 100 "	2-8
Argenti Nit. Cryst. 5-8; Argylol Eng. oz. 6-0	Laxative Vegetable 100 2-4; 1000 "	16-0
" Stick 5-0; Protargol " oz. 6-12	Nicotannic Acid 0-5 gm. 500 "	4-8
Bayer's Atebrin 15 1-0; 300 tabs. bot. 11-8	Sodamint 100 0-14; 1000 "	2-8
" 0-1 gm. lamp. 0-12; 50amps. box 25-8	Soda Citrate 2 gr. 100 0-13; 1000 "	3-12
" 0-03 gm. 2 amp. 3-4 25 amp. " 30-0	Sulphadiazine 25 3-0; 100 "	12-0
" Luminal 10 tab. 1-2; 50 tab. 4-4	" 500 52-0; 1000 "	90-0
" Campolan 5-14; Luminal 10x1cc. box 5-10	Yeast 100 tabs. 1-8; 1000 tabs. 6-8	
Boots Acriflavin 500 tabs 4-0; Burnol ea. 1-2	Eng. Belladonna Plaster doz. 7-8	
" Plurvite 100 caps. 7-8; Gastomeg 2oz 1-2	" Caffein Soda Benzoat 12 amps. box 2-4	
B.D. Stethoscope 23-8; Triple each 39-0	" Mop Iodine (External use) 6 amps. " 0-4	
Breast Pump. Ind. 1-2; Ger. 2-2 U.S.A. 27-0	" Procain Hydrochloride 1% 3cc. 25 " 4-8	
British Schering:—	F.L. Durex 0-14; Silvertax doz. 0-12	
Atophan 20 2-14; 100 tabs. bot. 13-0	" Paragon Washable 3-0 Crocodile " 9-0	
Cylotropin amp. I.V. or I.M. " 5-0	German Stethoscope Complete each 11-8	
Veramon 10 1-9; 20 2-14; 100 tabs bot. 11-8	Glass Rods 1-12; Cork Screw " 1-0	
B.W. Atrophin Sulph 1/100 gr. 20 tabs tube 0-8	Glycerine or Ear Syringe Metal 2 oz. each 6-4	
" Emitin hydro 1/2 gr. 100x1cc. " 80-0	" Syringe Plastic 1 oz. 3-2; 2 oz. " 4-2	
" Sulphagunadine 100 2-12; 500 tabs " 13-8	Glaxo D 1/2 lb. 18-0; 1 lb. doz. 30-0	
" Sulphetone 100 15-0; 500 tabs. bot. 60-0	" Adexolin Liq. 14 cc. 2-0; 100 caps bot. 6-0	
" Digoxin 25 2-0; 100 tabs bot. 5-8	" Berin 1 mg. 25 tabs. 0-9; 100 tabs. " 1-2	
Cinchona Febrifuge Eng. 31-0; L.P. 1 oz. 3-8	" 1 mg. 500 " 5-8; 1000 " 10-12	
Carnick's G.W.:—	" 50 mg. 10cc. 4-10; 100 mg. ea. 7-10	
Erythgen Liver Ext. 10 c.c. vial 3-2	" Fersolate 100 1-10; Codopyrin 10tab. 0-12	
Hormotone "T" 40 tabs. 9-0; Incretone ea. 7-0	" Vitamin B12 6x1 cc box 5-0	
Hormotone 50 tabs 5-12; 100 tabs. " 9-0	" Erbolin 10 tab. 1-6; Kapalin Liq. " 2-4	
Carter Liver Pills 16-8; Cactina Pillets doz. 58-8	" Celin 6x1cc. box 5-0; 6x1cc. box 5-4	
Catheter I.R. Ind. 8-4; German " 18-0	" Minadax Syrup 2-14; Ostomalt 1/2 lb. 2-4	
Ciba's Cibazol 250 tabs bot. 17-8	Huxley's Nervigour Plain 42-0 Formate doz. 42-8	
" Coramine Liq. 15cc. 3-14; 20 tabs. 3-5		
" 17cc. 5 amps 2-12 20 amps 10-8		
" Enterovioform 20 2-14; 100 tabs bot. 12-4		
Clinical Thermometers 1/2 min:—		
German Eng. Japan, U.S.A. Zeal, Hick's		
Rs. 24-0 25-0 16-8 25-8 37-8 52-8 doz		
Dispensing scale 4-8; Sup. each 5-8		
Douch fitting set Ind. 10-8; Italy doz. 15-0		
Ethyl Chloride Spray 100 gm. Eng. ea. 46-8		
Evan's Camphor-in-Oil 3 gr. 12x1 cc. box 1-0		
" in Ether with Oil 3gr. 12x1cc. " 1-8		
Evan's Mercury Binioidide 12 x 1cc. box 0-10		
" Sodium Glycerophos 3 gr. 12x1cc. " 0-10		
Endo's Emitin Hydro 1/2 gr. 6x1 cc. " 2-2		
Endocrine—Spicer's Eng.—		
Hydrageri Iodidum Rubrum 12x1 cc. box 0-6		
Sodium Cacodylate 0-01 gm. 12x1 cc. " 2-0		
Eu Quinine Holl 7-4; Java 7-8; Roche oz. 8-8		
Eye Dropper Usa type 0-5 Finger Stall doz. 1-0		
Elastoplast 2 1/2 x 5 yds. 2-4; 3x5 yds. each 2-8		
Fountain Pen Battery each 4-0		
Feeding Cup E.I. 33-0; China doz. 9-12		
Eng. Tablets.—		
Acriflavin 500 3-0; 1000 tabs. bot. 5-8		
Aspirin 5x100 0-14; 1000 " " 6-14		
" Caffein 100 2-4; 1000 " " 14-8		
Blaud Pill 5gr. 100 0-14; 1000 " " 8-0		
" C/Aloin 100 1-6; 1000 " " 8-8		
" C/Cascara 100 1-5; 1000 " " 8-8		
Calcium Gluconate 7 1/2 gr. 100 " " 1-8		
" 7 1/2 gr. 1000 " " 9-0		
" Lactate 5gr. 100 0-15 1000 " " 6-4		

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Hypo. Syringe Leur Lock Nacket:—

B.D. (C.N.) 2cc. 5c.c. 10cc. 20cc. 30cc. 50cc.	Quinine Bihydro Saccaros Solu. 10 gr. 50x2cc. Ind. " 9-12
7-12 13-4 15-0 17-0 26-0 33-8	" Bisulph How 2x100 3-2; 5gr. 100 ea. 7-8
" (S.N.) — 14-12 16-8 19-8 28-0 34-0	" B.D.H. 5 gr. 1000 tabs. bot. 46-0
Ideal (C.N.) 7-4 12-12 14-8 17-8 21-0 33-8	" How 5 gr. 1400 tin 88-0
I.C.I. Pamaquin 0-2 grm. 300 tabs. bot. 1-0	" Hydro. How 1 oz. 8-0; Bihydro oz. 8-8
" 0-1 grm. 500 " 1-4	Quinine Sulph How 76-0; Java lb. 72-0
" Paludrin 3 grm. 8 tabs. 0-7-6; 500 Tin. 26-0	" 1 oz. 7-0; Ind. oz. 3-14
" 1 grm. 1000 tabs. " 28-0	" Govt. B.P. 47-0; Std. lb. 42-0
" 2cc. 5 amps. 3-4; 2cc. 25 amps 11-4	Quinacrin USA 1000 9-0; 100 tabs. bot. 1-0
J.J. Belladonna Plaster doz. 10-8	Roche Redoxon 20 2-2; Saridon 10tab each 1-12
Lactometer Zeal. 6-4; Indian each 0-10	" 6x2 2cc. 6-14; 50x2 2cc. box 58-8
Lavandar Smelling Salt Eng. " 13-8	" Forte 20 tabs. tube 7-8
Litmus Paper Book Assor each 5-12	" Benerva 6x1cc. 3-14 box; 5 mg. 100 tabs " 3-12
Lumbar Puncture Needle each 0-8	" Prostigmin 20 tabs. 5-12; Thiacol 1 oz. 3-8
Leukoplast Elastic 1x3 yds 2-0	Rubber Gloves "7 1/2" or "8" USA per pair 1-4
" 3x5 yds 2-4; 2 1/2x5 1-0	Scissors "5" 2-0; Scalpel "5" each 1-12
Lilly's "Gentian" Violet Jelly 4 oz. 0-10	Sloans Liniment 22-8; Veganin 10 tabs. doz. 16-8
" Sulphanilamide Cream 4 oz. " 40-8	Sulphanilamide powder 1 oz. 1-4; 1 lb. 10-4
M. & B. 693, 100 tabs. 9-0; 500 tabs. tin 18-8	" 5 grs. 1000 tabs. U.S.A. bot. 6-8
" Soluble 1 gm 25 amps box 5-0	Sulphathiazole Boots's 500 tabs. tin 24-8
" Mercurio Chrome 5 gm. box 5-0	Suture Needles 0-4 Saline Needle each 1-14
" Acetylarsan 10x2cc. box 3-14	Stethoscope Rubber Tubing Per yard 0-8
" Stovarsol 4 gr. 30 tabs " 29-0	" Plastic Tubing " 2-0
" Thiazamide 100 7-0; 500 tabs " 25-0	Sterilizer Nickle "6" 15-0 "8" each 21-0
" Soluseptasine 20% 25x5cc. box 20-8	Saline Apparatus 300 cc. 9-0; 500 c.c. " 12-0
" Sulphagunadine 500 tabs. tin 46-8	Spatula Bolus 4" 1-0; 5" 1-4; 6" " 1-8
" Sulphatriad 100 9-12; 500 tabs " 9-10	Spirit Lamp Glass 2 oz. 1-4 4 oz. " 2-8
" Propamidine Jelly 1 lb. bot. 1-11	" Metal 2 oz. 2-14 4 oz. " 3-12
" N.A.B. 15 1-2; 3 1-5; 45 1-8; 6gm. ea. 1-11	Silk Worm Gut 1-12; Horse Hair 100 Strand " 2-0
Marmite 1 oz. 0-6; Marmite 2 oz. bot. 0-10	Stomach Tube with Ball & Funnel Eng. " 12-8
Maclean's Stomach Pow. Med. doz. 19-8	" German " 10-8
Measure Glass 1 dr. 0-8; 2 dr. each 0-9	Stethes cope Bowel Chest Piece " 12-0
" 1 oz. 0-9; 2 oz. " 1-2	" B.D. Type " Ind. " 12-0
" 4 oz. 0-12; 8 oz. " 5-0	Silk Ligature any number Ind. each 0-12
Menthol Cryst 1 oz. 10-8; Thymol 1 oz. 2-4	" Eng. " 1-8
Measure Glass U.S.A. 4 oz. each 5-0	Tongue Spatula 1-8 Folding each 2-4
" 16 oz. bot. 27-0	
P.D. Chloromycetin 12 Caps. bot. 27-0	
" Benadryl 50 cap. 6-8; Combex 10 cc. 6-12	
" Camoquin 3 tabs 2-0; Metatone 12 oz. ea. 7-4	
" Ferradol 1 lb. 8-8; Benadryl Elixir 4 oz. 4-0	
" Dinaltin Sodium 100 caps bot. 6-4	
" Emitin Hydro 1/2 gr. 6x1 c.c. Box 8-10	
" 1 gr. 6x1cc. " 8-10	
P.D. Liver Ext. 2 U.S.P. 10 c.c. vial 4-8	
" 5 U.S.P. 10 cc. vial 8-8	
" Promin Solution 5 gm. 12 1/2 cc. each 3-4	
" Vibex 50mg. 5c.c. 3-0 100mg. 6cc. ea. 4-6	
Pfizer's Penicillin 1/2 lac 12 tabs. box 3-8	
" 1 lac 12 tabs. " 6-8	
" Terramycin 16 caps bot. 39-0	
Plastules Liver Folio 30 caps doz 70-8	
Peacock Bromide 10-0; Chionia bot. 9-0	
Personal Weighing Machine U.S.A. each 46-8	
P.A.S. Italy 250 tabs 15-0; Italy 100 bot. 7-8	
" Italy 100 gm. 6-12; 250 gms. tin 18-4	
Quinine Bihydro How 105-0; Java lb. 98-0	
" How 2 gr. 100 4-0; 5x100 bot. 9-8	
" 15 gr. 2cc. 5 amps. Italy box 1-8	
" 10 gr. 2cc. 12 " B.W. " 5-10	
" 10 gr. 2cc. 100 " " 43-8	
" 10 gr. 2cc. 100 " P.D. " 56-8	
" 10 gr. 2cc. 100 " B.D.H. " 33-0	
" 5 gr. 1cc. 100 " " 27-0	
" 5 gr. 1cc. 6 " " 1-14	



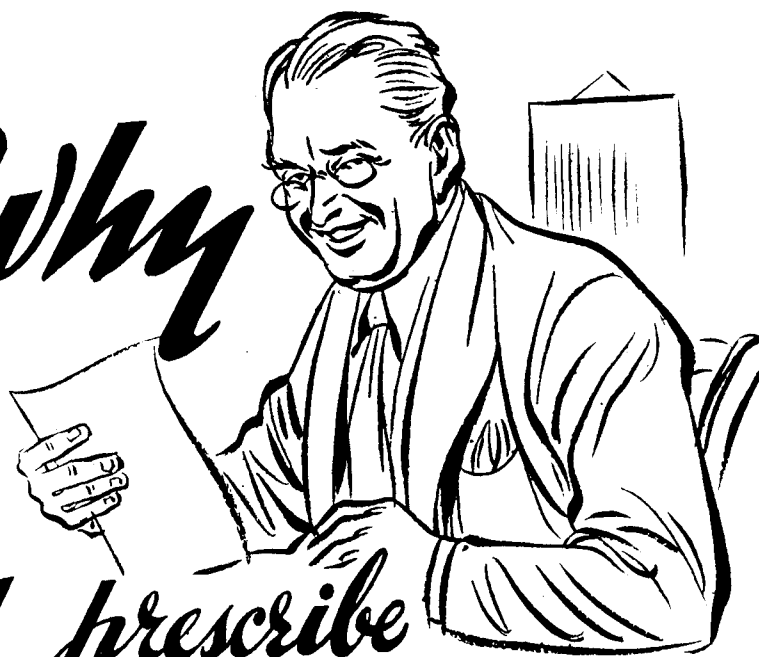
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 Supplemented with
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A highly potent water soluble extract containing all anti-anaemic principles and extrinsic factors from healthy young sheep liver, with added standardised vitamins - suitable for intramuscular injection. Photometrically standardised. For tropical macrocytic anaemias, particularly those refractory to ordinary whole liver extract. Boxes of 6, 25, 50 and 100 ampoules of 2 cc; also 10 cc vials

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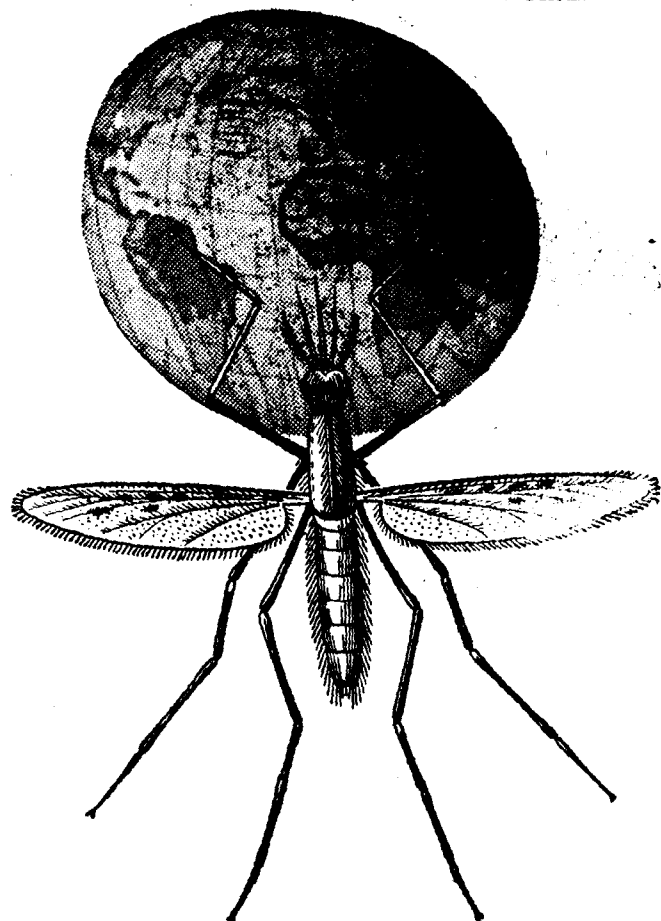
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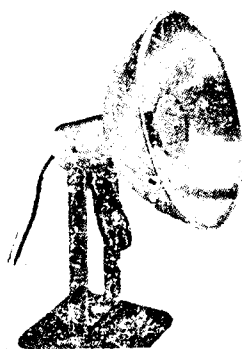
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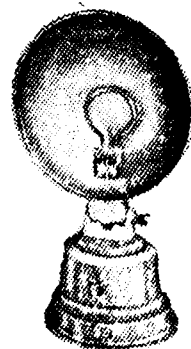
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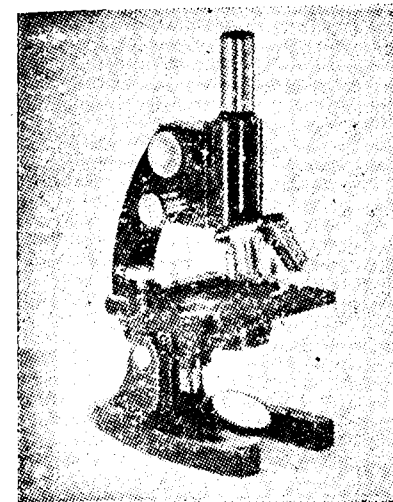
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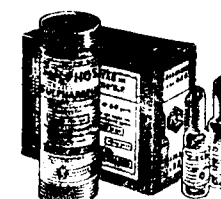
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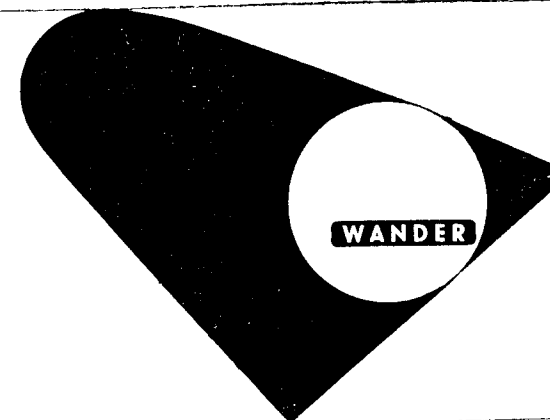
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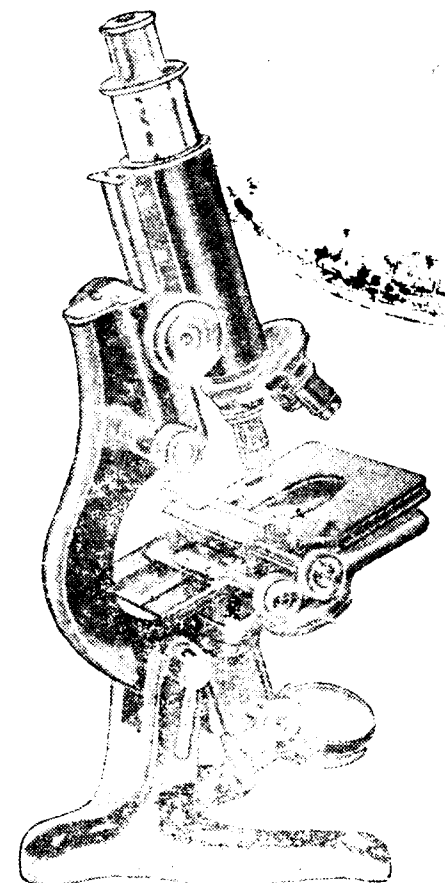
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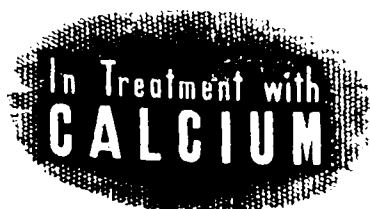
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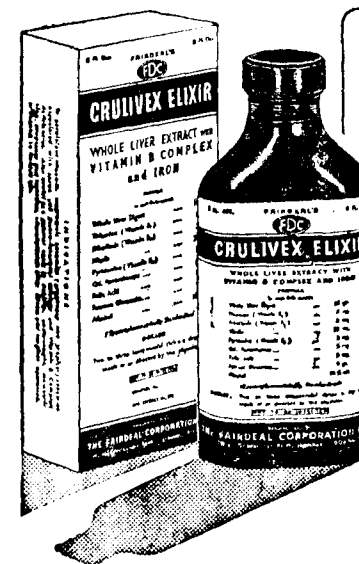
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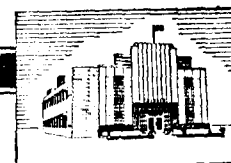
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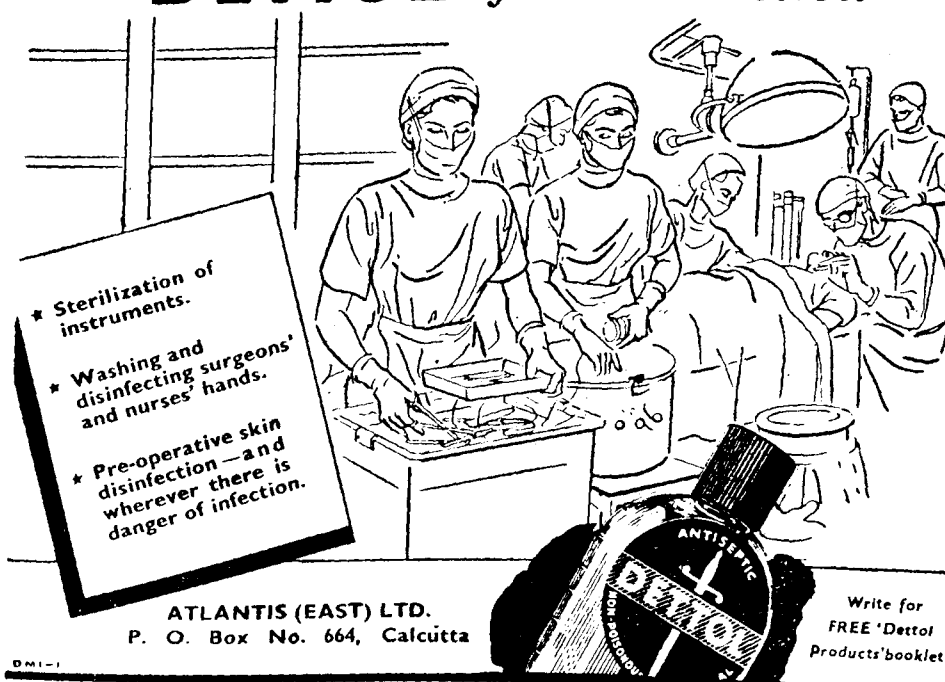
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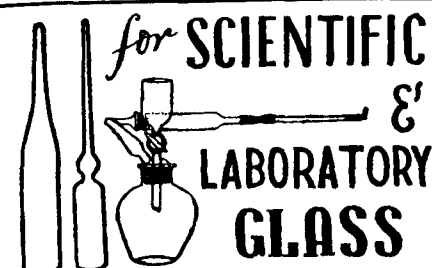
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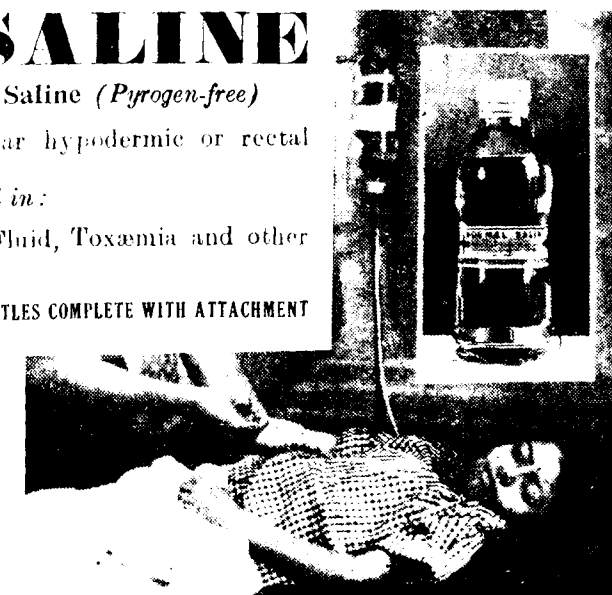
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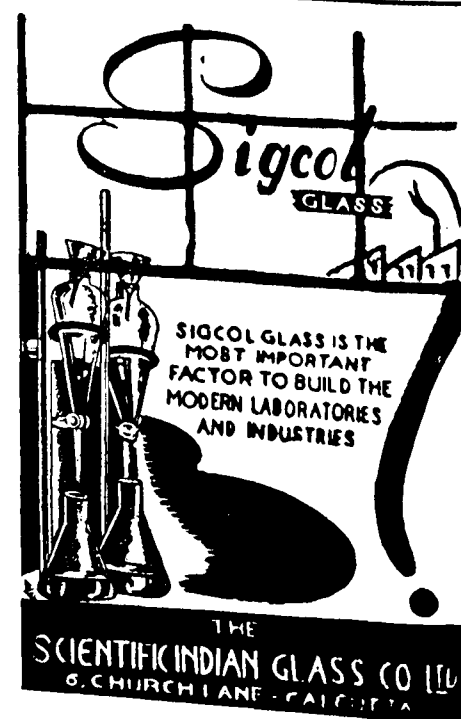
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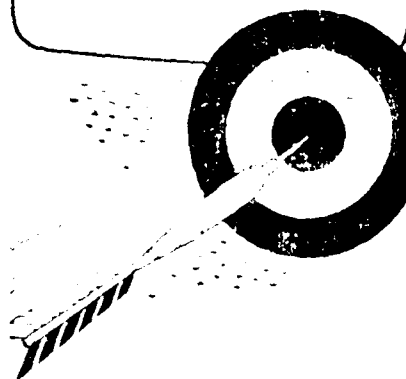
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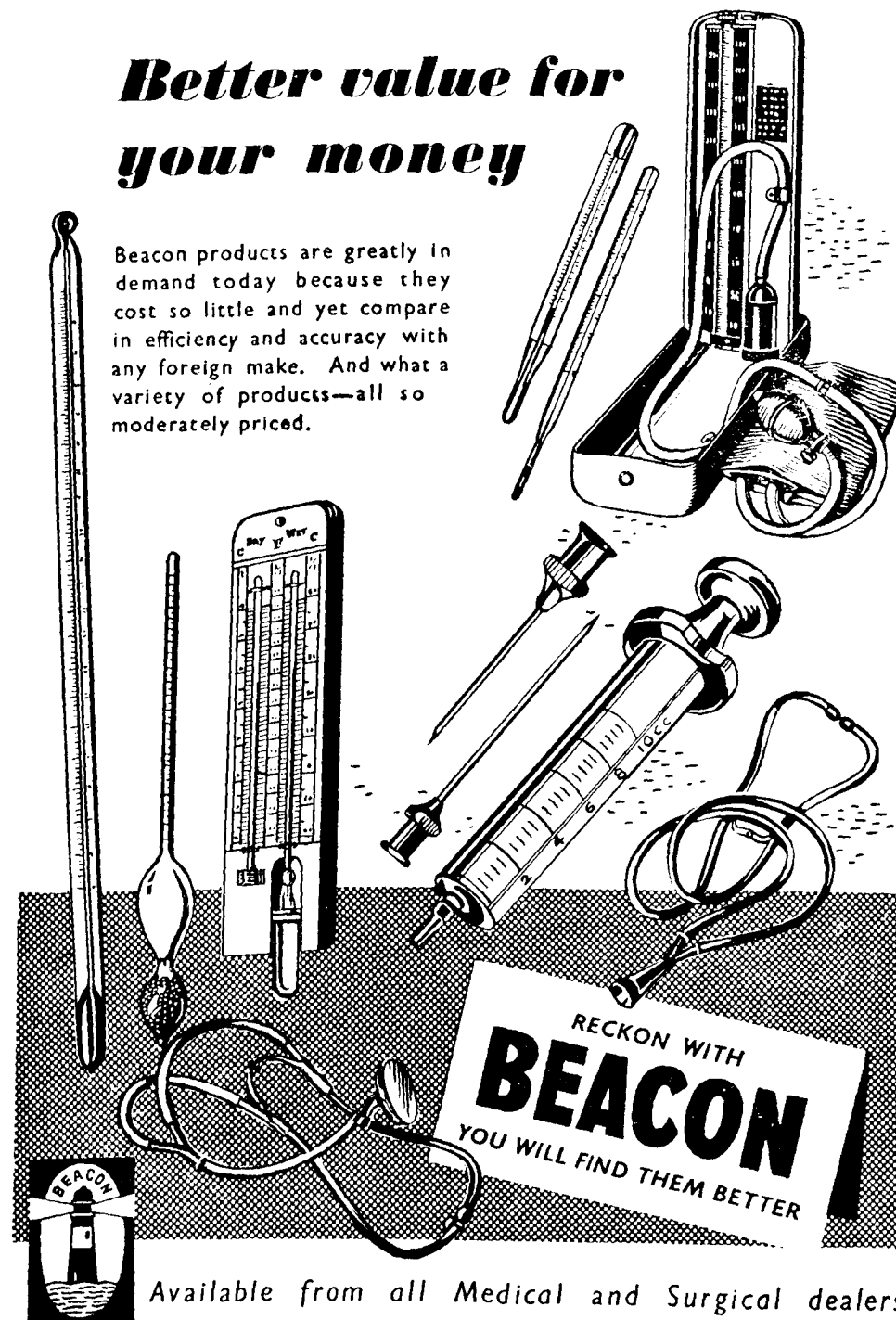
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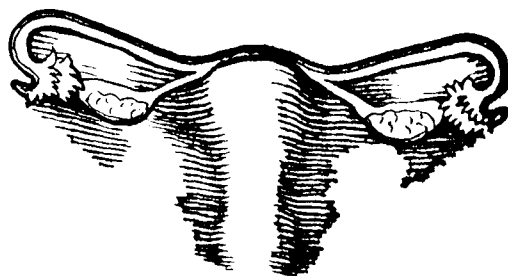
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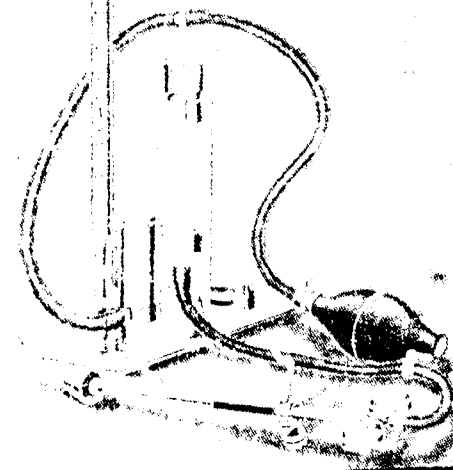
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No. 5

Original Articles

CONCEPT OF MYOCARDIAL INSUFFICIENCY AND THE MODERN TRENDS IN ITS TREATMENT*

PART I.

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MOST of the clinical conditions end sooner or later in circulatory or cardiac failure. It is, therefore, a condition commonly encountered in medical practice. The nature and the treatment of cardiac failure has continued to attract the attention of the clinicians and the experimental investigators for many years past. The fundamental step which put the phenomenon of heart failure on a sound experimental basis was taken by the work of Starling, Wigger, Katz and others. With his heart-lung preparation Starling established the Law of Heart so fundamental for the clinical study of cardiac failure. It enunciated that 'within physiological limits, the larger the volume of the heart, the greater the energy of contraction.' Thus dilatation of the heart is not solely a manifestation of impaired contractility and in itself purely deleterious to the function of the myocardium, but may at times be a useful compensatory process serving to increase the capacity for work of the dilated chambers. For this reason Rosenbach introduced the term 'Hyper-diastole', meaning thereby the supernormal filling of the cardiac chamber during diastole.

* Specially contributed to THE ANTISEPTIC

Since then the progress in the investigation of myocardial insufficiency has been rapid. Quantitative methods have been introduced for the measurement of some of the fundamental circulatory variables in health and disease. The estimation of cardiac output, previously hampered by clinical difficulties, has been achieved by means of cardiac catheterization. In 1929, Forssman passed a ureteric catheter through his own median basilic vein, into his right auricle. He then walked to the X-ray department and had it photographed *in situ*. In 1932, radio-opaque material was passed through the catheter into the heart by Monis and Carvalho, in Spain, and pictures of the pulmonary vessels were obtained. In 1941, Cournand and Ranges left the catheter in position for an hour, while making successive observations, clotting being prevented by running saline slowly and continuously. This new method led to important advances in three directions:—

- (1) It has enabled the measurement of pressures in the right auricle and ventricle directly.
- (2) It has enabled the accurate estimation of the cardiac output.
- (3) It has advanced angio-cardiography by introducing radio-opaque material directly in heart.

Here mention should be made of the introduction of Ballistocardiograph by Starr in 1941, for the purpose of the estimation of the cardiac output. It measures the recoil of cardiac contraction. The principle is that the blood ejected from the heart in systole makes the body recoil towards the feet, as it moves towards the head. Then as the blood column moves down along the descending aorta, the recoil is in the opposite direction. These movements are transmitted to a suspended table on which the patient is lying, and are photographed. The size and shape of the deflection obtained enable the output to be estimated. By this method cardiac output can be measured during relaxed condition of the patient, and vascular punctures and auricular catheterization are obviated.

A method of investigating the volume of the heart was devised by Nylin, in Stockholm, in 1943. Two simultaneous skiagrams are taken at right angles to each other. Transverse and A.P. diameters of the heart can then be measured. From these findings, accurate volume of the chambers can be calculated.

Prinzmetal, in 1949, introduced Radio-cardio-cardiography to measure the emptying time of the heart. Radio-active Sodium is injected intravenously and the concentration of the particles is obtained by a Geiger-Muller counter and recorded on a revolving drum. The method is useful in three ways:—(1) It estimates delay from the chambers; (2) It measures the emptying time; and (3) It indicates filling pressure separately for each chamber. This

method is expected to be useful in adding to our knowledge of hæmo-dynamics in cardiac failure.

John Hutchinson introduced 'Vital Capacity' Test in 1846, for use in pulmonary diseases. Peabody, in 1921, applied the method to the problem of cardiac dyspnoea. The test is quick and easy as you all know. A young athlete may puff in 5000 c.c. while the patient with cardiac failure barely manages to put in 1000 c.c. The prolonged ending by squeezing in the last few hundreds has proved to be a functional test of emphysema, and in lower ranges is seen also in patients with cardiac failure following emphysema.

In 1926, Blumgart and his associates injected a radio-active substance into the basilic vein and were able to detect its arrival at the brachial artery of the other arm. Thus, they were able to measure the time taken by the blood to flow up the vein to the heart, through the pulmonary circuit to the left ventricle, and finally out in the brachial artery. Many other simpler but less accurate methods have been used to the same end, *viz.*, to estimate the circulation rate. Endpoint in the different tests is different, *viz.*, taste in Decholin, Mag. Sulph and Saccharin tests, flushing of the skin in Histamine test and Amyl Nitrite test, odour of breath in Ether test, etc. Apprehension, thyrotoxicosis, anæmia, emphysema increase the rate. These are the conditions in which the cardiac output is high. The rate is slow in myxœdema, polycythæmia, and congestive cardiac failure. In cardiac failure the slowing may be about thrice the normal time.

These modern methods of investigation have tended to remodel our views on cardiac failure. Using these methods McMichael and Sharpey-Schafer have been able to show that cardiac failure may be present with output still above the normal. They also showed that the cases of cardiac failure, with high output, have a fast circulation rate, while those with lowered output have a slow circulation rate.

Critical consideration of newer concepts is not only desirable but also actually necessary for the scientific handling of patients. Some take the extreme view that the congestive heart disease and circulatory failure result primarily from renal changes and disorders of salt and water mechanism. It must be admitted that the œdema is the most important manifestation of myocardial failure and dissipation of œdema is accomplished by increasing the output of Sodium in urine. But the fact remains that the myocardial insufficiency begins in the heart muscle. The generally accepted conceptions of the functional origin of the symptoms and signs that accompany the weakening of the heart muscle support mainly the back pressure failure. But the evidence of forward failure in some conditions is definite. The blood flow through renal glomeruli in either condition is inadequate and Sodium is retained, and œdema appears. Thus, some revision of our old concepts is necessary in the light of modern

methods. A broader and more comprehensive concept of genesis of signs and symptoms of myocardial insufficiency must be evolved which may modify the treatment as well.

Mechanical work accomplished by the ventricle depends upon its fibre length. Starling has pointed out that oxygen consumption increases with fibre length. As long as oxygen supply keeps pace, the strength of the ventricular contraction and the cardiac output will respond to increasing dilatation. Circulatory equilibrium will be maintained, upto the critical diastolic volume and muscle stretch, beyond which oxygenation lags and ventricles fail to empty themselves. Inadequacy of the oxygen supply to the myocardium, especially the amount and availability of extra oxygen necessary for the accomplishment of extra mechanical work, will cause myocardial efficiency to drop off, and a relative insufficiency in the cardiac output develops. The ventricular cavities later dilate with an absolute decrease in the cardiac output. The classic picture of congestive or backward heart failure develops as the gradient of blood flow between the pulmonary and the aortic systems drops off, and as the blood accumulates in the venous channels. This backward failure appears early in rheumatic carditis and coronary insufficiency, while there is still considerable myocardial reserve¹.

Circulatory or forward failure may develop in several conditions, in which the arterial bed is widely dilated, as in aortic regurgitation, severe anemia, hyperthyroidism and beri beri. In these conditions, during failure, the cardiac output has been shown to be normal or actually increased, but still inadequate. The minute volume circulation is normal or above, yet the blood flow, actually provided to the tissues in the widely dilated bed, may still be below the critical minimum required for the body as a whole.

As a result of this new orientation of the views, two types of cardiac failure can be visualized, *viz.*, one with diminished or low congestive failure, and the other with normal or supernormal but yet inadequate ventricular output, and high pulse pressure resulting in forward or circulatory failure². In both types acute and chronic develops as a result of acute insufficiency or left ventricular failure with extreme dyspnoea or orthopnoea and acute pulmonary oedema. The chronic backward failure may arise in myocarditis, myocardial hypothyroidism, chronic pericarditis etc. Here, besides lung congestion, there are signs of right ventricular failure with engorgement of liver, ascitis and dropsy in dependent parts.

Acute cardiac failure occurs in cardiac standstill, shock, hæmorrhage, extreme tachycardia or bradycardia. Chronic forward failure, with high systolic output and high pulse pressure, yet insufficient minute volume circulation occurs in aortic

regurgitation, systolic hypertension, hyperthyroidism, arterio-venous shunt, congenital lesions, anemia and beri beri.

Clinical manifestations which are considered evidence of myocardial insufficiency have their origin in the failure of heart muscle in ventricular contraction, to supply the tissues with blood adequately. At a certain critical stage heart is not able to increase the ventricular output relatively or absolutely in response to the demands of adequate circulation. Cardiac output then falls below the level necessary for adequate renal function and oxygenation of tissues. Now the clinical picture of the 'high output failure' and 'low output failure' is almost identical, irrespective of the fact whether the inadequate output is relative or absolute.

When the myocardium begins to fail, the following important events take place :—

(1) The cardiac output falls relatively or absolutely, according to whether it is 'high' or 'low' output failure.

(2) There is retention of sodium and water in the extracellular tissues due to inadequate renal circulation.

(3) The venous pressure rises. This can be attributed to : (a) reflex veno-constriction as claimed by McMichael and Sharpey-Schafer; (b) increase in the blood volume; and (c) weakness of myocardium.

(4) The blood volume increases, due to hæmodilution, resulting from retention of salts by the kidneys.

(5) The circulation rate slows.

(6) Starling noted constriction of the arteries with dilatation of the arterioles and pooling of the blood in the veins. Extra blood is also contained by the dilated chambers of the heart. Both these facts necessitate an increase in the blood volume.

The sequence of events is by no means continuous, and is complicated by the effects of rest and treatment. (Treatment will be discussed in a subsequent paper).

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1. Hottmann—'Myocardial Insufficiency,' Jour. of Amer. Med. Assoc., 11th June, 1949, p. 509.
2. McMichael—'Pharmacology of the Failing Heart,' Brit. Med. Journal, 27 Nov. 1948, p. 927.

"Jayashree,"
Deshmukhwardi,
Poona City.

SEDATIVES IN HEART FAILURE*

S. M. BAXI, M.D.,

Hon. Physician, Irwin Hospital, Jamnagar.

THE patients with heart failure are often seen in a very anxious state. Part of the anxiety is psychogenic, part is due to repeatedly disturbed nights, and part, of course, is due to the failing circulation.

A right sedative given at the right time may make all the difference in the prognosis. More often than not, the right sedative is Morphine. But other sedatives have their proper place. The various sedatives described in this article had been administered to some 30 patients with heart failure. Majority of the patients were in right and left ventricular failure. At least one patient had only left ventricular failure following hypertension. It is not meant to belittle the importance of other standard measures such as Digitalis, Mercurials, etc., which in a way do help to sedate the patient.

Morphine.—This drug relieves the attack of cardiac dyspnoea like a miracle. The dyspnoea is due to the abnormal stimulation of the respiratory centre and disturbance in the reflex respiratory regulation. The reflexes originate in the lungs and the chemoreceptors in the carotid-sinus. Pulmonary congestion produces reflex hyper-ventilation. This may exhaust the patient by increasing his burden. Morphine helps by diminishing the excitability of the centres. Morphine relieves dyspnoea through a depression of the central sensory perception. All of us who use Morphine rationally, have seen the gratifying results obtained in patients who have spent sleepless nights and restless days. These unfortunate people suffered just because Morphine was withheld from them. I vividly remember a patient in severe dyspnoea, who had not known what is sleep or rest for six days and nights, falling immediately to sleep after a deep intramuscular injection of 1/6 gr. Morphine. Next day he was a different man. He was extremely grateful for the rest he had. I felt that if there is any joy in the practice of medicine and cardiology it is this:

Morphine is described as "Second Digitalis." I feel that it is the "First Digitalis", because it gives prompt relief during the period taken by Digitalis to have a hold on heart failure. At this juncture, the contra-indication to Morphine must be stressed. In any pulmonary dyspnoea and in 'Cor Pulmonale' it is absolutely contra-indicated. Morphine does have anti-diuretic effect, but this objection should not weigh too much when subjective relief from dyspnoea is to be obtained.

Clinical experience as early as 1850 has conclusively shown that Morphine has no deleterious effects in heart failure and the deleterious effects sometimes observed were due to the gravity of the disease rather than to Morphine. My plea is, too much of time should not be spent in trials of Barbiturates, Chloral and Bromides when the vicious circle can be stopped by Morphine.

* Specially contributed to THE ANTISEPTIC.

When psychosis sometimes accompanies severe heart failure, Morphine and Barbiturates may be harmful. In such a condition Paraldehyde may be the drug of choice.

Dosage of Morphine.— $\frac{1}{6}$ gr. to $\frac{1}{4}$ gr. hypodermically once or twice in a day till the action of other therapeutic agents is established.

Codeine.—It is generally used for control of cough when cough is a very distressing feature, especially, in some hypertensive failures, it works wonders. Cough is described as equivalent of cardiac asthma. Codeine is only one fourth as potent as Morphine in its ability to cause subjective and respiratory depression. Sleep induced by Codeine is not so refreshing as by Morphine. Hence it cannot be relied upon solely in allaying distress in severe heart failure. In high dosage, it may cause excitement. In two patients, one with hypertensive failure and the other with failure due to mitral stenosis, the cough was so severe that it was the major element in apprehension. One of the patients was given three and half grains of Codeine in 24 hours with most gratifying results. The pulmonary congestion is the main cause of cough. Bouts of cough tend to increase the venous return to the right side of the heart and this overburdens the pulmonary circuit. Hence the relief after Codeine is obvious.

Pethidine (Demerol).—It does not depress the respiratory centre so much as Morphine does. But it is not as effective as Morphine. Its property of relieving smooth muscle spasm is an additional advantage which might be exploited in certain cases of cardiac failure with broncho-spasm. It does not excite vomiting. Hence it is particularly useful when Morphine produces vomiting. It is not superior to Morphine, and it does lead to addiction. Oral dose is not always effective. Intramuscular or subcutaneous dosage of 50–100 mgm. is commonly employed. In my experience the drug is quite satisfactory, though I have never taken chance with it, in severe dyspnoea, which was not attended to for a long time. For such cases, I have always depended on Morphine.

One unique indication for Demerol, as contrasted to Morphine, is in dyspnoea of pulmonary origin and in Cor Pulmonale. Barach recommends Demerol in these conditions. I have no personal experience with this drug in Cor Pulmonale. In fact, I have never been bold enough to give it in this variety of heart failure, knowing the dangers of Morphine in Cor Pulmonale. Clinical trials of Demerol in Cor Pulmonale will be awaited with interest, because in this type of heart failure the physician is helpless as Digitalis does not help and is actually contra-indicated. I have given Demerol intramuscularly, to a patient with hypertensive failure, for a long time, with gratifying results.

Papaverine.—It is rarely used alone for its sedative action. Its coronary dilator action may be a quality worth exploiting. Some continental authorities have used it frequently as a sedative

in heart failures. But the consensus of opinion is not in favour of relying on it as opposed to Morphine. Dosage is 30-80 mgm. intramuscularly or orally and 10-60 mgm. intravenously. Attempts are made by one manufacturer to combine Papaverine and Codeine in a single injection. Its usefulness in cardiac failures remains to be proved.

Barbiturates.—These have depressed action on the cerebro-spinal axis. In heart failure they are used mainly for their hypnotic effect. Sometimes, they are useful in allaying apprehension in a very sensitive patient. But they can never stand any comparison with Morphine. At this stage I should like to stress that in a patient with severe dyspnoea and restlessness no Barbiturate should be given instead of Morphine. Barbiturates are better given at night as hypnotics when circulation has improved after 2-3 days with Morphine and Digitalis.

For hypnosis Diallylbarbituric Acid (Dial) or Seconal or Amytal or a combination of Seconal and Amytal (Tuinal) are useful. I have found these agents useful in 15 cases.

For sedation, Phenobarbitone is the drug of choice. It is given in $\frac{1}{4}$ - $\frac{1}{2}$ gr. doses twice or thrice a day.

Chloral Hydrate.—It is one of the cheapest and most effective hypnotics. In dosage of 15-20 grs. it produces sleep. It is indicated when the patient with heart failure is not getting sleep because of nervousness. The same remarks apply to this drug as have been made for Barbiturates. It can also be given rectally in 5 to 6 ounces of water.

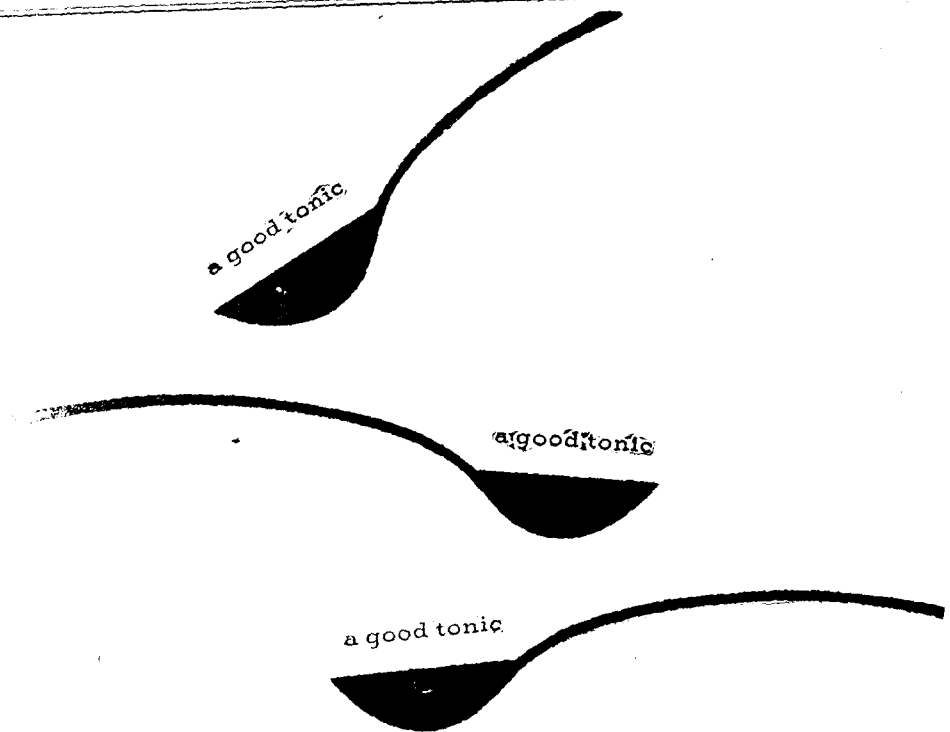
Bromides.—The same general remarks apply to this drug as for Barbiturates. A traditional combination of Chloral and Bromides is commonly used. It should be remembered that Bromides take two days before their action is evident. This is because, adequate concentration of the ion in extracellular fluids has to be reached. When rapid hypnosis is required, other hypnotics should be used. A single dose of Bromides can have no effect.

Paraldehyde.—It is a safe and effective hypnotic having the same place in the therapy of heart failure as the Barbiturates and Chloral. Its nauseating smell is the drawback. It may be given rectally 10-20 c.c. in two parts of Olive oil. It can be given intramuscularly 4-8 c.c.

In this article, even at the risk of some repetition, I have tried to put the various sedatives, in their proper place, in the management of heart failure. If used with proper understanding of the pathogenesis and pathologic physiology, these measures help to alleviate the sufferings of the patients.

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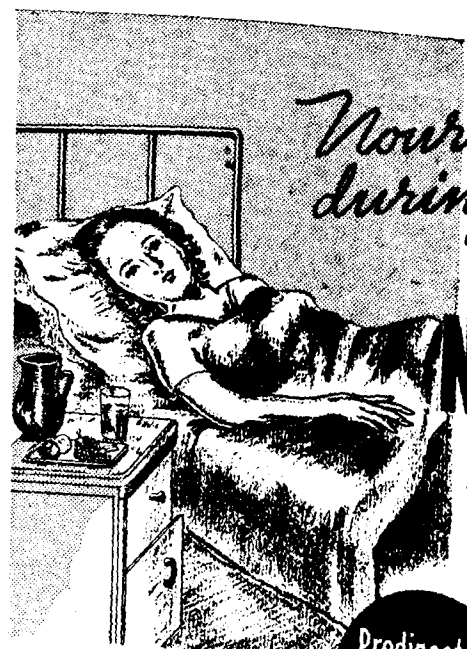
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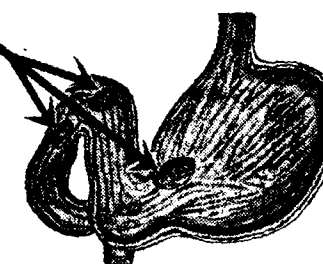
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NAS. 528

AUREOMYCIN — AN EVALUATION OF ITS PRESENT STATUS*

BRIJ-MOHAN BHARADWAJ.

Medical Officer, Civil Hospital, Mandi, (Himachal Pradesh).

THE subject for today's discussion 'Aureomycin' will be reviewed in the light of reports published in the medical press thus far. As it is, we cannot judge the merits or demerits of this powerful antibiotic in so short a time as two years within its discovery. Anyhow an attempt will be made, in this short paper, to present in a consolidated form, abstracts from the comprehensive literature that is available. Unfortunately, few reports have been published in this country and these too concern chiefly the typhoid group of fevers.

The year 1948 opened up a new chapter in the history of antibiotics with the announcement of the discovery of Aureomycin, by Dr. B. M. Duggar, of the Lederle Division, of the American Cyanamid Co. in New York. This antibiotic has been described by earlier observers as 'the most versatile of the antimicrobial drugs in present day use, with Chloromycetin a close second and with Terramycin, Polymixin and Bacitracin still running. Of course, time, experience and end results alone will show which of these, provided nothing new is discovered in the meanwhile, wins the race to subdue the widest range of bacterial activity with a minimum of toxicity and at a low cost. If medical research continues at the speed at which it has been working since the last fifteen years, it would not be inconceivable to dream of a drug having capabilities of destroying the malarial parasites, the cholera vibrio, Bact. typhosus, small-pox virus, End. histolytica, and lethal to the lepra and the tubercle bacillus, all in one pill; this would be indeed a dream fulfilled for many of us, who are already slowly but surely giving up the use of their clinical judgement and knowledge and are indulging in haphazard treatments. It is not a very rare occasion when we come across a patient who has been treated on the following lines for his fever: At the outset he is put on anti-malarial drugs and Salicylates; a few days later he is switched on to one of the compounds of the Sulpha group; thereafter he is advised a course of Penicillin injections and/or Emetine; if within a few days he has not improved or given up treatment he is given Streptomycin and Vitamin preparations; and if he unfortunately still survives financially, physically and mentally, he is sincerely advised to give a trial to Para-aminosalicylic-acid, or even Chloromycetin. Thanks to the prohibitive price of Aureomycin its reputation has not suffered like its companions in the field. I am sure if a patient like the one referred to above is examined a bit more carefully, history elicited more diligently along with the necessary

* Paper read before a meeting of the Clinical Association, Civil Hospital, Mandi.

laboratory and radiological aid, then a single chemotherapeutic agent or a judicious combination of any of these anti-microbial drugs that are at our disposal today, would have gone a long way in alleviating the suffering and preventing what I would term as 'a discouraging waste of time, money and energy.' Let us therefore be not led away by the huge array of antibiotics that we, by virtue of this noble profession, are privileged to use for the betterment of suffering humanity. The greater the number of such drugs the greater the need for an accurate diagnosis and hence a healthier prognosis, by the selection of the aptest therapy. Along with the knowledge of what these antibiotics will do, we must also bear in mind what they are unlikely to do, in order to avoid needless expense to the poor patient and disappointment to the physician. Homœopathic dosage of any antibiotic, as a rule, will do more harm than good. Hence adequate dosage of the specific therapy should be given a fair trial before it is condemned. Failures in treatment will then be far less than what they are today. Advantage should also be taken of the synergistic action of such drugs. "It should be remembered that Sulphonamide drugs, Penicillin, Streptomycin, Aureomycin and Chloromycetin, all attack and damage different systems in susceptible infecting micro-organisms. The intelligent exploitation of this knowledge will result in prompt and satisfactory cures of infectious diseases."¹

Let us now see what Aureomycin promises us before we are jewelled by this gold-coloured mould.

Pharmacology.—Aureomycin [also known as Duomycin] is a gold-coloured (crystalline hydrochloride) antibiotic, prepared from *Streptomyces Aureofaciens*, and which deteriorates rapidly in alkaline solution at room temperature.

Action.—The action of Aureomycin, according to Chandler and Bliss², is bacteriostatic rather than bactericidal. According to Finland *et al*³ most organisms do not become resistant to it as they do to Streptomycin or Penicillin. Price and his co-workers⁴ have demonstrated the existence of a synergistic relation between Aureomycin and Polymixin or Penicillin *in vitro*, and between Aureomycin and Penicillin *in vivo*.

Aureomycin, considered the most versatile of the antibiotics, has a range of activity overlapping that of both Penicillin and Streptomycin and extending into regions untouched by either. It has been found effective not only against a wide variety of gram-negative and gram-positive bacteria, many of the strains resistant to the other antibiotics, but against also those classes of very minute micro-organisms against which no effective weapon had previously been available. Its ability to traverse the meningeal barrier and appear in therapeutic amounts in the C. S. F. adds to its value in meningitis caused by susceptible organisms.

Aureomycin has been shown to be potent against all rickettsial, many bacterial, certain viral, and some parasitic infections. Before I go further into the details of the antibiotic potentialities of this drug it would be interesting to throw light on another function of Aureomycin as reported in the lay press⁵. In this short note is mentioned the growth-stimulating properties of Aureomycin. "According to the scientists of the Lederle Laboratories (Pearl River, New York), the addition of minute quantities of powdered Aureomycin to hog and poultry feed accelerated the growth of test animals by as much as 50%. Such a growth response "cannot be duplicated by any of the vitamins known at the present time, even when they are given in many times their normal requirements." Early medical reports on the successful use of Aureomycin in treating infectious diseases of children showed that the drug also increased the appetite, generally improved health, and sometimes stimulated growth. Doctors in many U.S.A. hospitals are now investigating the potentialities of Aureomycin in stimulating the growth of malnourished and undersized children. The vitamin-like qualities of Aureomycin were discovered by accident while Lederle Biochemists were studying Vitamin B₁₂, the anti-anæmia vitamin. Vitamin B₁₂, also a growth stimulator, is extracted from the fermentation residues left after production of antibiotics like Streptomycin, Penicillin and Aureomycin from soil moulds. The Vitamin B₁₂ extracted from the Aureomycin residue seemed to have more potent growth effects than those derived from other sources. The scientists after further research found the extra growth factor to be Aureomycin itself.

Requisite blood levels of Aureomycin.—Various workers have made attempts to determine the dosage of this drug to various diseases and consequently engaged themselves in obtaining blood levels after the institution of Aureomycin therapy in human beings and in laboratory animals; their results lead one to conclude that a dosage of 0.5 to 1.0 gm. is sufficient to maintain an effective blood level for about six hours. Dr. Perrin H. Long⁶, Baltimore, replying to a question during a discussion at the annual meeting of the American Medical Association in 1949, has very aptly cleared the position regarding blood level estimations of Aureomycin. He says: "I do not recommend determining Aureomycin blood levels as a routine procedure. I believe that if one sees the patient a couple of times a day and watches his temperature chart and his clinical condition one knows whether he has had enough Aureomycin; if his temperature is not down to normal in 48 hours and you are treating him for something that you know can be cured by the drug, then give the patient a little more Aureomycin."

Administration, absorption and excretion.—Herrel and Heilman⁷ have demonstrated that Aureomycin is readily absorbed into the general circulation and quickly distributed in many body fluids and tissues. It is capable of diffusing through the meninges,

the pleura, and the placenta, and is excreted into the bile as well as into the urine. The oral administration of 0.75 to 1.0 gm. promptly produces therapeutic serum levels (averaging 2-4 micrograms per c.c.) which are maintained for a number of hours and measurable activity may persist for as long as 30 hours. Lepper and his colleagues⁸ were able to detect Aureomycin in the cerebrospinal fluid in 6 out of 9 of the patients, the concentration seeming to depend on the height and duration of the blood levels. In one patient the breast milk was assayed and no Aureomycin was found, even with high blood concentrations. In all cases, the drug appeared rapidly and in high concentration in the urine.

Harned, Cunningham and co-workers⁹ found that following oral administration of Aureomycin Hydrochloride, the rate of excretion remained relatively constant for at least 6 hours, while after intravenous injection the excretion was rapid during the first two hours, slower between the second and fourth hours, and low between the fourth and sixth hours. Aureomycin was essentially without effect on the blood sugar, or on the activity of the isolated gut or uterus of guinea pigs or rabbits. No evidence of antipyretic or antihistaminic action was noted. It was found that Aureomycin was able to pass the blood brain barrier into the C.S.F. in therapeutic amounts, but no qualitative measurements were made. It appeared to be without effect on the central nervous system. No evidence of methæmoglobin formation was observed following intravenous dosage. Careful tests have shown no evidence of urinary impairment, jaundice, or changes in icteric index. Cephalin flocculation and prothrombin have been found normal. Repeated blood examinations have not indicated the development of anaemia or of any hæmolytic process, leucopenia or thrombopenia. Blood chemistry tests have shown normal values for total protein, albumin globulin content or ratio, cholesterol carbon dioxide, and alkaline phosphatase values. Aureomycin Lederle, is relatively non-toxic, but patients may become allergic to it in the same way that they become allergic to any other antibiotic. With the improvement in manufacturing processes and the elimination of impurities the side effects noticed following its use may also disappear.

On account of the nausea and vomiting that occurred following its use in some patients, earlier workers advised the use of Aluminium Hydroxide to combat this reaction, but recently Di Gangi, F. E. and Rogers, C. H.¹⁰ found that this alkali had a high absorption affinity for Aureomycin thus explaining the low blood levels of this antibiotic that have been observed clinically when Aluminium Hydroxide Gel was administered simultaneously. These workers treated several solutions of Aureomycin Hydrochloride with this Gel and after two hours assayed for potency both colorimetrically and bacteriologically, and they found that there was almost complete removal of Aureomycin from the solutions.

Waisbren *et al.*¹¹ reporting their observations confirmed (*in vivo*) the views of Di Gangi *et al.* They observed 11 human subjects prior to and after they were given Aluminium Hydroxide Gel. Ten of their subjects showed a decided drop in Aureomycin serum levels within 24 hours after they were given two tablespoonfuls of this Antacid with each 0.5 gm. dose of Aureomycin, thus proving that Aluminium Hydroxide Gel interferes with absorption of Aureomycin in the gut and may in certain infections lower the amount of Aureomycin in the serum and tissues below an effective blood level. Therefore Aluminium Hydroxide Gel must not be used along with Aureomycin.

Long⁶ suggests the use of Vitamins in amounts adequate to supply the total daily requirements of the accessory food factors to patients receiving Aureomycin for extended periods. His suggestion is based on the possibility that the disturbances of intestinal function often noted in these patients may produce subclinical vitamin deficiencies.

Toxic reactions.—Until recently the only side effects encountered in patients on Aureomycin therapy were:—Nausea, vomiting, anorexia, loose odourless bowel movements not amounting to a frank diarrhoea, due perhaps to its bacteriostatic action on the intestinal bacteria; excoriations around the anus; epigastric distress. These reactions did not prohibit the continuance of its use. Reactions following intramuscular injections were local pain and irritation at the site of the injection. No local effects were observed during intravenous therapy, or during instillations into the eye of the Borate (0.5%) solution.

Recently reports have appeared in the medical press pertaining to further undesirable reactions. Harris *et al.*¹² report rapidly developing mucous membrane changes in many female patients, attributed to Vitamin B deficiency through destruction of intestinal bacteria. Peck and Feldman¹³ have reported three cases of allergic skin eruptions due to Aureomycin. One eruption was urticarial in type, the second presented an erythema-multiforme-like eruption and urticaria, the third was an eczematoid eruption in the groin and on the scrotum. Scratch and intradermal tests as well as patch tests with Aureomycin failed to elicit a positive reaction. Re-elicitation of the eruptions in each instance on the administration of Aureomycin was evidence that the patients were sensitive to this drug. Apparently the skin eruptions which occur after the administration of Aureomycin follow the pattern of most drug eruptions in that they nearly always are associated with negative skin tests to the responsible drug.

Paréts¹⁴ describes a severe reaction consisting of angioneurotic oedema of the face and a fairly generalised nonpruritic erythematous skin eruption occurring on the seventh day of treatment with Aureomycin in doses of 2 gm. daily for early bronchiectasis. This reaction lasted for a week. Treatment with the various anti-histaminic

drugs was of no benefit. This patient was unfortunately sensitive to a number of drugs administered to him at various times. Quoting other workers on the subject, Parets, in the same article, describes Spink *et al*¹⁵ and Brande *et al*¹⁶, an evanescent type of reaction consisting of an abrupt rise and fall in temperature occasionally accompanied with a shock-like picture with a drop in blood pressure and tachycardia during the course of treatment of brucellosis. This is believed to be akin to the Herxheimer reaction. Rodriguez *et al*¹⁷ have observed a true febrile Herxheimer response frequently during treatment of early syphilis when large doses of Aureomycin are administered, but a cutaneous Herxheimer reaction has not yet been observed. Lennette *et al*¹⁸ noticed an inflammation of the mouth and scrotum as well as pruritic papular lesions on the shoulders of patients during the course of Q fever therapy. These symptoms did not necessitate the cessation of therapy or become progressively worse while administration of the drug was continued.

An interesting case of a severe reaction to Aureomycin has been recently reported by Riese¹⁹. As an experimental treatment for obstructive jaundice thought to be due to a virus infection he administered Aureomycin to a patient at the rate of 3 gm. daily for six weeks. At the end of this period "burning in the chest" and swelling of the legs appeared, but the symptoms subsided within two days after the patient discontinued the treatment. Aureomycin was re-administered and at the end of two weeks a toxic reaction, consisting of oedema of the face, hands, forearms, ankles and feet developed, in association with a papulovesicular eruption beneath the breasts, between the thighs and around the anus. The patient had burning sensations in the mouth, where an inflammatory reaction was noted. Symptoms again disappeared after the withdrawal of the drug within a few days. Later as little as 1.25 gm. of Aureomycin caused a reappearance of the symptoms indicating that true sensitisation had developed.

Although a number of toxic reactions have been enumerated above during therapy with Aureomycin Hydrochloride, it is at once apparent that the discontinuation of this antibiotic promptly relieves phenomena disappear.

The clinical use of Aureomycin.—Ever since the historic announcement of Aureomycin by Duggar, endless reports have appeared in the medical press all over the globe attributing hitherto unexcelled potentialities to it. It is being claimed to have cured more than half of the total diseases met with, and, with the vast literature still piling up, very shortly, it would be claimed to be a drug par excellence, a panacea for every disorder, were it not due to the disappointing results being reported now, which is putting a check to such early attributions.

As has already been stated elsewhere in this paper Aureomycin is a potent weapon against all rickettsial, many bacterial, certain viral and some parasitic infections. The following conditions have been treated successfully by various workers in the field. For detailed reports of cases you are referred to the Indian and Foreign Medical Journals published recently :

- | | |
|---|---|
| 1. Rocky mounted spotted fever. | 18. Tularemia. |
| 2. Primary atypical pneumonia. | 19. Osteomyelitis. |
| 3. Q. fever. | 20. Non-specific urethritis. |
| 4. Brucellosis. | 21. Anthrax. |
| 5. Typhus. | 22. Acute bronchiolitis or pneumonitis of infants. |
| 6. African tick-bite fever. | 23. Spirochaetes of relapsing fever. |
| 7. Infectious mononucleosis. | 24. Leptospirosis. |
| 8. Psittacosis. | 25. Gram positive infections including those caused by the following: streptococci, staphylococci, pneumococci, meningococci. |
| 9. Amœbiasis. | 26. Gram negative infections including those caused by the following: coli aerogenes group, and neisseria gonococci. |
| 10. Lymphogranuloma venereum. | |
| 11. Granuloma inguinale. | |
| 12. Peritonitis. | |
| 13. Boutonneuse fever. | |
| 14. Rickettsial-pox. | |
| 15. Pertussis. | |
| 16. Sinusitis. | |
| 17. Subacute bacterial endocarditis if resistant to Penicillin. | |

Aureomycin holds out hope for the following, as preliminary reports are encouraging :

- | | |
|-------------------------------------|---|
| 1. Actinomycosis. | 5. Chancroid. |
| 2. Acute non-specific pericarditis. | 6. Penicillin-resistant bacteremia. |
| 3. Influenzal meningitis. | 7. Bacillary infections of the urinary tract. |
| 4. Syphilis. | 8. Herpes Zoster. |

Aureomycin has also been found effective in certain ocular infections when used locally and/or orally.

The following are some of the conditions in which it is useful :

- | | |
|--|-----------------------------------|
| 1. Conjunctivitis due to various organisms and inclusion bodies. | 4. Epidemic keratoconjunctivitis. |
| 2. Dendritic ulcers. | 5. Trachoma. |
| 3. Superficial punctate keratitis. | 6. Follicular conjunctivitis. |
| | 7. Vernal conjunctivitis. |
| | 8. Morrens ulcer. |
| | 9. Parinaud's conjunctivitis. |

Results of treatment with Aureomycin of Salmonella infections are conflicting, some workers have had definitely good response with this therapy while others have not, anyway this confusion is now more or less of academic interest only, for Chloromycetin is more promising.

The above conclusions have been drawn from the work of authorities abroad. Very few reports have been published in India of the usefulness of this antibiotic—perhaps due to its prohibitive cost which has inhibited more extensive trials in the country.

Dosage schedule.—It is as yet too early to assess the exact dosage for an infection susceptible to this drug. However a scheme such as the following (Long⁶) should be a good guide, until more details are available:—

Severity of illness			Initial dose mg./kg of body wt.	Total daily maintenance dose mg./kg of body wt.
Moderate	Oral	...	10	25-50
	Oral	...	20	100
Severe	Intravenous	...	5	15

Note:—(1) The oral priming dose should be split into 3 parts, a part being given at hourly intervals for three doses.
(2) The oral maintenance dose should be split into 6 parts and given 4 hourly.
(3) Intravenous priming dose should be given in one dose.
(4) The intravenous maintenance dose should be split into 3 parts and administered 8 hourly.

The doses for children are slightly less. The therapy may be continued for 5-30 days, depending upon the clinical improvement.

Summary.—Aureomycin has been fully discussed in the light of published reports, with particular reference to its pharmacology. Stress has been laid on the toxic side effects and incompatibility with Aluminium Hydroxide Gel observed by earlier workers, which may have indirectly attributed to its failure, in conditions in which this Gel and Aureomycin were administered simultaneously. The clinical uses of this antibiotic have been detailed and its irrational use has been condemned.

Discussion.—A general discussion followed in which it was observed that this new versatile antibiotic was worthy of trial in amoebic dysentery cases resistant to other forms of therapy, in non-specific urethritis, peritonitis and in typhus fever; in view of the fact that the rickettsial infections in which it is of great use are not very commonly met with in this country.

The dosage schedule was also discussed at length.

The following members took part in the discussion:—Dr. K. N. Udapa, M.S. (MCH.), F.R.C.S. (C.), Civil Surgeon, Mandi; Dr. Jai Lal, B.Sc., M.B., B.S.; Dr. K. Pandya, M.B., B.S.; Dr. (Mrs.) Damyanti Kapoor, M.B., B.S.; Dr. H. K. Mathur; and Dr. Chandramani, L.S.M.C.

In the end my thanks are due to Messrs Lederle Laboratories (India), Ltd. for furnishing me with necessary data regarding this product.

I am also thankful to the Secretary of the Clinical Association, Dr. H. K. Mathur, for permission to publish this paper.

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Leprosy Relapse after Sulphone Therapy

Paul T. Erickson, Clinical Director of the National Leprosarium, at Carville, reports on six cases of reactivation of leprosy after sulphone therapy and reviews the status of sulphone treated patients whom he followed after apparent arrest of lepromatous leprosy.

Over a 5 year period in which the follow-up varied from 6 months to 5 years after arrest of lepromatous leprosy on sulphone therapy, relapse rates of 45 % for patients not continued on sulphones and 4.5 % for those continued on treatment were experienced. The occurrence of relapse following arrest of the disease, after stoppage of sulphone treatment, indicates that the sulphones are suppressive or bacteriostatic rather than bactericidal in action. The incidence of relapse can be effectively lowered by continuation of sulphone therapy in reduced dosage indefinitely for arrested cases.—(Erickson Paul, T., P. H. Reports, 8:9-1950, p. 1147-57).

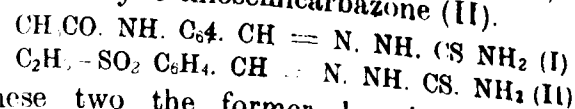
THIOSEMICARBAZONES— NEW THERAPEUTIC AGENTS IN TUBERCULOSIS*

U. P. BASU, D.Sc., F.N.I.,
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CHEMOTHERAPEUTIC drugs available for the treatment of tuberculosis have no clinical therapeutic effect comparable to the prompt and striking results commonly observed when drugs like Sulphonamide or Penicillin are used in the treatment of other bacterial infections. Of course in human tuberculosis the investigations with possible chemotherapeutic agent present certain difficulties. The *in vitro* activity bears no definite relationship to the *in vivo* activity, and the tuberculosis in laboratory animals again differs considerably from that in man. The recent investigations of Martin (1946), Raleigh and Youmans (1948 *a* and *b*); and Rake *et al* (1949) are, however, offering new approach for the evaluation of tuberculostatic agent on experimental basis. Of the multiplicity of substances recommended for the treatment of human tuberculosis, compounds that have at present won particular importance are the Glucoside Streptomycin, the Para-amino Salicylic Acid and the Thiosemicarbazones.

The antibiotic, Streptomycin, discovered by Waksman, Schatz and Bugie (1944) and first tested by Feldman and Hinshaw (1945) in tuberculosis, and Para-amino Salicylic Acid first synthesized in 1889 (German Patent 50835) and studied by Lehmann (1946) show similar inhibiting effects. But the latter is strongly hindered in its action by p-amino benzoic acid—a growth factor for tubercle bacillus (Cf. Ekstrand and Sjogren, 1946); while the Streptomycin is not. The systematic investigations with the Sulpha group of drugs against various pathogenic infections have led to the synthesis of a new group of chemotherapeutic agents that are active against tubercle bacilli. These are the Thiosemicarbazones.

These compounds were also developed in Germany and that again in the laboratories of the Farbenfabriken Bayer at the Elberfeld Works by Behnisch, Mietzsch and Schmidt with the co-operation of the discoverer of Sulpha drug, Domagk (1946). Since then a number of compounds in a series have been synthesized and is being evaluated (Cf., Donovan *et al*, 1950; Hamre *et al*, 1950; Francis, Spinks and Stewart, 1950; Basu and Banerjee, 1950). In the series so far the maximal activity in mice is being noticed in p-acetylamino benzaldehyde thiosemicarbazone (I) and p-ethyl sulphonyl benzaldehyde thiosemicarbazone (II).



Amongst these two the former has been extensively studied clinically in Germany and very recently in America (Cf., Mertens and Bunge, 1950; Hinshaw and McDermott, 1950; and Tucker, 1950).

* Specially contributed to THE ANTISEPTIC.
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THIOSEMICARBAZONES—U. P. BASU

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Characteristics.—Para-acetaminobenzaldehyde Thiosemicarbazone, more simply known as TB-I, is a pale yellow, finely crystalline powder of bitter taste. It melts with decomposition at about 230°C. It is practically insoluble in water (0.0172 gm. at 37°C). It is more soluble in serum and the solubility is dependent to a considerable amount upon the pH. It is also sparingly soluble in common organic solvents but somewhat soluble in alcoholic caustic soda. The substance dissolves in 50 per cent Sulphuric Acid to about 10 per cent. Antipyrine has the property of solubilizing the substance. The compound can be easily prepared from p-aminobenzaldehyde but its mode of action is not yet clearly established. Its primary action is bacteriostatic. Neither the free Aldehyde group, nor the free Thiosemicarbazide is responsible for its chemotherapeutic action as the free Aldehyde is inactive while the Thiosemicarbazide is very toxic. The acylation, however, plays a special part in imparting the bacteriostatic property to the compound as the free Amino Benzaldehyde Thiosemicarbazone ($\text{NH}_2\text{C}_6\text{H}_4\text{CH} = \text{N} \cdot \text{NH} \cdot \text{CS} \cdot \text{NH}_2$) is not so active. This is somewhat characteristic in the sense because of the fact that the activity of the product is not inhibited by the presence of Para Amino Benzoic Acid. The drug is rapidly absorbed in the blood system after oral administration and produces some side reactions. As such some of its substitutes by altering its systemic absorption might lower the toxicity of the compound. (Cf., Basu and Banerjee, 1950). The sulfur atom in the molecule seems to be essential as the oxygen analogues (semicarbazone, oxime, hydrazone etc.) of the Aldehyde are inactive (Cf., Behnisch *et al*, 1950). Substitution at the nitrogen atoms of the thiosemicarbazide grouping causes the action to disappear increasingly with the size of the substituents. It is to be noted that it is the Aldehyde and not ketone and that again of the aromatic nature which afford the active Thiosemicarbazones.

Therapy in humans.—Domagk's observations (1948) on the anti-tuberculous activity of the Thiosemicarbazone (I) *in vitro* and *in vivo* and subsequent findings of Hogarth *et al* (1949) from experiments with animals led to a thorough clinical investigation against various forms of human tuberculosis with this new type of chemotherapeutic agent. In pulmonary tuberculosis the activity of TB-I shows itself most clearly if the lesion is associated with a perifocal inflammatory process. The Thiosemicarbazone therapy is more promising if the lesions be more labile and if there be better supply of blood. Chronic stabilized cases of pulmonary tuberculosis are found to react less satisfactorily to Thiosemicarbazone medication. Cavernous processes have also shown some response. The findings so far recorded show that the best tendency toward healing is manifested in mucous membrane tuberculosis such as tuberculosis of the bronchus, and laryngeal, intestinal, and bladder tuberculosis. The p-acetylamino-benzaldehyde thiosemicarbazone (TB-I) can also be used as a drug of preference in the treatment of skin tuberculosis but it is contraindicated in miliary and meningeal tuberculosis.

The therapy is not free from toxic effects. At the beginning of the therapy, lack of appetite and gastric complaints are often noticed. But these often disappear with the confirmation of administration of the drug. Skin rashes, conjunctivitis, hæmolytic anæmias and agranulocytosis are other manifestations of toxicity. But if the dosage be properly regulated, most of the above symptoms are seldom noticed and/or easily controlled. There is a tendency toward increased fat deposition in the liver. All these complications should be borne in mind during any therapy with this new agent.

Use of the drug.—The success with this new therapy would depend to a considerable extent on the method of administration, adjustment of the dosage and regularisation of the diet. The dosage must be strictly individualised. In Germany the usual daily dose of TB-1 for adults amounts to approximately 2 mg. per kg. of body weight, by mouth. In any case the dosage must be adapted to the form and the stage of the disease, the responsiveness of the manifestation of tuberculosis, and the individual tolerance of the patient. Further the drug produces a sensitivity toward various substances, particularly to food proteins. A study on the albumin and gamma globulins during therapy might be of some use in controlling the rate of administration of the drug. It is to be noted that TB-1 is not only active for its tuberculostatic activity but also plays some other role either on the blood protein or on the circulating toxin. Most probably this may account for its superior action *in vivo*.

It is being suggested that the therapy should be started with a small dose and slowly increased noting the therapeutic response as well as the individual tolerations. It would be now necessary for our Indian Clinicians to find out the exact dosage for the people of this country. In Western countries the starting dosage for the people of once or twice daily. This is gradually increased to 25 mgm. daily.

Researches in this newer direction with this type of compounds might lead to evolution of a better and more tolerate drug.

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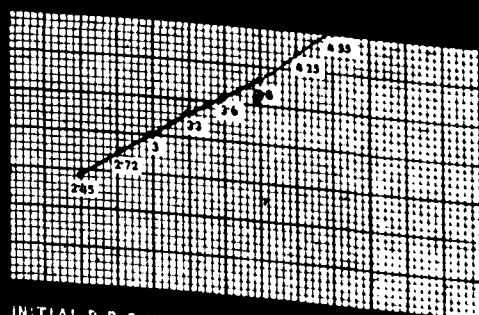
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SOCIAL ASPECTS OF SKIN DISEASES*

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A DISEASE referable to skin is at times a great handicap in social life. Skin diseases are more common than realized and it is estimated that over 10% of general practice cases are dermatological in nature. Unfortunately, there exist many a misconception about their infection and contagiousness in general public, and these false ideas injure the sufferer psychologically. Patients often have to be taken off work or children excluded from school, not because there is any danger in continuing there but because of feelings engendered in others. Leucoderma (white spots in the skin) is quite common and it is unluckily often regarded as "leprosy", and the poor patient is shunned and neglected. When such is the fate of one suffering from this innocent condition, the laity's reaction toward actual leprosy, which is quite rife in our country, could not be grasped. A man suffering from leprosy is called by such name as "Leper" and he is looked down and thrown to the streets.

Just to quote another familiar condition is "acne vulgaris", the so-called pimples, and these make the sufferer to keep off from social engagements. This condition is always taken as "something to do with the youth" or "something bad with the blood". Hence the shelter of "blood purifiers" is taken and they usually contain such drugs as Bromides or Iodides which make the condition still worse and give rise to "drug rash". Boils (furunculosis) and prickly heat are also regarded as "due to bad blood" or "heat in blood" and for these a person sometimes entreats for purgative to clean his body internally rather than using local medication.

One can go on summing up many skin conditions regarding which many false ideas are there in public. Just in passing, another instance is *Herpes Zoster* (or Shingles), which is regarded as "following the visit of a spider on the skin."

As for other examples, one may mention "Small-pox" about which such erroneous ideas are prevalent in lay public that it is regarded as a divine curse or displeasure and the patient is nursed in the most filthy circumstances and thus permanent and unwelcome damage is done to the skin. Any generalised skin rash is often mistaken for "Mata" (i.e., small pox) which, on careful scrutiny, may be just manifestation of syphilis. Conversely, many generalised skin conditions are often regarded as secondary to syphilis when injudicious treatment employing active arsenical drug causes extensive damage to the skin along with damage to liver, kidney, etc. The idea that many a drug when ingested by mouth may bring about generalised skin rash is hardly conceived.

* Specially contributed to THE ANTISEPTIC

It is truly said that a sound health is essential for a sound mind. To maintain a perfect health, skin cleanliness is the first thing. If one suffers from scabies or lousiness which are associated with overcrowding, lack of facilities for personal hygiene and cleanliness, his efficiency for work diminishes, as he cannot have a restful repose. The incidence of these diseases goes up under conditions of war and stresses during the refugee influx over here in 1947-'48. The number of loss of "man-hour-work" brought about by these is incalculable. Hence, there should be available facilities for treatment etc., for these conditions at public places at the cost of the Government centres exist and thus they have controlled these infections. Lousiness should be effectively treated as this is responsible for typhus fever.

Many skin diseases are spread from person to person and this goes on unknowingly. Dandruff is quite a common condition and it spreads through combs and brushes which are usually in common use in a family. The barbers and hair-dressers who keep their combs and other tools in an unclean condition, play an important role in the spread of this condition. Dandruff may persist throughout the life time without causing any symptom, but at times it may cause widespread dermatitis. If it be neglected, it may give rise to baldness.

To improve the health of our nation, our people should have their attention drawn to health problems. The public should be well informed and so health education is all the more important. Similarly, important organ of the body as it is the first line of defence, and, should not be lightly regarded but proper care should be taken. Skin disease is visible and treatment seemingly successful. Thus the patient and doctor can both observe progress directly and derive pleasure from good results and both are satisfied. But in spite of this, self treatment and self cure are quite rife.

It is impossible to imagine how many skin diseases are self-treated. Itching or irritation is a common feature of a good number of skin diseases which usually have different causation. To add to our misfortune, there is no dearth of advertised medicines which contain various strong chemicals in varying proportions and these act as sensitizers and give rise to "dermatitis medicamentosa" i.e. harm produced to the skin by the medicine, and this unfortunately condition. If you just pass along a market, you will find advertisements stating that such an ointment is good for all skin conditions viz., eczema, scabies, ringworm etc., etc. Peculiar ways of display of the advertisement are there to catch the public eye. It is necessary that the Government should take proper steps to stop such

malpractice which brings untold miseries to many. The "Quacks" should be banned.

Skin and central nervous system are closely related developmentally as being originated from the same structure (epiblast). So skin is very much influenced by environment e.g., economic instability and other adverse social factors. As for instance, infantile eczema, being intractable, presents a problem to the mother who sees her child suffering from intense paroxysms of irritation which often makes the baby to scratch until the skin bleeds. As weeks and months go by with little improvement, the mother may show signs of breaking down.

Cosmetics (face or hand creams, lipstick, face powder, nail polish, etc., etc.) are a boon to skin as they go a long way to save a person from a social trauma and makes him or her befitting for a society. These widely used in times of antiquity are now an integral part of the lives of civilized communities and of all classes. They enhance or add to personal appearances and correct minor blemishes and also reduce the effect of work, Sun, wind and sweat upon the skin. Lipsticks prevent cracking and chapping of lips caused by wind. But in some sensitive persons, they may give rise to various chemical dermatitis.

As we hope to progress in industries, there should be an industrial medical service enabling industry to provide medical care of workman at his job and to concentrate on control of industrial and occupational diseases on the spot. It would pay the various industries to seek the advice of a dermatologist before employing a person in a particular trade. Besides this, there should be posters displayed in prominent places in the premises of the factory, where various chemicals are used to save the employees from getting chemical or industrial dermatitis. A medical officer employed in a factory should have a thorough knowledge of various industrial diseases. Thus the various industrial diseases pertaining to the skin could be diagnosed in the early treatable stage.

The fact that some skin diseases of domestic pets (e.g., cats, dogs, horse and cattle) may also be transmitted to human beings, should also be recognised. Ringworm thus acquired may affect nails of the fingers of hand besides affecting the smooth skin and thus render one shy to shake hands.

The idea that skin troubles are only cured by ointments should be purged out of the public mind. Undoubtedly, ointments are mostly used. But there are many ways of applying medicine to skin viz., paints, lotions, powders etc., etc. Electrotherapy plays an important role in the treatment of skin diseases. Remember that many skin diseases may be just a manifestation of some internal cause, e.g., deficiency or irregularity of diet. An incipient diabetes may give rise to chronic itch.

Attempts should be made to attract the public to hospitals for the treatment of skin conditions for which there should be no feeling

of any social stigma as skin and V. D. are usually tackled together in some clinics. The patients feel diffident to attend them as they might be singled out to be suffering from V. D.

Skin may be regarded just a mirror upon which effects of dirty environment, poor, unbalanced diet, inefficient evacuation and septic focal spots are exhibited.

VITAMINS*

V. G. DESAI,
Kurdurwadi.

THE knowledge about vitamins has made enormous progress since the days of Sir James Lanchester in 1601 when he first introduced fresh oranges in the diet of his naval ratings to prevent a certain disability they suffered from, when on long voyages, which we today know as scurvy. It was all trial and error. Yet that opened out a wide lacuna of our knowledge of vitamins. The progress for further research had to be slow. No wonder therefore that the next in order of these essential factors was not discovered till about 1885. It was Takaki this time, working with the Japanese Navy, who noticed that his men when fed on polished rice showed symptoms of a disease which we today know as beri beri. This gave impetus to fresh work and diseases whose origin was obscure were viewed in this new light. So it was that towards the end of the last century that some pediatricians suspected that rickets had some such origin deficiency of an essential substance. But it was not till the beginning of this century that real experimental work began on this research. It was Eijkman in the East Indies who produced experimental beri beri in fowls. Girdins, his collaborator, isolated the anti-neuritic substance from rice polishings. Yet, that these essential substances could be vivisectioned and synthesized was never dreamt of as possible previously. They knew that these essential substances existed in certain foodstuffs. Funk worked over these substances for a long time and first propounded his vitamin theory. He postulated the existence of separate essential substances in certain commodities of food, absence or destruction of which produced a certain specific disease. Eijkman and Hopkins working separately proved this hypothetical theory by animal and later human experiments. They were therefore awarded the Nobel Prize in 1929.

2. Initially these vitamins had been very few and simple. Deficiency of any of these gave rise to a clearly defined disease. Today as many of these vitamins are known as there are letters in the Roman Alphabet. Many of them are known to form a complex and their deficiency gives rise to intricate syndromes. In the last few years biochemistry trying to be helpful essayed simplification

by fractionation of certain of these complexes. Today we have this in vitamin 'B' complex, a collection of major and minor vitamins. A general practitioner has a hard time finding his way out of these. A brief resume of all these vitamins with their uses and limitations is therefore here attempted.

3. All these essential substances or accessory food factors or otherwise known as vitamins, are broadly classified into two (1) Those that are present in fats. They are fat soluble. Fat soluble vitamins are vitamins A, D, E and K. They are found in most animal and vegetable fats. (2) The water soluble vitamins comprise the vitamin 'B' group and the vitamin 'C'. I shall not bother you with certain other vitamins whose existence and usefulness in human beings is still in dispute.

4. Broadly speaking all these vitamins have three main physiological functions:—

(a) Most of them are essential for normal growth development and maintenance of health.

(b) Their deficiency produces specific diseases which easily are curable when that specific vitamin is administered.

(c) They are used as adjuvants in the treatment of conditions which are not primarily deficiency diseases but which are likely to result in them.

5. Apart from this, there has been taking place an insidious development in vitaminology which may eventually lead to a division of this branch of therapeutics into two sections.

(a) Vitamin enzymotherapy where vitamins are used for the prevention and treatment of deficiency conditions in a relatively small amount. Most of the water soluble vitamins come under this category, with the exception of vitamin 'B₁' and 'C' which belong to this as well as to the next branch.

(b) Vitamin pharmacodynamic therapy where massive doses are given in order to utilize their potent metabolic effects in the prevention and treatment of diseases. The fat soluble vitamins fall under this branch. More will be said about these actions while dealing with individual vitamins.

Vitamin 'A'.—Also known as anti-ophthalmic and resistance builder. It is a fat soluble vitamin and is present in most edible oils, fats of animals and milk. It is found in a very concentrated form in the livers of cod and shark fishes. A provitamin of these vitamins is found in most leafy vegetables. As a matter of fact the more green a vegetable is, the more rich are its contents of B₂ carotene (Provitamin 'A'). The lower animals mostly synthesize these vitamins in their bodies from the grass they eat. The man, however, has to be supplied with this ready product in his food. Liver is the chief storehouse of this vitamin and that is why gross deficiency of this vitamin is rarely seen.

* Specially contributed to THE ANTISEPTIC.

6. Deficiency of this vitamin leads to the following conditions:—(a) Night blindness; (b) failure of growth; (c) xerosis of epithelial tissues or metaplasia; (d) multiple secondary infection; (e) xerophthalmia; (f) keratomalacia; (g) renal calculi; (h) peridental hyperplasia; (i) reproduction failure; and (j) degeneration changes in central and peripheral nervous system.

In one individual case one may not notice all these conditions. It depends on age and at what stage of deficiency the case is seen. In a few deficiency cases one sees most of the above conditions. The most sensitive test for detecting hypovitaminosis of this vitamin, is by dark adaptation. It is wise to make use of this vitamin as a prophylactic measure in small infants and growing children and in those who are confined to bed, or those who are on restricted diets. The prophylactic dose is 5,000 to 10,000 I.U. daily. In certain skin diseases (acne vulgaris, seborrheic dermatitis, keratosis follicularis), mucous membrane disorders, for example respiratory and gastro-intestinal disturbances; rhinology e.g. for treatment of *ozena*, in ophthalmology (xerophthalmia and keratomalacia), massive doses have to be given. These doses range between 1,00,000 I.U. to 6,00,000 I.U. daily either orally or parenterally. For those who are intolerant to fats, water soluble vitamin 'A' is also available and this must be used in preference to the other where the digestive system is not normal.

Vitamin 'D'—Also known as anti-rickets vitamin. This is present in most animal fats. The richest sources are cod and shark livers. Recently methods have been perfected for preparing this vitamin synthetically. It is known as Calciferol for preparing by the ultraviolet irradiation of Ergosterol which is pre-Sterols prevalent in nature and with suitable irradiation they can be converted into any of the vitamins 'D'. At least three of these are known. The action of all these is the same, control of calcium metabolism. Vitamin 'D' causes increased net absorption of calcium from the intestinal canal. Its deficiency causes disturbed absorption and metabolism of calcium and phosphorus resulting in rickets in young life and osteomalacia in the adult. Infantile tetany is a nutritional disorder and its direct cause is hypocalcaemia. It is not (parathyroid) administration in the initial stages aggravates the condition by mobilising bone calcium. Failure to absorb fat sometimes causes rickets and administration of vitamin 'D' in a non fatty vehicle cures the condition. Optimal prophylactic dose of vitamin 'D' for infants and children is 500 to 1000 I. U. Curative dose is 1000 to 3000 I.U. and the optimum dose is 10,000 I. U. Unlike other vitamins this vitamin cannot be given *ad lib.* The maximum 10,000 I.U. should not therefore be exceeded.

Calciferol (Vitamin 'D') marks a spectacular advance in therapy of lupus vulgaris. It has to be given in massive doses, remaining clear always of the optimal dose.

Vitamin 'E'.—Also known as anti-sterility factor or wheat-germ oil occurs in the oil from wheat-germ, rice-germ, cotton seed, maize and in green leaves. It has been isolated from these natural sources as Tocopherol. The Alphatocopherol is the richest, the Beta and Gamma being poorer in their activity.

Lack of vitamin 'E' produces different lesions in the two sexes; in the male it produces gradual atrophy of testis with degeneration of the germinal epithelium, and in the female it leads to characteristic type of secondary sterility where a normal pregnancy is abruptly terminated either by the death or absorption of the fetus. Like vitamin 'A' Tocopherol is also stored in the liver and therefore deficiencies of this vitamin very rarely occur. Prophylactically it can always be given in 10 to 30 mg. doses. In habitual abortion where all organic causes have been excluded massive doses of this vitamin (100 mg.) are necessary. For sterility in the males due to faulty spermatogenesis the prophylactic doses 10 to 30 mg. will be sufficient. Vitamin 'E' is considered to have pharmacodynamic action on conditions sharing common sclerovascular pathology e.g., intermittent claudication, Dupuyetrim's contracture, fibrositis, angina pectoris etc. The usual dose is 300 to 600 mg. daily.

Recent claims that neuromuscular diseases such as muscular dystrophies, progressive atrophy, amyotrophic lateral sclerosis, and aftereffects of poliomyelitis are cured or improved by this vitamin have not been substantiated.

Vitamin 'K' is a fat soluble vitamin and promotes formation of prothrombin in the liver. Prothrombin is essential to the normal coagulation of the blood.

It is absorbed from the intestinal tract in the presence of bile salts only. Conditions like obstructive jaundice, diarrhoeal conditions after operation requiring lengthy resections of intestine, and habitual medication with liquid paraffin, produce hypovitaminosis 'K'. Since liver plays an important part in its synthesis, it is obvious in conditions where liver tissue is damaged signs of hypovitaminosis 'K' should make their appearance. Its deficiency can be measured by the degree of hypoprothrombinemia by Quick's test (measuring coagulation time).

Little is known about its total requirements. For therapeutic dosage, the prothrombin level is a good indicator. Infants require about 2 mg. s.o.s. and adults 10 and 20 mg. s.o.s.

It is of use in all hemorrhagic disorders (not in hemophylic purpura), in disturbances of fat absorption (sprue, cardiac diseases etc.) in liver diseases such as cirrhosis of the liver, hepatitis, obstructive jaundice, and in hemorrhagic diseases of the new born e.g., umbilical and subconjunctival hemorrhages etc.

Water soluble vitamins, as already said, consist of the vitamin 'B' complex group and Vitamin 'C'. They are not stored to any extent

in the body. They therefore have to be supplemented or eaten with food. Their deficiencies are more frequent and varied.

Vitamin 'B' complex group comprises of thermolabile and thermostabile components. The thermolabile are further essayed into Vitamin B₁ and Pantothenic Acid. Both of these do not withstand heating.

Vitamin B₁.—Anti-beri beri factor - Aneurin or Thiamin Hydrochloride. This was isolated many years ago from rice polishings. It is also prepared synthetically and is known as Thiamin Hydrochloride. It occurs in high concentration in the outside bran coats of cereals. It is abundantly present in Brewer's yeast.

Its deficiency produces beri beri, the principal features of which are anorexia, marasmus, cardiac abnormalities, paresis or paralysis and sometimes oedema. Its characteristic nerve lesion is a demyelination of peripheral nerve, the so called polyneuritis of the alcoholic and pregnancy. It has an important physiological action the enzyme function referred to already. It provides a co-enzyme necessary in the breakdown of pyruvic acid in the intermediate metabolism of carbohydrate to carboxylase.

The daily requirements of this vitamin depends upon the carbohydrate intake. Generally about 1-2 mg. are sufficient. Massive doses are, however, required while treating polyneuritis and other frank deficiency conditions. In combination with Nicotinic Acid Vitamin B₁ is used successfully in delirium tremens in alcoholics. (About 100 to 300 mg. of Thiamin with 50 to 60 mg. of Nicotinic Acid repeated s. o. s.)

Pantothenic Acid.—The filtrate factor or the anti-grey factor (also known as chick anti-dermatitis factor) is still in the experimental stage of discovery. It is supposed to be essential for the development and natural functioning of the tissues. Its deficiency leads to disturbed metabolism and diminished resistance of epithelial and mucosal cells (especially of the respiratory and digestive tracks).

Its daily requirement in human beings is not known. For deficiency signs about 50 to 100 mg. of the salt are daily required. Owing to its epithelial cell-regenerating property it is also used as a lotion in burns or surgical wounds.

The thermostabile component of the vitamin 'B' group consists of: (1) Nicotinic Acid; (2) Lactoflavin or Riboflavin; (3) Pyridoxin; (4) Biotin; (5) Para-amino Benzoic Acid; (6) Inositol; (7) Folic Acid; (8) B. 12; and (9) Choline.

Nicotinic Acid, also known as anti-pellagra factor or P. P. factor, is known since many years. It plays an essential part in the body enzyme reaction.

Its frank deficiency produces pellagra—known by the three D's: Diarrhoea, Dementia and Dermatitis, though in all cases the

MAY '51]

three may not be necessarily present. The cutaneous lesions produced by its deficiency are symmetric pigmentation of the skin which may progress to atrophy of the skin as deficiency increases. Nervousness, tendency to undue fatigue, insomnia are some of the early symptoms of its deficiency.

The average daily requirement is estimated to be 10 to 30 mg. For treating deficiency conditions large doses upto 400 mg. per day may have to be used. It is said to minimise the toxic effects of Sulphonamides. As already said, it is used in conjunction with vitamin B₁ in the treatment of delirium tremens (alcoholic).

Lactoflavin also known as Riboflavin is the yellow constituent of the B complex group. It is so widely spread in the animal and vegetable kingdom and being relatively heatstable, a frank deficiency of this vitamin should not occur. In those cases where it is seen it is usually due to incomplete absorption or intermediate destruction. In pregnancy there is an increased demand of this vitamin and deficiency symptoms might occur in that condition.

This vitamin is essential to a number of vital oxidation-reduction processes concerned with the metabolism of carbohydrates, proteins and fats. It enters into the structure of a large number of enzymes taking part in tissue respirations. It helps dehydrogenation of citric, malic and lactic acids in the muscles, oxidises aldehydes as in liver and milk, and deaminates histamine. Thus probably it plays some part in the prevention of certain allergic states.

Its deficiency produces oral, skin and eye lesions. The cheilosis, angular conjunctivitis, sometimes with circumferential injection, and desquamation with crust formation, as in seborrhoeic dermatitis, are very characteristic lesions of this deficiency. The daily estimated dose is about 1.5 mg. The usual dose in any deficiency is about 10 to 20 mg. There is no fear of hypervitaminosis with Riboflavin, as any excess of this vitamin is excreted giving the flavin colour to the urine.

Pyridoxin. Also known as Adermin or Vitamin B₆. Its physiological role in man is not clearly understood. It is reported to have a marked sedative effect in man. Its deficiency probably leads to hyper irritability.

The human daily requirement is unknown. It is widely distributed in chemical combination with foods and 1 mg. is suggested as the daily dose for human beings.

Biotin.—Some time back called as Vitamin H. This is the latest of these series to be synthesized. It is a growth factor for bacteria (intestinal).

Its deficiency can be experimentally produced by feeding animals on white of eggs. It also results while on treatment with Sulphaguanidine or Sulphathiazole in certain persons. Its lesions

are a generalised scaly dermatitis, worst on the face, arms and legs. Its daily requirements are not known. Its experimental dose in human beings is about 150 to 300 microgrammes daily.

Para-amino-Benzoic Acid.—It is also a growth factor for many bacteria in the intestines. It is by depriving this food to bacteria that Sulpha drugs exert their bacterio-static action. Para-amino-Benzoic Acid is one of the constituents (bacterial) in fresh buttermilk and this explains why sometimes one finds Sulpha drugs quite inactive when a person is consuming large quantities of buttermilk or curds. The beneficial action of buttermilk in certain diarrhoeas may also be due to its being a vehicle for introducing the right flora and their food into the human intestines. For man therefore this vitamin component is only a secondary nutrient.

Its daily requirement is not known as also its dosage. Some experimental work is being carried out in this country for its use on human rickettsial diseases, particularly typhus.

Inositol.—So far its action is only known in lower animals. Its deficiency in them causes hairlessness and severe dermatitis. It is so widely distributed in plant and animal life that its deficiency probably never occurs. Like Para-amino-Benzoic Acid it also acts as a second nutrient, since its presence is essential for the biological activities for certain intestinal flora.

Minimum requirements in human beings are not known and even very large doses do not seem to do any harm.

Folic Acid.—Known also as vitamin M, L. Casei factor or Pteroylglutamic Acid. It is called Folic Acid, because it is found in green foliage. It is also present in yeast, animal tissues, liver and kidney. This is normally synthesised by bacteria present in the human intestine. The growth and development of this bacteria forming the flora, however, depends upon the available Folic Acid in a person's diet. It would be reasonable to expect, therefore, that in conditions where this is in short supply or in conditions, that an abnormally large number of bacteria are present in the upper part of the small intestine, a deficiency of this vitamin occurs. The latter is supposed to be a more common condition and possibly a cause of the sprue-syndrome. In this disease an invasion of bacteria is supposed to occur in large numbers and this accounts for the large bulky fermentating stools and the extra amount of Folic Acid required to sustain these additional invaders. This fits in with our clinical experience that this complex improves after parenteral administration of Folic Acid, or where large doses of the same drug are given by mouth. The metabolic demands of varying but essentially nonpathogenic flora may be the key to the problem of the multiple but selective vitamin deficiencies so commonly observed in these conditions.

Its deficiency produces the sprue syndrome. It is besides very useful in such purely nutritional aspects of deficiencies as gastro-enteritis, glossitis, stomatitis, steatorrhoea and hypoproteinaemia. Its chief interest is however in megaloblastic anaemia and leucopenia. Its unrestricted use sometimes precipitates neurological complications of an irreversible type. Its use therefore in Addisonian type of anaemias should be carefully watched. Its daily requirement in man are still uncertain. For therapeutic action about 5 to 30 mg. are sometimes required. The exact dose is an individual factor. The maintenance dose is usually very small. The synthetic preparations of Folic Acid are supposed to be even superior to the conjugated form of Folic Acid which is interesting, because much of the Folic Acid in nature, therefore, in the human diet, is in this state.

Vitamin B₁₂. This is a very recent member of the B complex vitamins. As is usual with all recent discoveries a hell of a noise is made about it, some even call it the last remedy for all types of anaemias. Time however is the best test for all such remedies and a wise clinician always depends on this for his choice.

This was originally isolated from crude liver extract by Leslie Smith. It promotes the growth of *Lacto bacillus lactis* Dorner—the L.L.D. factor. It induces haemopoietic response in patients suffering from pernicious anaemia. The reticulocyte response is very brisk and reaches its peak in about 4 to 9 days. Unlike Folic Acid this is remarkable in its effect in relieving subacute combined degeneration in pernicious anaemia patients. It is not so effective by mouth in the initial stages of the disease since it is supposed that the intrinsic factor in the gastric juice is necessary for its absorption. Large amounts of this vitamin have been isolated from human faeces in untreated cases. It is therefore given by injection, or if the oral method is to be preferred very large doses have to be given (450 microgrammes). In uncomplicated cases 10 to 15 microgrammes are required once or twice a week (roughly one microgramme a day). An effective maintenance dose is again an individual factor. For arresting subacute combined degeneration of spinal cord about 30 microgrammes once or twice a week are required. It is useful in quite small doses (a single dose of 10 microgrammes) in nutritional macrocytic anaemia, in sprue and in macrocytic anaemia of infancy (a single dose of 25 microgrammes).

Choline or Choline Chloride. It is still under clinical trial. It is supposed to play a useful part in the transport of fat from the liver and therefore theoretically would be an ideal remedy for fatty infiltration of the liver. It cannot be given *ad lib.* The toxic dose lies very near the therapeutic dose which is about 1.5 grams, which should not be exceeded.

Vitamin C. Anti-scorbutic vitamin or Ascorbic Acid. This is the first vitamin whose presence stimulated the research of similar food adjuncts. It is thermolabile but the vitamin C present in

citrous fruits is peculiarly stable. In "amla" or the Indian gooseberry, it is retained even when the fruit is dried. For a strong physiological functioning of all the systems of the body, adequate quantities of this vitamin are essential. It acts as an oxido-reductive substance regulating cellular respiration. It is essential for the maturation and growth of red cells, white cells and platelets. It has some action in stimulating the healing of wounds, probably by helping to build up interstitial tissue. It prevents capillary fragility and in consequence protects one from capillary haemorrhages (Petechie). It is an anti-infective factor. It is also anti-toxic and desensitizing agent. It has been alleged that this vitamin is also concerned in the production of anti-bodies.

Its deficiency produces the typical scurvy—easily bleeding gums, tendency to petechiae, and capillary bleeding etc.

The early signs of hypovitaminosis 'C' are undue fatigue and a feeling of lassitude, tendency to cough and colds, decayed teeth and spongy gums, slow healing of wounds or fractures. Certain conditions such as pregnancy, lactation, periods of change in life, and acute infections, produce an extra demand for this vitamin. The body stores a certain reserve of this vitamin but an excess is easily excreted in the urine. This fact is utilised for measuring 'C' hypovitaminosis and the severity of an infection (which is inversely proportional to the infection). The suprarenal cortex probably acts as a store house for this vitamin.

The daily requirement of this vitamin differs at different ages, in health and disease, and at rest or while exercising. An infant requires about 25 to 30 mg., a growing child 75 mg. upto 12 years, and an adult requires 75 to 85 mg. Twice these amounts are required in febrile conditions in the different age groups and about 100 to 150 mg. in pregnancy and lactation.

Conclusion.—Vitamins have a great future. Their bio-synthesis is now known very well. They are not merely accessory food factors. They play an essentially vital role. They are necessary for tissue respiration, for certain oxidation reduction processes, and also in their enzymic action. Their competitive phenomenon is now better understood. Nobody therefore prescribes large supplements of single vitamin. The pendulum has once again swung back and we have again begun prescribing the old blunderbuss form of treatment.

They have opened still another apartment for research work. Some workers have found an excess of some of these vitamins in certain malignant new growths. Whether this is just an accidental finding or whether depletion of that particular vitamin would stop or cure the condition the future alone should tell.

There is also another interesting finding connected with vitamins. Some of them *e.g.*, Ergosterol (Vitamin D₂) has a sterol

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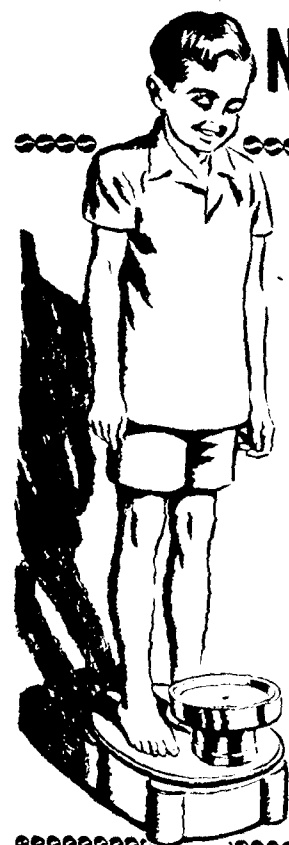
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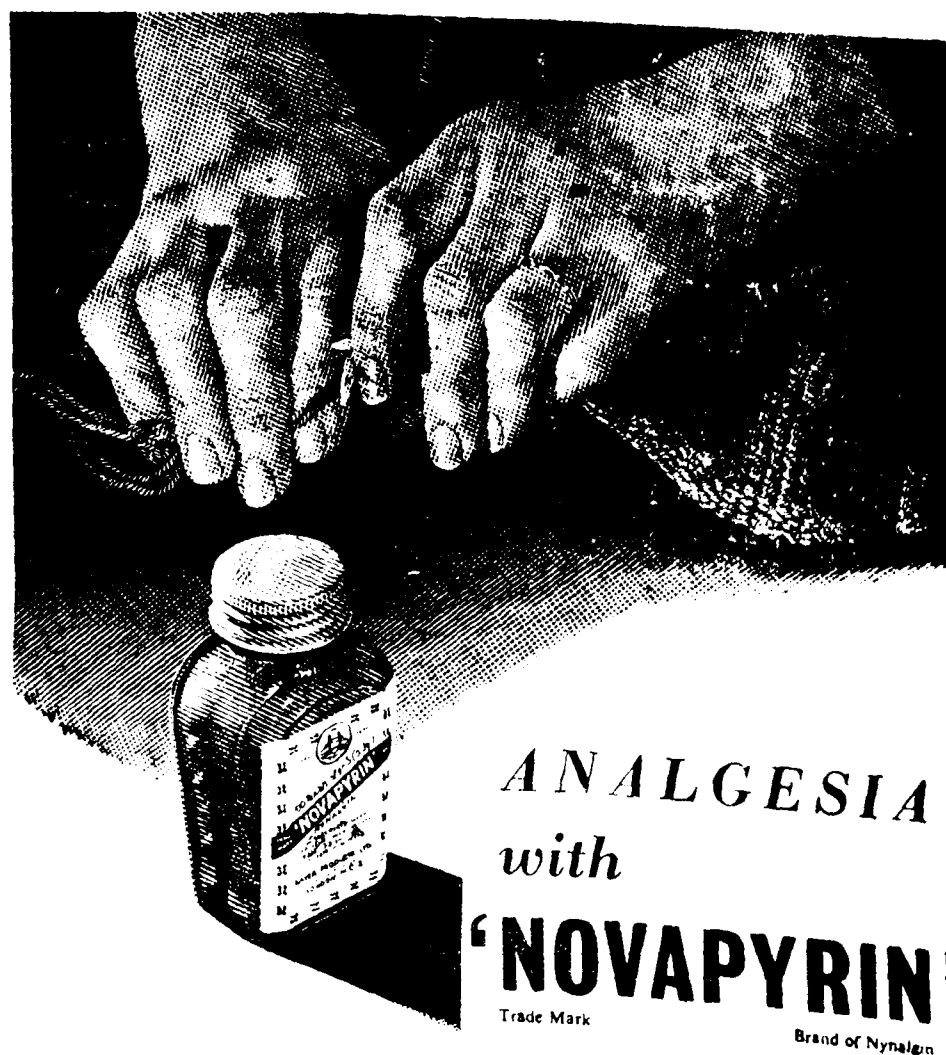
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nucleus. So also have the human sexual hormones—Testoviron—Stillbœstrol. I have already told you about the supposed presence in some good amount of vitamin "C" in the adrenal cortex. Does this show any correlation? Are the vitamins just extrinsic hormones? These are difficult questions to answer. We can think in the present. We only dream about tomorrow.

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DIVES INTO ANCIENT HINDU MEDICINE

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(Continued from page 379 of May '50 issue)

Section IV. Kapha-Masurikas

THESE too, like Vaata- and Piththa-Masurikas hold six main types; each main type holding sub-types, there are 32 kinds of Kapha-Masurikas. General and constitutional features have been discussed in Section I; the individual characteristics of the different kinds will be considered here.

MAIN VARIETY	SUB-VARIETIES
I. Paaloori (5 minors)	(1) Paaloori proper, (2) Manal-paaloori, (3) Ari-ppaaloori, (4) Viyarp-paaloori, (5) Ninal-paaloori
II. Vin-chilanni (6 minors)	(1) Venchilanni proper, (2) Vel-chilanni, (3) Aana-chilanni, (4) Vatta-chilanni, (5) Vitta-chilanni, (6) Kootta-chilanni
III. Moar-chilanni (5 minors)	(1) Moar-chilanni, (2) Paal-chilanni, (3) Kaal-chilanni (4) Thati-chilanni, (5) Vetti-chilanni.
IV. Neer-chilanni (6 minors)	(1) Neer-chilanni, (2) Koor-chilanni, (3) Pon-chilanni, (4) Aar-chilanni, (5) Poar-chilanni, (6) Veer-chilanni.
V. Pon-chilanni (5 minors)	(1) Pon-chilanni, (2) Mani-chilanni, (3) Maanikka-chilanni, (4) Aani-chilanni, (5) Kata-chilanni.
VI. Oatu-chilanni (5 minors)	(1) Oatu-chilanni, (2) Ul-chilanni, (3) Kaattu-chilanni, (4) Kaal-chilanni, (5) Maattu-chilanni.

I. **Paaloori.**—The affection is so called probably because of the odour of cow's milk given out by the efflorescences when ripe. There are 5 sub-groups in the affection; only one of them proves fatal. The presiding devatha is "Pulli-Marutha."

CLINICAL FEATURES:—I. General characteristics are as in Kapha-jwara in Masurika, (Section I). Fainting or unconsciousness at onset of fever, intense thudding head-ache, congested eyes; vomiting constantly, and diarrhoea rarely; general pains over and

a swollen condition of body—these are some of the main features observed in all varieties of Paaloori.

All types of Paaloori, especially the Paaloori proper, are highly infectious; it is said that an infected case quadruples the number in the affected group by infecting three more.

2. Special diagnostic features: (a) If, during the height of fever, the nasal discharge of the patient is thrown into the juice of green turmeric, the whole will turn blood-red in about half an hour (one 'naazhika').* (b) Mixture of patient's urine and breast-milk, if kept undisturbed and examined after one naazhika, will exhibit bead-like formations.† (c) During the prodromal period, application to umbilical region of a paste of leaf-buds of *Ficus Religiosa* will make the rashes visible—although the eruptions normally come out only a day or two afterwards.

CLINICAL MANIFESTATIONS:—1. *Paaloori proper*: General features have been discussed above. The rashes, when they appear on the third day, are pepper-sized, red-topped, and hemispherical or triangular. They become white on the 7th day (of fever or eruption?); gradually ripen, emitting the odour of cow's milk; and break leaving white scabs.

The patient can be bathed after 14½ days.

2. *Manal-paaloori*:—('Manal'=sand):—Resembles the above, except in the rashes being smaller. Patient can be bathed on the 10th day; if the patient be strong, bath may have to be delayed to the 14th day.

[It was mentioned under Poozhi-kkalloori (Section III) that there permeates about the patient the sweet odour of Champak flower when the rashes break, provided the patient is *not* strong ('Sakthan'), in which case there will be a mal-odour surrounding him. And in Manal-paaloori we are told that the stronger the patient the more delayed will be the day of bath. Can the conclusion be "the greater the vitality, the more the pabulum offered to the invader; and consequently, the greater the vitality the more offensive the pathological products of 'war', or the greater the inducement for the invader to stay and despoil the host"?]

3. *Ari-ppaaloori*:—('Ari'=rice):—The rashes here are bright and clear and of the size and shape of rice grain; and they continue to be bright and clear when they ripen too. When the efflorescences get resolved, the eyes become congested—a special feature of this affection.

The patient can be bathed on or after the 14th day.

* Juice of green turmeric—for that, a solution of dry turmeric too—will turn blood-red on the addition to it of a small pellet of 'chunnam' or slaked lime.

† Apparently, the bead-like formations are curds or clots

4. *Viyarp-paaloori*:—'Viyarpu'=sweat:—The 'Birth' of the rashes outside is accompanied by profuse sweats all over the body. The patient can be bathed on or after the 12th day.

This affection is also called 'Visarp-paaloori.'

5. *Ninal-ppaaloori*:—The rashes, when they appear, are sand-like in size and shape and blood-red in colour. Nasal discharge will be in plenty; and, at some time or other, there will appear blood in urine and motions. On the 6th day (of fever?), the rashes recede; between the 6th and the 9th day, the eyes are affected and become blind; and on the day the eyes get involved, the patient dies. Death is usually sudden and occurs just after 8½ days from the day of onset.

TREATMENT.—1. *Externally*:—As indicated.

2. *Internally*:—(a) *Cooling oushadhas*: (i) the spiritous liquor called 'Sura'. (b) *Decoctions*: (i) onions, coriander, Bael root, Laaja powder—prepare decoction, and sign as usual; and (ii) decoction of Naal-paal-mara.

3. *For the eyes*:—Cumin seeds, flower buds of Tulsi, kernel of very tender cocoanut—bundle, crush, soak in breast-milk and squeeze drops into eyes.

II. *Ven-Chilanni*.—'Chilanni', also known as 'Chilanthi', means 'spider'. Perhaps, the particular affections of variola with their appellations ending in Chilann (th)i were called so because of the eruptions resembling a spider in appearance at one stage or the other of the disease.

Ven-Chilanni holds 6 sub-groups, of which all except "Vattachilanni" are of very grave prognosis; Ven-chilanni proper, Vittuchilanni, and Kootta-chilanni invariably prove fatal, while cases of Vel-chilanni and Aana-chilanni have a remote chance of recovery. Cases associated with sweet odour of lotus in the early stages and mal-odour later are of comparatively good prognosis; cases with following features rarely recover—prolonged unconsciousness at onset, breaking of rashes delayed to after 14½ days and bleeding into the raw surfaces then, anuria or retention of urine ('Moothra-sthambhanam'), involvement of eyes, laryngeal or pharyngeal obstruction, raving mania, and terminal diarrhoea. Cases that recover do so with loss of function of one or more of "Chathur-Indriyas," viz. eyes, ears, nose or tongue, or some other sequela.

The presiding devatha is 'Kolli—Marutha'—a fiery Marutha indeed! ('Kolli' = fire or incendiary).

CLINICAL FEATURES.—1. General features as in Kapha-Jwara of Masurika (Section I).

2. Special diagnostic features: (a) During the acme of fever, the patient's hair, if thrown into water, will gradually sink to the bottom; (b) application of a paste of Gorochar in tender cocoanut

water to the soles will make rashes on the forehead visible, during the prodromal period.

CLINICAL MANIFESTATIONS.—1. *Ven-chilanni proper*: General features are as in Kapha-Masurikas and are seen in all varieties of Ven-chilanni—Loss of consciousness at onset, intense headache, congested eyes, vomiting, severe constipation, nasal discharge, sweats on face—these are the main symptoms and signs.

The rashes, when they appear on the third day, are pretty large and lotus-bud-like with a broad circular base and a pointed apex. The apices, as the rashes grow, get less and less pointed and more and more flat till the eruptions in course of time break and dehisce even as lotus buds do into lotus-flower; and then, there will be given out an intense foul odour. The patient invariably dies on the 18th day.

2. *Vel-chilanni*:—The rashes, when they appear, resemble those of Ven-chilanni, but show red streaks all round their bases (sign of inflammation?). They do not dehisce, but get fissured; the open wounds are whitish or bloody. In the former event, the patient can be bathed after 22½ days; in the latter case, the patient dies within or close after 22½ days.

3. *Aana-chilanni*:—‘Aana’ elephant. The eruptions here, as the name will indicate, are very large. Except in size, they resemble Ven-chilanni rashes. When they break and begin to desiccate, they leave large black open wounds which, appearing over the whole body, give the patient a hideous appearance.

The prognosis is bad; in exceptional cases, the patient may recover and be bathed after 38½ days. But, it will take 90 days for the body to be clear of all skin-wounds.

4. *Vatta-chilanni*:—The eruptions here are circular. When they break, they do so discharging much blood and pus. The patient usually dies within 18 days; if death does not supervene within the 18 days, he can be bathed after 18½ days.

5. *Vittu-chilanni*:—When the rashes come out, there appears diarrhoea too. And when they break, there sets in mania and the patient develops pica—a morbid appetite for the most revolting inedible materials, including excreta. The patient invariably dies on the 25th day.

6. *Kootta-chilanni*:—The rashes here are peculiar in that they come out in clusters of bubbles. Another peculiarity about them is that they so configure themselves that they look like human hands and feet to the observer. When they break, they profusely bleed. The patient dies on the 20th day.

TREATMENT.—1. *Externally*:—As indicated.

2. *Internally*:—(a) Solution through boiling of pistils of lotus flower in tender cocoanut water; (b) decoction of liquorice; (c) red sandal, China rose, onions and “Makki-poo” in equal

parts, prepare decoction and sign as usual; (d) decoction of Chob Chini purified through boiling in milk; (e) kernel of seeds of Mimulus Elengi (Bakula), Saussurea lappa, Acorus Calamus, Nigella Sativa in equal parts, powder finely and give with honey as linctus frequently or in measured doses at fixed intervals; and (f) give with honey fine powder of Chob chini purified in milk.

3. *For the eyes*:—(a) Make a solution of tendrils of bitter-gourd in tender palmyra water through grinding and filtering, and use the clear solution for washing the eyes; (b) bundle crushed buds (or stalks?) of Mussenda Frondosa (“Vellila”) and Indian Sarasaparilla (“Naru neendi”) and squeeze drops into the eyes.

III. *Moar-chilanni*.—This group of Kapha-Masurika includes 5 sub-groups, one of which alone proves fatal. The presiding devatha is “Thulli-Marutha.”

CLINICAL FEATURES.—1. General features are as in all Kapha-Masurikas (vide Section I). Additional features are:—All the sub-varieties have an ‘incubation’ period of 18 days (i.e., the disease plays in the ‘dhaatus’ for 18 days without the patient being aware of it). The invasion period is ushered in by rigours, high fever, intense headache, and unconsciousness; soon, appreciable swelling of body develops. In point of infectivity, Moar-chilanni group is on a par with Paaloori group.

2. Special diagnostic features:—(a) The urine of patient during the height of fever, if collected in a vessel and examined after a time, will be found to contain drops or particles (‘Bindu’)—of what? (b) A mixture of urine and gingelly oil, if kept and examined after a time, will appear as bubbles.

CLINICAL MANIFESTATIONS.—1. *Moar-chilanni proper*:—The rashes appear pepper-like, and with their eruptions, the fever and painful symptoms subside. The efflorescences become ripened on the tenth day, and then they emit the odour of pure buttermilk (“Moar”). When they dry up and break, the surfaces show a dark centre on a white base. The patient can be bathed on the 15th day.

2. *Paal-chilanni*:—The eruptions, when they appear, are pure white; and when they dry up and break, they leave surfaces whiter still. Their whiteness throughout has earned the name of Paal-chilanni for the disease (‘Paal’ milk). The patient can be bathed on the tenth day.

3. *Kaal-chilanni*:—The rashes in this affection are few, and few and far between. When they break, the surfaces present the appearance of legs with toes. (‘Kaal’ leg). The patient can be bathed on the 10th day.

4. *Thati-chilanni*:—The chief features here are swelling of the body, and the affection of eyes when the eruptions break or dehisce. Nothing is said about the termination of the affection.

5. *Vetti-chilanni*:—The initial symptoms and rashes are as in 'Moar-chilanni'. But, on the tenth day, the rashes break into fissures; and the patient develops brain symptoms of a raving type. He dies on the 18th day.

TREATMENT.—1. *Externally*: As indicated.

2. *Internally*:—(a) In the initial stage, decoction of Indian Sarasaparilla with sugar candy three times a day; (b) when fever has subsided and to help the rashes to desiccate, a decoction of root of *Clitoria Ternalia*, bael root, glycerizæ, and coriander in equal parts is to be administered.

3. *For the eyes*:—(a) Crush and bundle *Phyllanthus Niruri*, onion, cumin seed in equal parts, soak in breast milk, and squeeze drops in the eyes; (b) mix lime-juice and the clear supernatant portion of sour gruel in equal parts, and use for washing the eyes.

IV. *Neer-chilanni*.—This holds 6 sub-groups, two of which prove fatal. The presiding devatha is "Neer-Marutha".

CLINICAL FEATURES.—1. General features are as in all Kapha-Masurikas. The following additional features are special to all varieties of *Neer-chilanni*. The 'incubation period' is 30 days, and the actual manifestation of the disease depends on the final pathological state of the body when the disturbed equilibrium manifestly affects the system and must show symptoms.

2. Special diagnostic features:—(a) Mixture of patient's urine, rice-washing-water and goat's milk will settle themselves in the vessel in separate layers; (b) betel-leaf, on one side of which patient's urine has been brushed, will show on the other side eruption-like projections; (c) application of paste of tortoise-shell in cow's milk to the face will bring out rashes on the chest, and application of the same to the chest will bring out rashes on the face during the prodromal period, in either case.

CLINICAL MANIFESTATIONS.—1. *Neer-chilanni proper*:—The period of invasion is ushered in by high fever, cephalalgia, loss of consciousness, vomiting and diarrhoea. The course and prognosis: Cases with vomiting and diarrhoea at onset are of a mild type, the patient recovering and becoming fit for bath on the 18th day. On the other hand, the patient dies on the 22nd or 28th day if the following troubles appear viz., exceeding foul smell about the patient, abdominal or throat pain, intensely red eyes, obstruction to voice, anxious gaze or stare of extreme fear, hallucination of "non-existent" calls and actions suited to follow the "caller", profuse sweats, terminal diarrhoea, feeling of oppressive and oedematous swellings over bregma or navel ("Moola-aadhaara"), and like ominous symptoms. Even the mild cases, that, under proper care, can be bathed on the 18th day, will swing between life and death for 48 days, if not properly cared for.

The rashes, when they appear, are of the shape of 'Kot-taikka' (?); and they come out on the third day. Though they may

seem to contain fluid, the contents are viscid; and when they rupture, necrotic cores will be exposed; and when the cores get removed and the wounds heal, the scars are severe black. Mature efflorescences, before rupture, will resemble Jambul fruits and emit mal-odour.

2. *Koor-chilanni*:—'Koor'—sharp or pointed. The general symptoms are as in and common to all varieties of *Neer-chilanni*. The rashes are discrete and particularly pointed; they become ripe and dry up in due course. Patient can be bathed on the 10th day.

3. *Pon-chilanni*:—This should not be confused with 'Pon-chilanni' and its branches below. The chief distinguishing feature of *Pon-chilanni* of *Neer-chilanni* group is that the rashes are tense with fluid; and the rashes are abundant. The patient can be bathed on the 12th day.

4. *Aar-chilanni*:—'Aaru'—six. The rashes appear on the 3rd day as usual; and on the fourth day of their appearance, i.e. the sixth ('Aaru') day of fever, they mature and become ripe fully. Because they become fully ripe, exactly on the 6th day, the affection is called *Aar-chilanni*. When they mature, they impart a special brilliance and shininess to the body. The patient can be bathed after 14½ days.

5. *Poar-chilanni*:—'Poar'—battle. The rashes here appear in columns and resemble 'a body of troops' drawn up in deep files; hence, the name 'Poar-chilanni'. When the efflorescences are grown and have become filled, the intervening spaces present an ashy-grey hue. The patient can be bathed on the 10th day.

6. *Veer-chilanni*:—'Veerkal'—a swollen condition. Sand-like rashes appear all over the body; and with that, the body gets swollen. They recede some time later, and then there occurs bleeding per rectum. The patient dies on the 14th day.

TREATMENT.—1. *Externally*:—As indicated.

2. *Internally*:—(a) Decoction of equal parts of red sandal, cumin seeds and leaf-buds of horse-radish (Drum-stick plant) is to be given with sugarcandy added; (b) decoction of onions, cumin seeds, pavonia odorata and leaf-buds of cassia fistula in equal parts; this brings out the rashes in bold relief.

3. *For the eyes*:—Rub gold and silver in breast-milk and use the solution for washing the eyes.

V. *Pon-Chilanni*.—This affection holds 5 sub-groups, one of which proves fatal and another is of doubtful prognosis. The disease is called *Pon-chilanni* because of the golden colour of rashes when they ripen. *Pon-chilanni* is considered a lucky affection, affecting only the lucky. The patients who recover from the illness, being only the lucky, are empowered and helped to acquire the wealth of 'Kub-seems', are empowered and helped to acquire the wealth of 'Kub-seems'. *Pon-chilanni* of Kapha-Masurika in many a way resembles

Kanaka-kkalloori of Piththa-Masurika. Presiding devatha is Soorga-Marutha.

CLINICAL FEATURES.—1. General features are as in Jwara of Kapha-Masurika (Section I). The additional features—common to all kinds of Pon-chilanni—are silk-red colour of the whole body, severe constipation in some cases, and giddiness accompanied by nausea and blurred vision on getting up. Odour of edible figs when rashes ripen is a good sign.

2. Special diagnostic features :—(a) Patient's urine, if mixed with fowl's blood, will turn the colour of latter to white, (b) Patient's hair, if soaked in cow's milk and examined after a time, will be found to have turned grey.

CLINICAL MANIFESTATIONS.—1. *Pon-chilanni proper* :—The rashes appear on the third day like gunja-seeds in size and shape. With the appearance of rashes, the eyes begin to clear. When the rashes are ripe, they are golden in colour; they contain no pus, but a viscid substance. They usually desiccate and break; and on doing so, impart a shiny appearance to the body. If the patient is fortunate and does not die within 18 days, he can be bathed after 18 days.

2. *Mani-chilanni* :—The rashes resemble white beads and are discrete. They are stroaked and contain no pus; they desiccate and break. Patient can be bathed after 14 days. [Cf. 'Manian' under 'Kalloori' in Piththa-Masurika].

3. *Maanikka-chilanni* :—('Maanikkam'—ruby). The rashes here resemble the fruits of the plant Jungle Geranium, and in course of time desiccate and break. Patient can be bathed on the 10th day.

4. *Aani-chilanni* :—'Aani' = nail or peg. The rashes, when they appear, are nail-pointed; on the 5th day of their appearance, they get flattened, globular, and umbilicated. When, after ripe, they rupture, firm necrotic cores become visible, and much blood and pus escape. Secondary (septic?) rashes of different sizes and shapes appear in the neighbourhood of initial rashes, and these secondary rashes recede after a time. The patient dies on or after the 16th day.

5. *Kata-chilanni* :—The rashes are very dark and contain fluid. After a time since they break and desiccate, the patient can be bathed.

TREATMENT :—1. *Externally* :—As indicated.

2. *Internally* :—(a) Administer a mixture of fecula of Ficus Glomerata and onion in tender palmyra water. (b) Decoction of coriander and red sandal in equal parts. (c) Make a solution of grapes in pure cold water and give with candy for 3 days.

3. *For the eyes* :—Make a solution of coriander in tender cocoanut water, filter, and use the clear solution for washing the eyes; (a) Crush and bundle 'Amal-pori' (Mongoose plant) and cumin seeds, and squeeze drops into eyes three times a day.

VI. *Oatu-Chilanni*.—This affection is the least dangerous of Kapha-Masurikas; and Kapha-Masurikas being the least dangerous among the main varieties of Masurikas, Oatu-chilanni group may be considered as the least fatal type of "small-pox." But the fact should not be lost sight of that the rather mild affection may, under congenial circumstances, develop into the most dangerous and positively fatal forms. Besides, the tendency to infect is highest in this affection; being so, the attendants and visitors, liable to be lulled into a false sense of security, should be warned of the maximum infectivity of the affection. The presiding devatha is "Chandra-Marutha."

CLINICAL FEATURES :—General features are as in Jwara of Kapha-Masurikas (Sec. I). Special features are diarrhoea at onset and comparatively less congestion of eyes.

Special diagnostic features :—(a) During the height of fever, Chameli flowers, if scented, will induce vomiting; (b) application of Gorochan to root of ears will bring out rashes there, during prodromal period; likewise, application of charcoal from crematory as paste to glabella will bring out rashes there, during the prodromal period.

CLINICAL MANIFESTATIONS :—1. *Oatu-chilanni proper* : Rashes appear on the 3rd day; and simultaneously with that, there develop also "Kitakka-marungu" (bed-sores?) They ripen within 7 days of their appearance; and when ripe, they exhibit the colour and odour of "Managola" (Realgar?). The patient can be bathed after 10 days.

2. *Ul-chilanni* :—'Ul' = within. The rashes, a brief time after they come out, get fissured, discharging blood. The eyes are affected, and the patient dies on the 12th day. The affection is rare.

3. *Kattu-chilanni* :—The eruptions are black in colour, the affection runs a mild course, and the patient can be bathed after 10 days.

4. *Kaal-chilanni* :—The viscid rashes ripen from within outwards, break and desiccate. The patient can be bathed after 12 days. (Vide a similar affection under 'Moar-chilanni' in this Section).

5. *Maatu-chilanni* :—The efflorescences give the appearance of flies ('Makshika') sticking to the body; when they ripen, they become white or whitish. The patient can be bathed after 11 days. It should be noted that development of secondary boils over joints is a possible sequela in this affection.

TREATMENT :—1. *Externally* : As indicated.

2. *Internally* :—(a) Administer laaja powder mixed with the kernel of very tender cocoanut three times a day. (b) Rub Strychnos Potatorum in tender cocoanut water, boil and "digest" the whole, and administer. (c) Administer a decoction of onions, leaves of Krishna Tulsi, Strychnos Potatorum and 'Makki-poo.'

3. *For the eyes*:—Make a solution of purified Cowries in decoction of cumin seeds, and use for washing the eyes. (2) Crush and into the eyes.

Some Notes on Kapha-Masurikas

1. Kapha-Masurikas are certainly the least dangerous among the three main groups of Masurikas. While 27 out of 32 varieties of Vaata-Masurikas invariably prove fatal and 12 out of 32 do so among Piththa-Masurikas, only 9 out of 32 varieties of Kapha-Masurikas end in certain death of the patient; 18 varieties of the last have a good chance of recovery, while the remaining 5 have a fair chance of getting round. Of the cases that prove fatal, those of Ninal-paaloori and Veer-chilanni die of internal hæmorrhage and recession of rashes; those of Kootta-chilanni, Aani-chilanni and Ul-chilanni die of external bleeding into eruptions when the latter break; those of Vitta-chilanni and Vetti-chilanni meet their ends through raving delirium and exciting brain complications; cases of Ven-chilanni proper prove fatal through septic absorption and severe toxæmia; and those of Thati-chilanni die of "un-mentioned" causes. It will be observed that of the 9 fatal varieties 5 prove fatal through internal or external bleeding—i.e., more than 50%.

2. Kapha-Masurikas, though less fatal, are more infectious. In fact, it would appear that infectivity runs per contra to fatality among Masurikas—the less fatal varieties proving more infectious and *vice versa*.

3. The facts of minimum fatality and maximum infectivity and the facts that in non-fatal cases the patients can be bathed early on the 10th day—these facts make one suspect that cases of Kapha-Masurika (at least, cases that are mild and do recover) are really cases of Varicella and not cases of Variola; and perhaps the rows of rashes in Poar-chilanni of Neer-chilanni group and the 'bed-commonly associated with chicken-pox. We shall revert to the subject in the next and concluding section where we shall, in brief, make a comparative study of Masurikas of old and exanthemata of new.

(To be continued).

Atropine—Antidote to Phosphorus Poisoning

The newer phosphorus containing insecticides, are certainly poisonous and when poisoning occurs as a result of excessive and careless handling, the early signs observed are tightness of the chest, slight twitching of the muscles of the eyelids and tongue and contracted pupils. Dr. Goldblatt recommends, for the earlier stages, a dose of $\frac{1}{2}$ mg. of Atropine Sulphate by mouth. If symptoms are not relieved in an hour, repeat the dose, observing the patient closely. If he does not improve but gets worse, 1 mg. of Atropine Sulphate may be injected subcutaneously or intravenously. For later stages of poisoning, even higher doses may be given.

The organic insecticides which include hexaethyltetra phosphato, and tetra acetylcholine.—(Pharmac. Jour., March 1950).

INTERPRETATION OF LABORATORY FINDINGS AS AN AID TO DIAGNOSIS*

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Fæces—Its diagnostic importance

MUCH information can be obtained by mere inspection of fæces and the most important one can be gathered from its character. The normal character should always be borne in mind. It is formed, soft with light or dark brown or brownish yellow colour, with slight offensive odour. Typical characteristic stools as described in diseases are not always found, for example, in cases of acute amœbic dysentery we do not get the characteristic findings early, though at later stages in most cases we get it, but in subacute or chronic cases the character varies. It may be scanty, grayish green to reddish brown and mucoid. The stool in other cases may be entirely of blood and mucus, pure or mixed up with a little faecal matter, or blood-stained purulent material with almost always of characteristic foetid odour. Sometimes stools may be of liquid, yellow with only flakes of mucus, or it may be of slimy nature.

In cases of acute bacillary dysentery which is generally caused by shigella—the typical stool appears to be liquid watery in which flakes of mucus float—the liquid portion may be of red colour denoting blood or the flakes may be blood-streaked only. Here we get the colour of the blood as bright red in contrast with amœbic where it is blackish red. The odour here is not characteristic, rather it can be said inodorous.

In cases of flagellate protozoal infection of which giardia infection (scientifically it is non-pathogenic) may be taken as an example, stool almost always is liquid yellow with little mucus, bulky and often frothy and oily—the reason possibly is due to the fact that the habitat of giardia is in the duodenum where the proper digestion is hampered. One of the characteristic points of this infection is the occurrence of alternate diarrhoea and constipation.

In cases of ciliate protozoal infection (type—Balantidium coli) the appearance of stool is almost like that of an acute attack of bacillary dysentery. In cases of other infection of intestinal tract (cholera), after some period of the onset characteristic rice-water stool as a result of absence of bile secretion gives one the definite point to arrive at a diagnosis.

The other enteric group of organism of which E. typhosum is important the character varies very much—from pea soup colour of stool to frank blood as a result of perforation of ulcer. Often it may be found as greenish liquid with masses of mucus.

Coccal infection may cause diarrhoea and sometimes the appearance of stool is liquid red, but presence of R.B.Cs. may not be revealed by microscopic examination. In all probability such a type is due to hæmolytic strain (Streptococcus).

* Specially contributed to THE ANTISEPTIC.

The blood-inhabiting protozoa (plasmodia and leishmania-donovani) may cause diarrhoea, the former may often show of choleric nature or even like that of acute dysentery; in the latter, the diarrhoea shows of small quantity of various colours—the number of stools become great and this is almost always terminal.

In deficiency disease and anæmia of macrocytic type, the character is liquid mixed up with faecal matter or practically of watery nature, odour is offensive or sour and stools are bulky pointing to indigestion.

The appearance in diseases of liver is almost always grayish or muddy, frothy and bulky with offensive odour (cause—absence of bile).

In sprue or para-sprue, we expect to get frothy and bulky stools with steatorrhœa.

In ulcerative colitis, blood-mixed stool with mucus is the ordinary feature, but may be only of stools with mucus.

In infantile diarrhoea, if caused by dentition, it is at first simply yellow liquid with scanty faecal matter leading on to greenish with strips of mucus and watery and then to simply watery and mucus (all possibly due to want of proper nutrition—inanition).

Climatic and altitudinal diarrhoeas are simple ones—the quantity is large, liquid or semi-liquid in consistency containing faecal matter and motions passed with sounds.

Helminthic diarrhoea shows itself to be mucoid, yellowish, semi-solid, often in many cases with streaks of blood, but the infection caused by ankylostoma often shows stools of blackish colour due to altered blood.

Flattened ribbon-like stools result from some obstruction in the rectum, such as from tumour or stricture caused by a healed ulcer—may be of syphilitic origin. If such a stool shows streaks of blood, it gives a suspicion for carcinoma in the absence of bleeding piles.

Mucous present in stools signifies irritation or inflammation of the intestine. If mucous is small and intimately mixed up with stools, the trouble is probably in small intestine. Wholly mucus and blood-stained stools point to dysentery, ileo-colitis, intussusception, mucus colitis or membranous enteritis or secretory neuroses. Shreds or ribbons of altered mucus representing complete casts of portions of bowels are passed especially after an enema, and after washing such a stool segmented strands may appear to delude to observer suggesting fragments of tape worm. By sieving stools, concentrations such as gallstones by their faceted surface can be recognised.

Odour of stool is another important finding. Stools emitting a very foul stench odour are suggestive of malignant or syphilitic or ulceration of rectum or gangrenous condition due to any causes. As previously noted in acute bacillary dysentery stools give no characteristic odour.

Reaction of faeces to litmus is important for diagnostic purpose. In almost all cases the reaction is acid. In cholera,

bacillary dysentery and even in pure and simple diarrhoea and in many other cases where the passing of intestinal contents be very hurried, the stools give reaction to alkalinity—sometimes in cases of acute amoebic dysentery, the reaction of stools become alkaline, the reason of course being due to excess of blood.

Other chemical tests also play an important role to aid clinical diagnosis. Amount of blood in stools, too small to detect by simple inspection, constitute occult blood, and this requires a chemical test for detection.

What does the blood in stools—naked eye appearance or detection by chemical test in case of occult blood—denote, is a potential question. The blood in stool may come from anywhere of the long alimentary tract—bleeding gums, ulcers in the tract, bleeding piles, dysentery, etc. Blood may also be of lung origin—hæmoptysis—in which case the blood may get into stomach by regurgitation (act of deglutition). By only getting the occult blood test positive, one is not justified to lean to make a diagnosis of duodenal ulcer. Repeated tests are required and if in seven successive days the stools show positive reaction in different times, then and then only the case should be looked upon with suspicion and this is the consensus of opinion. If the colour of blood is bright red, one can assume that its origin is at rectum or a little higher up. If colour is blackish and pure blood, the origin is venous and may be taken as of coming from upper bowels. If the colour shows tarry or black character, certainly the blood is coming from higher up the alimentary tract. The colour-change is due to the blood being digested with formation of hæmatin. Blackness of stool due to blood may be distinguished from that produced by drugs by a simple physical test. "Mix thoroughly stool with twice its volume of water and allow to stand. The supernatant fluid is tinged and becomes reddish in case of blood, and which in other conditions remains dark or greenish", but one is to remember that dyes such as hæmatoxyline or any fruit with red colour, if administered to patients, or people who are heavy consumers of beetle, may pass reddish stools and that may impart the red tinge to the supernatant fluid in the above physical test mentioned and the chemical test therefore is of so much importance here. It is well to bear in mind that various drugs, etc., may give rise to various colours, e.g. cocoa and chocolate impart dark gray colour, calomel—green due to biliverdin, Iron and Bismuth—dark brown or black; hæmatoxyline—red. In this connection one must not forget the frank blood passed along with stools in bleeding piles, but here we get pure blood which generally comes by drops earlier to passing of stools.

In cases of deviation from normal colour of stools, one may carry out the test for bile, the absence of which will point towards deficiency of liver action. Green stools in children, if accompanied by symptoms, is pathological, such as in cases of green diarrhoea—the colour is due to biliverdin. Chromogenic bacterial infection

may also impart such or other colour. Milk diet in excess gives a light yellow colour. Whitish curd-like masses in stools of infants is due to either imperfect digestion of fat or casein or to excess of these diets. When there is an interference of fat digestion, e.g. in pancreatic disease, stools appear greasy and consist of fat or its derivative in excess. An important fact is to be always borne in mind that after administration of fat, castor oil for example, the stools may show fat globules microscopically.

The tests for enzymes are carried out to find out, e.g., the pancreatic deficiency, but authorities are divided into two camps as to the validity of the test. Any way the following facts may beneficially be remembered. Two ferments, amylase and trypsin, are normally present in fæces. Pancreatic disease or obstruction of pancreatic duct cause the ferments diminish or become absent. So a quantitative test and a qualitative as well may be helpful. Of these two ferments amylase is the most important since the action of trypsin may be simulated by Erepsin or the proteolytic activity of bacteria.

Microscopical Appearances

A good deal of information as to the nature of infection may be had from this—helminthic or protozoal or otherwise. Elucidation regarding dyspeptic condition, defect in liver action etc., may be recognized also, e.g., starch granules, fatty acid crystals, neutral fat etc., point to particular deficiency. Infantile liver causes diarrhoea, but microscopic appearance does not give any clue by characteristic findings, i.e., there is nothing which is characteristic. Presence of Charcot-Leydon crystals point to chronic amœbiasis mostly, but may be encountered in other cases as well, e.g., helminthic infection (ankylostoma particularly). Fatty acid crystals, neutral fats signify deficiency in fat absorption and only be encountered in pancreatic diseases provided no bland oil was administered. Presence of cysts of pathogenic protozoa suggests that the disease has gone up to chronic stage and such cases need handling with great care. In bacillary type of dysentery—in acute cases—large number of macrophages are seen. If R.B.Cs. are present in stools, the character may be noted—if they are discrete, and microscopic field shows abundant in addition to other picture, it is generally of bacillary origin, but in amœbic cases the red cells show tendency to agglomeration. If microscopic findings show pus cells and epithelial cells mainly entangled in mucus the cases are generally of enteritis. Presence of A.F.B. in stools is less significant than in other materials as their presence in stools may be wholly due to swallowed infected sputum. Pure cholera stools do not ordinarily show pus cells, but smear examination reveals comma bacillus.

*Note:—*The examination of stool is not complete if at least ordinary bacteriological examination by way of culture be not undertaken.

Special examination, e.g., cholera red reaction or special cultural examination or animal inoculation, only gives many clues to facilitate diagnosis.

PHYSIOLOGICAL FACTS ABOUT MICTURITION*

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EXCRETORY system persists in us because we are still imperfect from the point of view of evolution. Were it not there, waste products would have accumulated and life could have extinguished. All that we eat or drink is not completely metabolised and transformed into energy, static or dynamic.

Mechanism of urine formation.—The urine which is voided by a healthy human being is quite different from what it is actually formed initially by the kidneys. The manufacture of urine is the sole proprietary right of the kidneys, but it does not mean that the kidneys have only this function to perform. They serve a more important function, rather a very vital function, of maintaining the normal pH of blood in the body, which is extremely essential for the optimal activity of the protoplasm.

Structure of the kidney:—The human kidney is phylogenetically the metanephros, the older pronephros and metonephros exist only during embryonic development of the foetus. The kidney is a compound tubular organ having an external lining, called 'cortex', and an inner one, the 'medulla'. The functional unit of the kidney is a "nephron". A nephron has got 2 main parts.

(1) *Bowmann's capsule:*—It encloses a tuft of very thin-celled, blood capillaries, which are merely an intra-renal portion of the vast capillary bed. 'These tiny intra-renal tufts of capillaries enclosed in the Bowmann's capsule are called the 'glomeruli'.

(2) *Uriniferous tubule:*—The renal tubule in its entire length is lined by a single layer of cells; and the more we proceed towards the collecting tubule from the neck of the uriniferous tubule, the cells richer in their protoplasmic contents are found.

The length of the human renal-tubule is approximately $1\frac{1}{6}$ ", its diameter being about 44–60 μ .

BLOOD SUPPLY.—Renal artery enters the kidney at the hilum, and there divides into a series of 11 branches that pass towards the renal cortex, termed as the "inter-lobular arterioles". These arterioles, later called as 'afferent vessels', ramify to constitute the glomerular tufts, and then turn back without anastomosing, to be called the 'efferent vessels'.

These efferent vessels, like a portal system in miniature, further break up into several minute capillaries to supply the uriniferous tubules, and finally unite to form the venules and then the renal vein.

Blood pressure in the glomerular tufts is much higher normally than it is in the capillaries elsewhere in the body. And, not all the

* Specially contributed to THE ANTISEPTIC.

glomeruli are working at any particular moment, as if there is also "shift" system of activity in the glomeruli.

Nerves have probably no direct influence on the renal activity except that they do modify the blood-supply to the kidneys through a humeral mechanism.

Functions of the kidneys.—Kidney in its excretory role is closely related to the skin, while in maintaining the pH of blood to the lungs.

1. *Bowmann's capsules*:—It has been experimentally proved that the Bowmann's capsules have no physiological activity. The filtration of urine by glomeruli is a simple physical process. Nature is a very economical engineer. Histological structure of the Bowmann's capsule consists of a single layer of nongranular cells deficient, rather, lacking practically, in protoplasm and its nuclei are inconspicuous. This structure itself is adapted to the action of filtration of urine, which is a non-vital process, and wherein the wall of the Bowmann's capsule acts as a daily sink membrane allowing the crystalloids to cross the "barrier" and retaining the more important constituents of the blood *viz.*, the colloids. That is, the urine poured by the glomeruli = plasma minus colloids. As filtration of urine is a physical process, a change in the blood pressure influences the amount of urine filtered out; but any alteration in the osmotic pressure affects a little.

2. *Uriniferous tubules*:—The uriniferous tubules, on the contrary, have got their wall lined by a single layer of cells rich in protoplasm and with well-defined nuclei. This itself indicates that the uriniferous tubules are, by Nature, meant to execute a vital function. An abundant provision of protoplasm to the cells of the uriniferous tubules must have got some purpose to serve. And it is actually so. There is a sort of selective re-absorption capacity in the cells of the uriniferous tubules, a very complicated affair, meaning thereby that a further change in the filtered urine during its onward course in the uriniferous tubules involves a vital process. The "torrents of undifferentiated filtrate" which amounts to something like 150 litres in 24 hours (actual urine discharged by a healthy adult in 24 hours is approximately 1.5 litres)—such an enormous quantity which would necessitate not only an extraordinary burden to the kidneys but also an unwanted wastage of the threshold substances is definitely reduced and changed in quality in its passage down in uriniferous tubules. The useful substances are picked up and re-absorbed, whereas the things otherwise harmful to the human system are eliminated and excreted. Water, glucose and chlorides which are essential constituents of the blood, and are called as 'threshold substances' by Richards, are taken up from the filtrate. The inorganic threshold substances are absorbed along the distal tubule, while the organic threshold substances are absorbed from the proximal tubule; water is absorbed from the

entire length of the uriniferous tubule. Thus, it is seen that urine is the medium for only nonvolatile water-soluble solid wastes. A change in the blood pressure has practically no effect on the quality of the urine, but a change in the osmotic pressure does affect the quality of the physiological diffusion.

Other proofs:—There is yet another way to prove that Bowmann's capsule acts as a filter, while the uriniferous tubules act as dialysers. When two samples of blood are taken, one from the efferent vessels after its circulation in the glomerular tufts, and the other from the renal veins, and if these are examined for their individual contents of oxygen, it would be found that whereas in the former case oxygen content is the same as it is in the blood of the efferent vessels, in the latter case there is less oxygen content in the blood of the renal veins than in that of the efferent vessels. This clearly indicates that some of the oxygen is definitely used by the cells of the uriniferous tubules, whereas none by the cells of Bowmann's capsules, and "no vital activity is ever possible without the utilisation of oxygen" is the fundamental fact of physiology. Hence it is proved that the Bowmann's capsule acts passively, whereas the uriniferous tubules work actively; the former acts as a mechanical agent, the latter as "living" dialyses. A kidney consumes as much as about 0.05 c.c. of oxygen per gram of its substance per minute.

Nature's economy.—Nature is never extravagant. Its economical working is well appreciated when we observe that the blood supply is first to the structure which little uses O_2 , *i.e.*, to the Bowmann's capsules, and thence to the uriniferous tubules, which utilise oxygen.

Path of secretion of urine.—Kidney → renal pelvis → ureter → urinary bladder. The bladder is thus merely a storehouse of the manufactured urine, from where it is voided to the exterior from time to time.

Nerve supply to the urinary bladder.—Urinary bladder is innervated by the autonomic portion of the nervous system. The A.N.S. is distributed as:—

A.N.S. →	{	P.N.S. → Causes relaxation of the sphincters, and the contraction of the bladder wall—hence urine passed out.
		S.N.S. → Causes contraction of the sphincters, and the relaxation of the bladder wall—hence urine withheld back.

Sympathetic nerve supply is from the hypogastric nerves, while the parasympathetic one is *via* the nervi erigentes. Lower centre is in the lumbar enlargement, and the higher centre in the hypothalamus. A new third centre is created in the motor cortex of the cerebrum when a voluntary check over the act is cultivated.

The fundamental facts about micturition and its physiology are thus outlined above. Principally, micturition is an unconditioned reflex for which a gradual rise in the intra-vesical pressure of the urine and its reaching to a certain optimum is the all important exciting stimulus for the execution of the act.

The sensation of distension is the sole basic phenomenon for the discharge of voluntary micturition, and this sensation is perceived when the tension of urine in the bladder reaches about 15-18 c.m. of water.

Summary.—1. Excretory system persists in us during the course of evolution as we are still imperfect.

2. Manufacture of urine is the sole proprietary right of the kidneys, although their more important function is to maintain the optimum pH of blood.

3. Nature is a very economical engineer, and this we can observe if we study the histology and circulation of the Bowman's capsule and of the uriniferous tubules.

4. Bowman's capsules are merely mechanical filters involving no use of oxygen, while the uriniferous tubules are physiological dialyses involving the use of oxygen.

5. Fundamentally, micturition is an unconditioned reflex requiring a harmonious co-operation of the two components of the autonomic nervous system, and for the execution of micturition, a certain optimum intravesical tension of urine is most important.

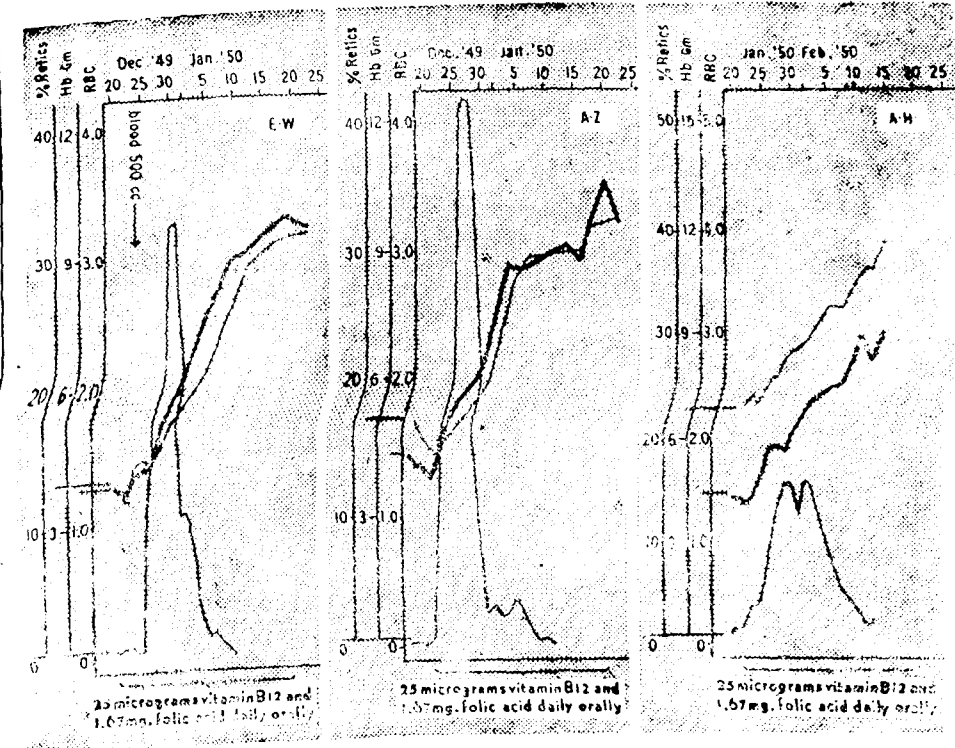
Comparative Effects of Water, Soda-water, Sod. Chloride and Soda Bicarb Solutions on Gastric Secretion

From time to time one sees or hears the statement that 'carbonated soda-water, or soda bicarb solution stimulates gastric secretion in men. Hale *et al* of the College of Medicine, Chicago, carried out controlled tests to determine whether soda-water or soda bicarbonate had a significantly different effect from an equal quantity of plain water or normal saline on the secretion of acid by the stomach in human subjects. The subjects were normal young adult males and male adults in whom the diagnosis of duodenal ulcer had been radiologically established. The results showed—

(1) In normal human subjects (a) carbonated soda-water does not stimulate gastric secretion or affect gastric emptying to any greater extent than plain water; (b) normal saline and normal soda bicarb solutions leave the stomach at about the same rate.

(2) In cases of duodenal ulcer, normal soda bicarb solution leaves the stomach more rapidly than normal saline solution.

(3) In contrast to plain (distilled) water, normal saline does not stimulate gastric acid secretion.—(*Jour. Lab. Clin. Med.*, 35, 2, pp. 249-252, 1950).



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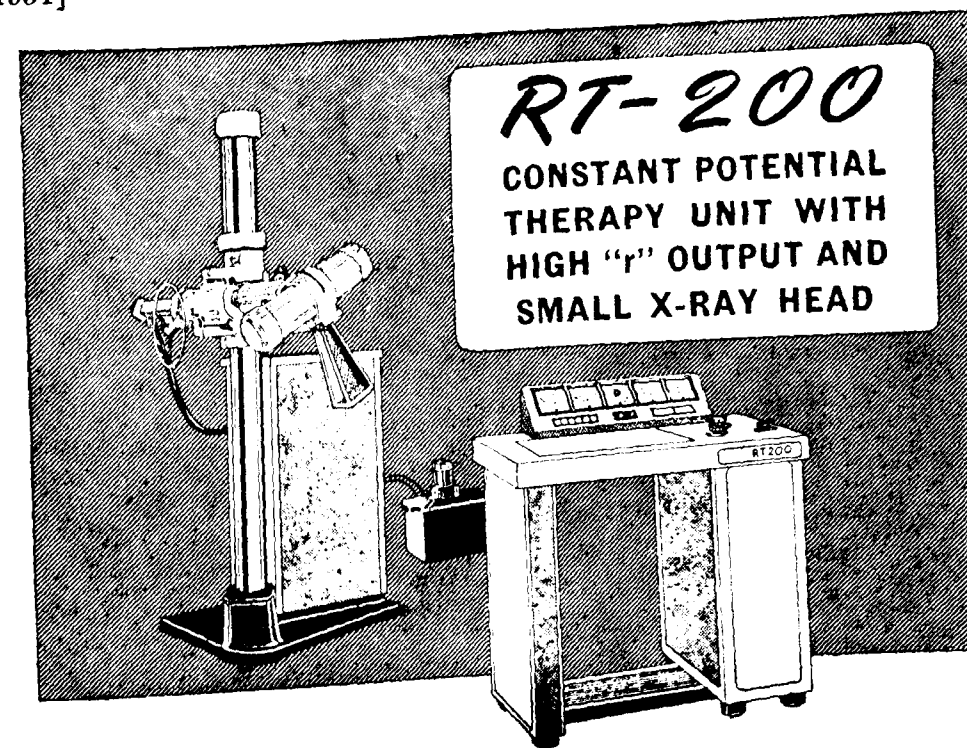
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Cases and Comments

SYMPTOMS OF 'ACUTE ABDOMEN' IN CHOLERA

DAMODAR PRASAD, L.M.P.,

Registered Medical Practitioner, P.O., Hajipur (Behar).

IN over ten years of my practice I have treated a comparatively larger number of cholera cases. I was very recently faced with such symptoms of "acute abdomen" as to advise the removal of the patient to Patna for operation. This, of course, I did in consultation with one of the most senior members of the profession who agreed with my diagnosis which proved, in the end, to be utterly wrong, though the treatment which I had given was credited with success.

With the idea of confessing my shortcomings and placing this queer complicating symptomatology of a cholera case before the profession, I propose to give an account of the same.

On 30-8-'50 at 9 p.m. I was called to see one Jaidayal Singh, aged about 50 years, for the treatment of diarrhoea and vomiting. The patient complained of—

(1) 7-8 watery motions since the morning. Vomiting had occurred 3-4 times. The first vomit consisted mainly of undigested food matter which the patient had taken the previous day; (2) extreme weakness; (3) violent thirst; and (4) restlessness.

On examination the patient revealed the following.—(1) Constitutionally thin and anæmic; (2) no sign of dehydration except slight sinking of the eyeballs which I attributed to his build; (3) tongue—moist, coated with white fur; (4) pulse—110 p.m. regular, V & T low; (5) temperature 97°F (armpit); (6) no abnormality in heart and lungs; (7) abdomen—soft and gurgling, spleen and liver not enlarged; and (8) urinary system—urination occurred with motions. Bladder empty.

History:—The patient had his meal very late on the previous day after great exertion which was unusual for him. A few days back there had been two cases of cholera, of whom one died in the vicinity.

TREATMENT.—1. Sulfaguanidine 8 tablets plus 4 tablets Soda-mint in $\frac{1}{2}$ ch. of water was given stat and half the dose was recommended 3 hourly.

2. Grape sugar solution 50 c.c. 25%—2 c.c. Cycliton was given I.V. slowly.

Result:—Pulse improved, thirst and restlessness decreased.

I left the patient at 10 p.m. with the following instructions:—(1) to take the medicines as directed; (2) to take sips of glucose water frequently; (3) to pass his urine and stool in bed; and

(4) to send for me immediately if weakness or restlessness increased or cramps appeared.

The same night at 1.30 a.m., a man knocked at my door and reported that the patient's condition had worsened and I was to go there with Saline arrangements.

I rushed immediately with necessary arrangements and found that the patient was complaining of:—(1) Extreme prostration; (2) cramps were evident in legs and abdomen; and (3) anuria and restlessness.

On examination.—(1) Facies of cholera established, husky voice evident; (2) signs of dehydration with sinking of eyeballs and shrivelling of fingers and toes were evident; (3) pulse quick and thready; and (4) axillary temperature subnormal; (5) heart sounds feeble; and (6) bladder not distended.

I asked my assistant to prepare two pints of Normal Saline 4% Glucose and in the meantime I injected 50 c.c. 25% Glucose and 2 c.c. Cycliton I.V.

The pulse returned to normal after one pint of Saline transfusion and the patient began to feel much better. However, I thought it better to transfuse another pint of Saline and Glucose and added 1/2 c.c. Adrenalin and gr 1/100 Atropine into that. By the time 16 oz. of next pint of Saline was finished, the patient complained of sudden pain in the abdomen on which I withdrew the saline needle from his vein and switched it on to his armpit subcutaneously. By this time the pain had increased all the more in spite of his feeling well otherwise. I kept waiting and watching by his side till 4 a.m., but the pain was not reduced. One tab of "Cibalgin" was given stat and I left the patient when there was some amelioration. The abdomen was not exhibiting any particular sign till then and I attributed the pain to be due to intestinal spasms although it is rare in cholera. Acute dysentery of course was a probability.

I had hardly a wink of sleep when a man came and awakened me at 6 a.m. on 31-8-'50 and reported that the patient's condition had worsened still. On my arrival I found that the patient was (1) almost pulseless and restless; (2) complained of severe pain in the abdomen which had become board-like rigid. The thighs were in flexion. On percussion it was tympanitic all over except on the lying side. The liver dullness had disappeared. There was no bowel sound; and (3) vomiting and diarrhoea had stopped since the beginning of pain.

On the above findings I suspected gastric perforation, especially when I was able to elicit the history of previous pains relieved with Soda. I called in one of my senior colleagues for consultation and he corroborated my diagnosis and the question of removing the patient to Patna for operation was considered. As he was almost pulseless (primary shock?), it was thought better to wait till it improved. It was decided to push another pint of Saline, so in the meantime

50 c.c. of 25% Glucose—2 c.c. Cycliton was again given I.V. by the time Saline was ready. But there was no improvement until one pint of Saline was transfused.

The patient was removed to Patna on a country boat at 11 a.m. on the same day with a history and treatment note prepared by me.

Discussion.—A. Was this a case of cholera or acute gastroenteritis culminating into intra abdominal perforation?

POINTS OF INTEREST:—Cholera:—(1) History of cholera in the vicinity; (2) signs of dehydration; (3) no nausea or griping; (4) toxæmia lesser; and (5) vomits profuse.

Acute gastroenteritis:—(1) Acute pain in the abdomen; (2) vomiting and diarrhoea; and (3) rigidity of abdomen.

More points were in favour of cholera.

B. Can acute abdomen supervene in a case as above?

(1) Gastric perforation can certainly occur in a case of incipient ulcer due to lowered vitality, starvation and sudden accumulation of a large amount of fluid in the stomach; (2) rupture of some intra-abdominal arteriosclerotic vessel might possibly occur in an aged person due to rapid Saline transfusion; (3) paralytic ileus may occur in a case of cholera but in this condition there is no pain; and (4) acute uræmia sometimes presents the picture of acute abdomen but the pathology of pain is not explainable.

In the above case we removed the patient in favour of more serious condition about which we were more confident and for which we had nothing under our domain to deal with. Our conviction was much in favour of No. A or No. B 2.

I had no information of the patient until the next morning although I was very eager and anxious to know about the progress of the case and confirmation of the diagnosis.

At about 10.30 a.m. on 1-9-'50 one of the attendants returned from Patna with a smiling face and informed me that the patient was doing well. He said that the pain began to decrease while he was on the way and completely subsided when the patient had a motion when he reached there, his pulse maintained although no treatment except Alkaline mixture, cholera powder and an injection of "Carbachol" was given after his admission in the Cholera Ward of the P.W.M. College Hospital, Patna. The patient was discharged from the hospital and came back on 4-9-'50. I had the opportunity of examining him again after his arrival when he was free of troubles except some residual weakness.

Probably this case developed toxic uræmia which presented the symptoms of acute abdomen, or there had been some small gastric leakage which may have sealed automatically. But in the former case, the pathology of pain remains a problem and requires elucidation by those competent to explain.

INTRAVENOUS INJECTION OF UREA STIBAMINE AND NITRITOID CRISIS

CHINTA HARAN GHOSE, L.M.P., L.T.M.,
Retired Medical Officer, P.O. Powakhali, Dt. Purnea (Bihar).

ACU TE vasoparetic reaction or nitritoid crisis is the term employed by Milton because the symptoms and lesions resemble inhalations of "Amyl Nitrite". These reactions are produced by the intravenous injection of many substances such as Urea Stibamine, N.A.B., Glucose etc., and are common among individuals with Adrenalin insufficiency and thyroid disturbances. They have been attributed to the disturbance of the "sympathetic system". But it is more likely that the toxicity of the drug is responsible for the manifestation of the acute symptoms, or they may be due to some abnormal changes in the capillaries, or the combination of both (Chopra).

The symptoms manifested shortly or immediately after and rarely during the injection are the flushing of the face, nausea, vomiting, abdominal pain and sometimes diarrhoea and collapse. There is sudden fall of blood pressure with feeble, small and imperceptible pulse; constriction of the throat, swelling of the lips and respiratory embarrassment are also present. Seldom there is loss of consciousness which may last for several hours and the case may either revive or end fatally. Reactionary fever is always present and comes on not at once but a little later. These reactions though alarming are rarely fatal.

I met with only one case of fatal reaction during my whole period of service of about 30 years. I came across cases with very severe reactions and they all revived after proper treatment.

These reactions are also called "Anaphylactoid reaction", because they resemble, "Anaphylactic shock", which is due to antigen anti-body reaction. These are quite different from "serum sickness". In serum sickness the symptoms come on 8 to 12 days after the injection and are characterised by erythema, urticarial rash, joint pain, and fever, and are more frequent after intramuscular than after intravenous injection. Anaphylactic reaction according to Park is 1 in 20,000 and fatality 1 in 50,000. I presume reactions after intravenous injection of Urea Stibamine are much higher, though the fatality figure may not exceed that due to anaphylactic reaction.

I had the misfortune to find fatal reaction in a case receiving only .05 gm. of Urea Stibamine (Union Drug & Co.) in the first injection. This was an early case of kala-azar diagnosed after usual serum test, his general health being not much affected. I gave him .05 gr. Urea Stibamine intravenously. Just after the injection I noticed that he was reeling and suspecting something wrong. I at

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once made him lie down on the floor. His eyes became red and he was restless. He could hardly speak and his voice was husky. He expressed his agony by the gesture of his hands. Pulse was very feeble and almost imperceptible. Soon he became cyanosed and had hurried and stertorous breathing, followed by complete loss of consciousness and death. Specific treatment of the condition with Adrenalin Chloride could not be given to the patient, it being then out of dispensary stock. All cardiac stimulants like Digitalin, Strychnine, Ether Camphor were given parenterally but with no response. Artificial respiration and cardiac massage were also resorted to but all in vain and the patient died within 10 to 15 minutes after injection. I never came across deep cyanosis in any of my previous cases with very severe reactions and never ending fatally, though such cases do occur in very rare instances.

I think it will not be out of place to cite here a case of snake-bite treated with intravenous injection of "Anti-venom" (Pasteur Institute, Kausali). Within a few seconds after the injection the patient suddenly turned deep blue and died immediately after. I then attributed this deep cyanosis to a sudden change in the blood due to the sudden dislodgement of snake venom into the circulation after the intravenous injection. But now I am led to believe that the deep cyanosis and death were due not to snake venom but to anaphylactic shock which resulted from the intravenous injection of "anti-venom" and as a result of antigen anti-body reaction.

The cause of, "Nitritoid crisis", after intravenous injection, has not been accurately found out, different authors holding different views.

1. Col. CHOPRA :—His contention is that some change—precipitation—takes place in the blood as soon as the solution reaches the circulation. Precipitation is often seen to take place within the syringe during the injection when blood enters the barrel of the syringe. There is no agglutination and hæmolysis.

It is not understood why reaction generally does not take place in the first injection and in every injection inspite of the precipitation of the blood being present in all cases but occurs late when the course of treatment is about to be completed. There is no denying the fact that precipitation is less when the patient is about to be cured and when he is in the last phase of treatment. Hence his argument does not stand.

2. Dr. U. N. BRAHMACHARI :—According to Dr. Brahmachari reactions are due to, "Idiosyncrasy" or "over-susceptibility". It is true, certain individuals are hypersensitive to certain drugs such as Quinine, Mercury, Pot. Iodide etc. But hypersensitive persons are always susceptible to the first dose and also to all subsequent doses if not de-sensitised. After intravenous injection, reaction generally takes place not in the first injection but late in the 5th or 6th injection or towards the completion of the course.

Thus the explanation is vague and not based on strong grounds.

3. Cumulative action :—Some say this might be the cause.

As elimination of Antimony Salts (Urea Stibamine in the present case) after intravenous injection is very rapid and because injections are generally repeated every second or third day, the chance of accumulation of the drug is almost nil. Besides, there can be no accumulation in the first injection as in the present case. Hence the argument is groundless.

4. High toxic doses may produce reactions. But in the present case the dose is not sufficiently high to produce reactions. Again, in all cases of reactions, the doses were not proved to be high to produce symptoms of reactions. Hence the cause of reaction must be something else.

5. Severe reactions following intravenous injections may be due, at least, in part to the fact that the pH of the fluid introduced is decidedly more acid or alkaline than that of the blood. Such solutions should be buffered. When not done so *i.e.*, when not buffered, reaction may occur. But the fact that reaction takes place after several injections and not in the first, does not lend support to the above contention.

Buffers.—If acid or alkali be added to a solution of a strong base or acid it will be found that usually the pH is markedly affected. Certain substances, however, when present in the solution, act to modify the usual effect in such a manner that the change in the pH may be practically inappreciable. Such substances are known as buffers. The important buffers are Bi-carbonates, Proteins (specially Hæmoglobin) and Phosphates.

Blood contains substances like Acid and Alkaline Phosphates and Sodium Bicarbonate which together with Hæmoglobin and Protein act as a powerful buffer and prevent reaction of the blood being easily changed.

Note :—A few days after the incident, it came to my knowledge that the patient in question kept on starvation for two or three days before the injection owing to domestic quarrel.

Starvation produces acidosis, *i.e.*, changes the pH of blood to the acid side. As long as pH is normal (7.3 to 7.5), the acid base equilibrium is normal or compensated, otherwise it is uncompensated and life is threatened. It is possible that the change of pH to the acid side due to starvation might have something to do with the death of the patient above alluded to. Again, as the reaction came on in the first injection and with a small and non-lethal dose it is probable that the death was due to "Hypersensitiveness."

It is essential that the cause of reaction, after intravenous injection, so alarming and sometimes fatal, should be found out.

A CLINICAL OBSERVATION OF PHTHALYL SULPHACETAMIDE IN B. DYSENTERY

B. K. DEY, L.C.P. & S., (EX-Captain I. A. M. C.),
P. O. Mundakayam, Travancore, S. India.

SINCE the reference to the above mentioned drug in Jan '51 issue of THE ANTISEPTIC by U. P. Basu and A. N. Bose of the Bengal Immunity Research Institute, Calcutta, this clinic gave a fair trial to this drug in a series of 12 B. dysentery cases. The use of this drug was confined to patients whose ages ranged between one month to 7 years. The drug was used to treat more than 12 cases of dysentery but the clinical symptoms of B. dysentery were very clear in only 12 cases.

All these 12 cases showed more or less the same symptoms *e.g.* fever at the onset, gripping pain in the abdomen with number of loose motions loaded with blood and mucous. Eight of them showed an additional symptom of vomiting everything out. Two were complicated by the native *vidians* in as much as their bowels were constipated which added more distress to the already toxic patient.

The drug in the form of 5 gm. tablets is known by its trade name as Enterocid (P-Phthalyl Amino Benzene Sulphonacetamide). The drug was administered in the following dosage :—

3 months to 1 year— $\frac{1}{2}$ tab. q. 4 h for 2 days, q. i. d. for 2 days.
1 year to 3 years— $\frac{1}{2}$ tab. q. 4 h for 2 days, q. i. d. for 2 days.
4 years to 7 years—1 tab. q. 4 h for 1 day, $\frac{1}{2}$ tab. q. i. d. for 3 days.

For a complete cure a 4 days' treatment was quite sufficient.

The required amount of the drug was given in the form of a mixture, added to each dose 3 to 10 grs. of Sodi-Citrate and sweetened by any simple syrup. Children take this mixture very easily. In cases of vomiting, if the first dose is vomited out, immediately the next dose is given and this is well tolerated. If the child retains one dose, the improvement will be seen within the next 2 to 4 hours' time. Glucose water by mouth in small teaspoonful doses, is an added advantage. The sucking babies were not disallowed milk but the older ones used to rice etc., were restricted to fluids alone.

It is stated that the drug is also useful in the treatment of ulcerative colitis, typhoid fever, cholera and in intestinal surgery. The drug is not yet freely available in the market but we hope that it will be given a fair trial in the treatment of other diseases also, when it becomes available.

The drug has no toxicity, is well tolerated, has no bad taste and is effective in very small doses. We hope that the price also will be quite reasonable.

I have no laboratory facilities and the cases have been diagnosed purely on clinical symptoms, naked eye examination of the stool and the presence of a mild epidemic of dysentery in this part of the year in this locality.

I express my gratitude to the Superintendent, Bengal Immunity Co. Ltd. for supplying free samples of the drug for trial in all these cases in my clinic.

A CASE OF ANÆMIA TREATED ON INTRAVENOUS IRON THERAPY

Miss. JIWANLATA,
Supintendent, Mrs. Girdharlal Maternity Hospital, New Delhi.

Name of the patient: A.D., aged 25 years; residence: Delhi. Patient started attending O. P. D. from 13.9.'50.

Complaint:—Increasing weakness for the past several weeks. Pregnant: 8 months. 5th para. Three were full term normal deliveries but none living. Two of these children died one on the 15th day and the other at 3 months. One was twins. None living.

On examination the patient was a pale looking woman. Teeth and tongue—N.A.D.P.A.—Uterine size 8 months L.O.A. F.H.S. good. Liver and spleen not palpable. Heart—both sounds faint. No adventitious sounds heard. Blood pressure—110 and 60. Hb. 50% by Hæmoglobin scale book. Her blood was + for Kahn. Stool—showed no abnormality. Urine—N.A.D.

She was given Procaine Penicillin 4 lac units one dose and a course of six injections of Thiarsin. She was also put on Polvron by mouth. Injections Neo-hepatax 2 c.c., Vitamin B complex 2 c.c., on alternate days. These were continued throughout but hæmoglobin remained persistently below 50%.

Previous to starting treatment in the hospital she had taken a lot of treatment from private doctors but no improvement occurred. She was admitted on 2-11-'50, delivered a female child weighing 6 lbs. 12 oz. Her hæmoglobin was 30% by Hæmometer. The same two injections were continued but Inj. Iron Arsenic were also given. During her stay of a week in the hospital she was also put on large doses of Ferri et Ammonia Citras. She left the hospital against advice. She then started taking injections of Vitamin B₁₂ but with no improvement whatsoever. She was advised blood transfusion. She consulted me again in December for increasing weakness with attacks of faintness and giddiness.

The blood examination report was as follows:—R. B. C. count: 2,410,000. Hb. % Sahli 30% 5.16 gms. per 100 c.c's. Colour index .6. W.B.C. count: 9050; Diff. count: Polymorphs 72%; Lymphocytes 21%; Large Mononuclear 3%; and Eosinophils 4%.

Before taking blood transfusion I advised her to take intravenous iron injections. I started with 2 c.c's of Iviron undiluted but given very slowly. She felt faint for 15-20 minutes. She was made to lie down and given a few drops of Niacin.

She was next given 5 cc. and was continued on 5 cc. on alternate days, or even on 5th or 6th day, depending on the reaction. It was very difficult to give her an injection intravenously as the visible veins were threadlike. I persuaded her to take at least six injections, by which time she could decide for herself whether she should take more injections or not. After the fourth injection she felt definite improvement and her attacks of faintness disappeared. Incidentally her veins also became more visible and injections became easier. After six injections her Hb. increased by 10%. She was given 12 more injections of Uniferron 5 c.c. containing 100 mg. of saccharated Oxide of Iron. Her Hb. went upto 60%. There was a little setback in between the injections due to a bout of malaria.

This patient had tried all kinds of known treatments for anæmia, e. g., large doses of Ferri et Ammonia Citras, Vitamin B Complex, Liver, Folic Acid, Vitamin B₁₂ etc., and showed no improvement with any kind of treatment but with intravenous iron therapy she started remarkable improvement.

This case is therefore quite illustrative. I have since then started giving Uniferron injections to every indoor anæmic patient and in every case there has been improvement. In some it is slow, in others rapid, but in none of the cases I have found Hæmoglobin going up by 4% after 100 mg. of Oxide of Iron as is mentioned in the literature and by the firms manufacturing these preparations.

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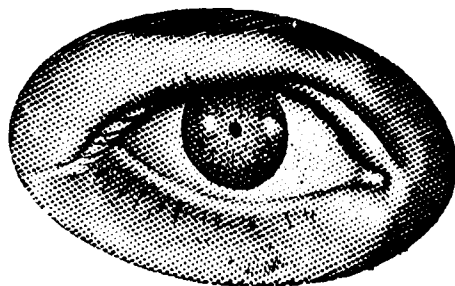
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PLANNING FOR HEALTH

WE have been stressing with all the emphasis we can command in the ANTISEPTIC that if the schemes that have so far been formulated and are likely to be formulated in due course by the Planning Commission to bring about far-reaching improvements in the industrial, agricultural, economical and social spheres in the country, it should, side by side, give deep thought and consideration to the improvement of public health in the country. Only when the foundation is well and truly laid can the superstructure stand any stress and strain. So also in regard to a country, only when effective steps are taken to ensure positive health to the people, can they take an increasing and enlightened interest in the implementation of the plans for regeneration that have been formulated. We are glad that the Planning Commission has realised the importance of this matter. Addressing the meeting of the panel on health programmes held in New Delhi on April 12, 1951, Shri GULZARILAL NANDA, former Labour Minister of the Bombay Government and Vice-Chairman of the Planning Commission, recognised the importance of the health programmes of the future keeping pace with the growing expectations of the people under a new democracy in India. As the old order of alien rule in India has given place to a new democracy, it is essential, he said, to approach all social problems, including the problem of health, from a new angle so that concentration of efforts might be directed largely towards the benefit of the common man.

It is ironic that when our exchequers, Central and Provincial, were overflowing, our alien rulers had not the will to remedy the evils which deprived the common citizen of a fair chance of good health. Now we have the knowledge and the will too, but economic

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and financial difficulties stand in the way. SHRI NANDA pointed out that while in the United Kingdom the percentage of expenditure on health to per capita income was as much as 3.9, it was as low as 0.6 in India. The percentage of expenditure on medical and health services in the Centre, States and local bodies in relation to the total expenditure comes only to 5.2 as compared to 10 in the United Kingdom. And the present is, no doubt, a great improvement on the past, due to the efforts of the Congress Ministries to provide for larger sums under this head. But the present provision is only a drop in the ocean. Yet the financial position of the Centre and of the States being what it is at the present moment, it is not possible for the Governments to provide larger and larger sums for the improvement of public health and the extension of medical relief far and wide. The Public Health Minister suggested to the panel that it may consider two methods for raising funds, namely by introducing health stamps as has been done in France, Belgium, Italy and Switzerland, and secondly by developing the idea of health insurance. As regards the first, India is not in the same position as other countries mentioned by her. The per capita annual income is much lower than that in those countries and the majority of the people are not even having one square meal a day. Besides, taxes have been raised considerably during recent years that it would be no exaggeration to say that people are really groaning under heavy taxation. It is therefore for the Planning Commission to consider if it would be wise to expect any large income from this indirect means of taxation. As regards the second, it is a matter worth the serious consideration of the authorities and the public.

In the circumstances the panel was called to discuss and advise the Planning Commission on the general pattern of health development, the priorities to be given to various schemes, adoption of a uniform health policy, co-ordination between the Centre and the States on health matters, and financing of health schemes and their re-orientation having regard to the special conditions and limited resources of the country. Shri NANDA placed before the panel several suggestions such as the vexed question of multiple systems, prevention of adulteration of drugs, improvement of health and vital statistics by application of scientific methods of registration, the chalking out of a programme for dissemination of knowledge on health and expansion of health education. He also referred to the present maladjustment in the sphere of medical education as a result of which "while, on the one hand, there are not enough doctors to go round the country, on the other hand, there is no lack of unemployment in the profession of medicine and nursing." He also made it clear that health services should be of real help to the poorer class and should be easily available to them.

The Health Minister availed herself of the opportunity afforded by this occasion to warn the panel against any idea of expanding

medical services at the cost of lowering the standards or quality of the profession. "The health of the nation is," she said, "its greatest asset and all systems of medicine must stand the searchlight of scientific investigation. Only those who are well equipped to practise should be recognised by the State." This was urged also by Dr. P. S. SRINIVASAN, at the Licentiates' Convention held at Ambala in April. "As matters stand now," he said, "there will be a clash between members of the scientific medical profession who number about 55,000 and the practitioners of the indigenous systems of medicine who, according to the Chopra Committee Report, numbered 2,00,000. It is essential to decide whether Government may safely let loose 2,00,000 practitioners of indigenous systems of medicine in India to do both preventive as well as curative work." The panel has divided itself into 11 sub-committees to consider problems connected with education and research, relative position of different systems of medicine, moral health, problems of malaria, tuberculosis and leprosy control, industrial health, woman and child welfare, health education, production and supply of drugs and other equipment, population growth and family planning. On the subject of family planning, the Health Minister suggested that the problem had to be tackled from a much more fundamental angle than what artificial methods of birth control could hope to achieve. Large scale introduction of artificial control measures, she said, apart from their doubtful moral value, was rather impracticable in India because the country could not just afford it. She herself made some suggestions such as the raising of the age of marriage, prohibition of marriages for persons suffering from insanity, leprosy and tuberculosis, provision for compulsory medical examination before marriage and finally steps towards improvement of the standard of living. The cumulative effect of all these measures, she hopes, would promote limitation of families. We shall await the reports of the Sub-Committees and the decision of the panel thereon with interest. The machinery has been set in motion and is bound to produce results.

THE LICENTIATES' CONVENTION

"TIME and opportunities are now ripe to do all we can to be forgotten as a separate entity. We should therefore not lose the time and opportunities at our command", said Dr. P. S. SRINIVASAN, M.L.C., Madras, presiding over the All-India Licentiates' Convention held at Ambala in the second week of April 1951. If the profession as a whole has not become one entity so far, the fault lies on the All-India Medical Licentiates' Association, some of the leaders of which are still against the merger of the I.M.A. and the A.I.M.L.A., in spite of the fact that opinion is slowly and steadily gaining ground among the licentiates themselves that merger would

be to their advantage in every respect. The reasons are not far to seek. The Indian Medical Association has extended its hand of fellowship wholeheartedly; the Government of India themselves are veering round to the view that the differentiation which was created by their predecessors to suit their own purposes, would not pay, and that if the wholehearted co-operation of the profession is to be secured in the huge task of reconstruction that lies ahead of them in the country, *viz.*, taking effective steps to assure positive health to the people, the existing differences should be done away with; in fact, in this very Convention, the Hon'ble RAJKUMARI AMRIT KAUR, India's Health Minister, announced that "the question of instituting an All-India Register for doctors by amending the Indian Medical Council Act is receiving the urgent attention of the Government of India. Both graduates and licentiates would be eligible for registration"; the Government of Madras have removed the distinction between Civil Assistant Surgeons belonging to Classes I and II and placed them all in one cadre, though in regard to pay there is still a differentiation between the graduates and licentiates. Such a distinction is wholly uncalled for and unjustifiable in view of the fact that the licentiate course has been abolished in this State long ago during the first Congress regime and those of the licentiates who are now serving as Civil Assistant Surgeons are persons who have put in service for a number of years and have proved themselves as worthy as the graduates themselves. Further representation is bound to wipe out this difference also and if the demand goes forth from the profession as a whole the mistake is bound to be rectified early and the licentiates in the cadre of the Civil Assistant Surgeons placed on a par with the graduates in regard to their emoluments. We therefore fail to see why the President, who is anxious that the licentiates should get merged in the profession as one whole entity, should still remind them that they are only a part of the whole and not the whole and that they should carry on their fight to get their grievances redressed. It is this lead which he gave, we think, that should have been responsible for the authority given to him by the Convention to set up an Eleven Man Committee in order to get their decisions implemented by the authorities. The royal road lies before them. By giving up their separate existence and merging the A.I.M.L.A. in the I.M.A. and making their cause the cause of the profession as a whole, they can get all their legitimate grievances redressed quickly. No Government, much less a responsible Government, can ignore the united demand of the profession.

Dr. SRINIVASAN urged the resumption of recruitment of licentiates for temporary military service through the I.A.M.C. This was one of the allurements offered to the licentiates by the previous Government during the war period to make the licentiates stick fast to their separate existence to suit their purpose, and this was dangled by those at the helm of the A.I.M.L.A. as one of their greatest achievements. We had our own doubts then if it would remain a

permanent gain, since no successor government was bound to follow it and we gave expression to it at the time. It has happened as we had expected and the recruitment of licentiates had been discontinued. We are at one with the licentiates in their demand, since they have, by their meritorious and gallant services during the emergency period, proved themselves fully worthy of the trust reposed in them, and we are sure the Indian Medical Association also will support them in this demand. The demand of the Convention that provision be made for the admission of licentiates in the State Medical Colleges for the condensed M.B., B.S. course is very just, reasonable and in the interests of the country itself. The more they learn the more their services would become invaluable. There is already provision for such a course in Madras and in Calcutta, and it is the duty of the Government to see to it that adequate provision is made in all the State Medical Colleges for this higher course for the licentiates.

Dr. SRINIVASAN had some harsh things to say against the present Indian Medical Council and its functioning. "Whatever might have been the practice during the period when India was under the yoke of foreign rule," he said, "it is humiliating that at present when India is independent we should allow the British Medical Council to continue directly or indirectly its authority on the Medical Council of India." Whatever might have been the inner motives of the previous Government to assign a dominating position to the British Medical Council, the reason openly stated then was the fixation of medical standards in India. Our country has achieved independence and it is as competent as the British Medical Council to fix its own standards in conformity with the standards prevalent in other countries. As a matter of fact, the Health Minister herself has been persistently insisting upon a higher standard, not to satisfy the Medical Council of Great Britain but to establish standards for ourselves in the best interests of the country. Now that the amendment of the Indian Medical Council Act, to enable licentiates to get themselves registered along with graduates in an All-India Register, is under the active consideration of the Government, it is worthwhile taking this matter also into consideration and freeing the Indian Medical Council from the domination of the British Medical Council and establishing our own standards.

The President appealed in fine to those who have retired from service in whatever capacity to start an All-India Medical Mission for service in the villages. As he said, 90% of the population of India live in villages. The state of affairs that existed during the British rule, the utter neglect of the health and welfare of the people in rural areas, still continued with this difference that while the British rulers, though they had the money, were unwilling to spend it for the improvement of rural areas, the present Government suffer under a serious financial strain due to causes into which it is

unnecessary now for us to enter. But this state of things should not be allowed to continue. The profession can do much to alleviate the sufferings of ailing humanity in rural areas. It is not only people who have retired from service but even those who remain in active service who can do much to alleviate their sufferings. And service to the poor, voiceless millions, is service to God. We would therefore suggest that the medical profession as a whole take a direct interest in the matter, evolve a plan of action and implement it. Such help as they may need for such implementation, the Governments are bound to give them and, we are sure, will give them.

Effects of Mass B.C.G. Vaccination

Measuring the effects of mass B.C.G. vaccination by the subsequent tuberculosis mortality involves long delay. This time lag, Dr. T. Gedde-Dahl suggests, might be overcome by studying the earliest manifestations of infection with tuberculosis. In Norway both erythema nodosum and pleurisy are notifiable: and since 1941 their incidence has declined remarkably as the following figures will show:—

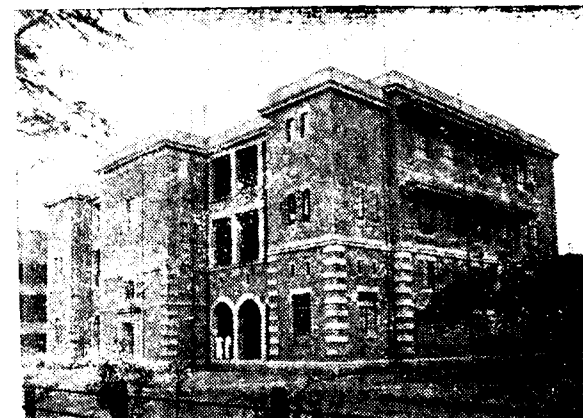
1941	... 1374	2989
1942	... 1416	2687
1943	... 1155	2203
1944	... 1192	2293
1945	... 1073	2108
1946	... 1147	1991
1947	... 859	1708
1948	... 634	1247

It will be seen that the fall in numbers was greatest in the last 2 years during which, for the first time, mass B.C.G. vaccination was carried out in Norway (35,000 in 1947 and 135,000 in 1948). There are, of course, various other factors for which credit can be claimed; during the past decade there have been large advances in the campaign against tuberculosis and since 1943 mass radiography has played an important part. The invidious task of apportioning marks between all the factors capable of reducing morbidity and mortality would tax the ingenuity of any statistician and Dr. Gedde-Dahl is not prepared to rush in where purists would not tread. But he has a suggestion to make: Let tuberculosis notifications be accompanied by a statement that the person concerned has or has not been vaccinated with B.C.G. In countries, where mass vaccination with B.C.G. is extensively practised, this plan might well yield valuable information.—(*Nord Med.*, 10.3.50, p. 444, *The Lancet*, 29.4.50, p. 838).

Diet in Congestive Heart Failure

Stroud and Stroud have suggested, on the basis of their experience in the management of congestive heart failure, that patients be put on a low sodium diet containing 0.5 to 1.5 gm. of sodium per day. Low sodium diets are hard to follow because of the lack of palatability. Fluid intake should be adequate, at least 2000 c.c. per day. The B complex and ascorbic acid should be given in adequate amounts. Protein 1 to 2 grammes per kg. of body weight is necessary. A caloric intake adequate for maintenance of body weight is also essential.—(*Med. Clin. N. Amer.*, 34, p 563, 1950).

HUNDRED YEARS OF PATHOLOGY*



(In the Grant Medical College, Bombay)

P. V. GHARPURE.

Professor of Pathology, Grant Medical College, Bombay.

It appears clear from all available records that the teaching of morbid anatomy took prominence very early in the history of the Grant Medical College. Records from 1872 of post-mortems done by several teachers have been carefully preserved and these will show the high standard of description attained then. It is, however, not possible to describe in so many words as to how the subject of Pathology was taught in the early years. In all probability, the work in the dead house formed all-in-all of Pathology, at least till 1877. In that year, on the 22nd of August, a memorandum was addressed to the Director of Public Instruction proposing a separate Chair of Morbid Anatomy and Pathology. In the same year a separate laboratory was inaugurated. The following extract from the College Annual Report will speak for itself:

"Work was commenced in the separate Pathological Laboratory. It is provided with all necessary apparatus, microscopes, preservatives, chemicals, re-agents and a series of registers in which the daily observations made in the dead house are recorded. This work is presided over by Dr. Anna Moreswar Kunte, the Demonstrator in Anatomy. Several students, chiefly from the huge class of fourth year, have volunteered to do the daily routine work. Sir Cowasji Readymoney offered a prize to a student devoting to research in Morbid Anatomy."

Surgeon Arnott is mentioned as the first Professor of Pathology and Dr. Anna Moreswar Kunte, the first Mayo Demonstrator in Anatomy. He was succeeded by Dr. Vithal Vinayak Gokhale in 1881 and Dr. S. B. Bharucha took up the post in 1897.

Government Resolution No. 1967, dated 4th June 1881, instituted a full-time Professorship of Pathology and Major Waters was appointed to that post.

To divert for a while, it was in the period 1890 to 1900 that several renowned research workers were given accommodation and other facilities within the four walls of this College. They all brought honour to the Grant Medical College.

Dr. K. N. Bahadurji (1889 to 1892) worked on the staff, in this period. A short life sketch of the pioneer worker by Dr. P. A. Dalal appeared recently in the Jan. 1949 issue of the *Indian Journal of Medical Sciences*. In 1895, Dr. N. F. Surveyor was allotted accommodation in the Framjee Dinshaw Petit Laboratory

* Some of this account has appeared in the Grant Medical College, Magazine, Vol. xlix, pp. 4-12, Dec. 1949.

for Medical Research. Dr. Surveyor was the Professor of Bacteriology for many years. His notable researches were on actinomycosis and malaria.

In 1896-1897, arrangements were made for research facilities for Messrs. Haffkine, Hankin, and Dr. Manser—well-known plague workers.

In 1898-1899 Messrs Marsch and Pitchford were provided for in the Petit Laboratory for plague research. In the same year, Dr. R. Row was allotted a set of rooms for research in the same laboratory. Dr. Row worked in these rooms till 1929. Dr. Row's record of research papers has rarely been surpassed.

The rooms used by the late Dr. Surveyor were, after his death, used for short periods for research by Dr. A. J. Noronha and Dr. L. D. Dhawale.

It may be mentioned here that the post of Bacteriologist, for the first time held by Dr. Surveyor, came into existence in 1906-07. Dr. D. A. Turkhud was appointed Professor of Bacteriology in 1914-15, and Dr. P. A. Dalal in 1921. The Professorship was subsequently abolished, being replaced by a lectureship and that, as an independent post, at a later stage, was also abolished.

Thus at present there is a single post of Professor of Pathology with lecturers under him.

The Pathology Laboratory work was carried out for a number of years in a part of the ground floor of the college main building. Post-mortems were conducted in a room adjoining the wing where the present Pharmacy Department is located. The post-mortem work was later shifted to the present ladies' waiting room, from there to a shed behind ward No. XIII, and thence to another place, a stone building, now used as stores, and finally in 1909 to the present post-mortem room. This is about the best connected account that can be collected. While post-mortem examinations were being carried out in the present ladies' waiting room nearer the road, Koch worked and demonstrated the cholera vibrio. It was again here that Childe described the lung of pneumonic plague.

With the completion of the Coroner's Court building in 1909, the Pathology Department "secured accommodation better than it ever had before". The first floor nearly 4000 square feet, was used by the Pathology Department and the ground floor was occupied by the Coroner and the Police Surgeon much in the same way as one sees now. The present practical class room on the first floor has remained practically unchanged. The present lecture theatre is a new design remodelled in 1929. This room alone was all that formed the Pathology Department from 1909 to 1929. This large room was the working place for the staff and technical assistants, of whom there was only one. The Professor had a room to himself, the present preparation room.

The staff was not very elaborate, - a Professor, a part-time Assistant Professor and two part-time Tutors. The Bacteriology Laboratories were housed independently in the present students common room. The total number of laboratory examinations was comparatively small, never exceeded 500 to 700 in a year. There were many autopsies. All permanent records were written up by students, till 1932. All records from 1872 are available and all records have been indexed. The course of studies was simple, the tuition proportionate, and the degree examination consistent with all these. There was no separate higher degree in Pathology and Bacteriology till 1928. Mention must be made at this stage that the Sir Jamshedji Jijibhoy Hospital had only two laboratories (of the status of clinical side-rooms) quite until 1934, one on the ground floor and the other on the 1st floor. These were used by the medical officers and by their registrars (the present housemen) as they were then called and by the students. It was in one of these laboratories, the one on the first floor (the Laboratory No. 1 of to-day) that the great discovery of the relapsing fever spirochaete was done by Dr. Vandyke Carter, without the help of an oil immersion lens (1877-1880). Carter's book, *Spirillum calcoli* and several other subjects. Carter donated Rs. 10,000 and founded the Lord Beay lectureship for encouraging research in Physiology, Pharmacology, and

Pathology. 1914-1918 saw the World War I. This period interrupted the growth of this scientific subject in this college. Several officers were called up, many of the graduates joined active service, and so great was the shortage of medical men that students before getting a degree were selected to occupy posts of registrars, posts parallel to the present day housemen.

Mental strain coupled with scarcity of men and materials produced a deleterious effect. Progress of the work stopped and at the end of the War, as far as I can recollect, the Pathology Department was behind where it had been in 1909 and much farther behind what the world expected it to be then. The five years after the War were years of new schemes. The re-staffing of this institution took birth.

During the four years of the War and the few years after it, a series of changes took place in the staff of the Pathology Department. Major Gordon Tucker, Major L.T.R. Hutchinson, Dr. F. N. Kapadia and Major S. S. Vazifdar worked as Professors.

It was at this stage that Dr. V. R. Khanolkar, M.D. (Lond.), B.Sc. (Lond.), was selected for the post. He took up the post and started improvements. He made proposals for the expansion of the buildings, etc. About this time the scheme for the opening of the Seth Goverdhandas-Sunderdas Medical College, Parel, Bombay, matured and Dr. Khanolkar decided to leave the G. M. C. to join the new college which was to have an entirely Indian staff. The new college paid higher salaries too. Before he had completed two years of service in the Grant Medical College, Dr. Khanolkar left.

The author of this article had joined the Pathology Department as a voluntary worker in 1925, has been appointed Assistant Professor later and had the honour to succeed Dr. Khanolkar as acting Professor in 1926. It has not been an unbroken period of responsibility on my shoulders since then. Almost a year later, Government requested Dr. Row to accept the Professorship. Dr. Row retired in 1932 and I succeeded him and I am holding my present post since then, actually from the 16th of December 1931. Thus I have nearly completed 25 years connection with the Pathology Department as a member of its teaching staff. Long connection with a Department brings with it responsibility. Whether I have fulfilled a useful purpose future generations will say.

I propose to give below an account of the growth of the Department of Pathology during this period.

With the opening of the G.S.M. College, the Grant Medical College, in a way, lost the monopoly of creating medical graduates. The new college had the advantage of all the mistakes the G.M.C. had committed and consequently made a good start.

The Pathology Department, as it was housed in a small place, found it impossible to cope with the ever-growing ambitions of the reorganised staff of the J. J. and allied hospitals. Schemes for re-staffing were put up very early in 1928. The anticipated expense was great and therefore Government sanction was difficult to obtain even in those days. When a case was made out it was referred back for convincing arguments and yet more convincing arguments and the time spent in writing up these, easily enable one to bridge over financial years. 1943 saw some of the proposals first put up in 1928 fulfilled, and even up to the date of writing this staffing is under discussion. Proposals for additional accommodation were under consideration for years. Twice proposals for a large building for Bacteriology were made. Tentative plans for additions to and alterations in the existing Pathology building had also been made.

It was not until Dr. Row's personal request to Sir Dorab Tata that a further definite step was taken. An offer of 2 lacs was made to the Government by him. An equal amount was to be contributed by the Government.

A committee of officials and non-officials was appointed by the Legislative Council to examine the plans. These were finally approved. The building was completed in less than 18 months and was formally opened by the Surgeon-General, General Mackie on 7th June 1929.

This gave the Pathology and Bacteriology Departments of the College a House. The two Departments were moved into this Pathology School under one roof. The new building housed well the Museum which till then occupied a part of the first floor of the college main building. For the better unification of efforts it was considered necessary to introduce a certain degree of amalgamation of the two Departments. This was effected soon after occupying. The abolition of the Professorship of Bacteriology which came much later, it can be assured, will not hinder the growth of the subject of Bacteriology. In fact, with proper adaptation and co-ordination, the growth ought to be, and I assure will be, faster and healthier.

From the moment of occupying the new building, from time to time alterations in the use of different parts of the building has been found necessary. Changes of a definite nature towards improvement in the staffing have been effected in spite of the War, and the Department was distinctly better off than it was when I left it in 1941 for active service. There are further schemes for improvement under consideration. Additional staff has been administratively approved in 1950. The teaching department has not grown lopsided. The clinical investigation section has materially been reorganised. In 1934, a wholesale reorganisation of the ward laboratories was done, providing a clinical side-room per 30 beds. This proportion was unfortunately upset during the War, mainly due to shortage of space and materials. It has been re-established in recent years. Thus in place of 2 laboratories there are now functioning numerous clinical side-rooms for the use of housemen and students.

The Vandyke Carter Central Clinical Laboratory established in 1933 has been replanned to function better as new staff is arriving. It is the ambition to make this laboratory a training centre for students.

The designation of the Head of the Department of Pathology up to 1934 was Professor of Pathology, Morbid Anatomy and Histology and Curator of the Museum, Grant Medical College, quite a descriptive phrase.

This alone can floodlit the growth of the Department. At one time there was a Curator of the Museum and a Professor of Morbid Anatomy. Step by step, duties of several were combined and produced this clumsy looking designation.

It was at my suggestion that two changes were effected by Government in 1934. The designation was changed to Professor of Pathology and Pathologist, J. J. Group of Hospitals. The second change was making the post a non-vacation one; and today the rest of the full-time posts are also non-vacation posts.

For a period of almost 30 years the Department had a part-time Assistant Professor. His salary was Rs. 200/- per month. For the first time in 1938 the post of the Assistant Professor was made full-time. The post was included in the B.M.S. Class II. At the beginning it was non-pensionable and temporary. Much later it was made pensionable as it is now. The designation and scales of pay are now revised. The present pay scales, it is hoped, will attract keen persons.

There were two tutors in this department till 1938. They were paid Rs. 100/- and Rs. 75/- per month, depending on their being senior or junior. These posts were attractive at one time, many first class graduates took these up. A certain time limit for the tenure was introduced after 1926. Till then a tutor could hold an appointment as long as he wished. In 1938 these posts were replaced by those of part-time demonstrators.

Three demonstrators were appointed on Rs. 50/- per month in place of the two tutors. At the time of writing two classes of demonstrators exist (i) full-time and (ii) part-time. The Department was given three assistants satisfying the demands of the University. It may be said that the chief reason for the changes in the staffing has been the need for adequate provision for teaching. The College possessed a Museum from the early days. The following are some milestones in the growth of the Pathology Museum of this College.

The first Museum Catalogue was published in 1850. The Museum had a full-time Curator for 30 years upto 1877. At present the Museum occupies a floor space of 11,200 sq. ft. There are several sections—general pathology, special pathology, hygiene and preventive medicine, forensic medicine, etc. Needless to say, building up of a Museum needs help from all quarters. The College Museum is referred to by Markham and Hargreaves in the volume "Museums in India" published by the Museums' Association, London, 1936. Now I turn to the present.

The Department, as it is now, the Department of Pathology and Bacteriology, has a single head controlling the clinical investigation work for the J. J. Group of Hospitals and the teaching at the Grant Medical College, in collaboration with the clinical staff of the J. J. Group of Hospitals. The clinical investigation department has two full-time resident clinical pathologists and some technical staff. The work is carried out in three stages: bed-side investigations are done by housemen, further work done by the Vandyke Carter Central Clinical Laboratory in the out-patients' department building, and work beyond the capacity of this unit is passed on to the Pathology School. In this building on the first floor a set of six rooms is set aside for clinical investigations. In these rooms are being carried out bacteriological, hematological, chemical and histological investigations.

The work at present is heavy and is expected to grow still more.

Teaching of undergraduates. There is adequate accommodation for practical classes and lectures and lecture-demonstrations. There is the necessary equipment and teaching material. Post-graduate teaching efforts are being made to satisfy the ambitions of post-graduates. Much more requires to be done for adequate facilities for post-graduate study in this as in many other subjects.

The Department possesses an animal house and necessary animals are available.

Adjoining the Pathology School is the mortuary with a cold preservation plant. This was built along with the Pathology School in 1929. In 1940 a shed for mourners was built.

The six years of the World War II has fortunately left institutions in this country intact. With the exception of the damage done by the explosion of 1944, the buildings of the Pathology Department have remained in good condition. The work was carried out by the staff between 1941 and 1946 under Drs. Paramanand, Manohar, Saldanha, and Parekh as the head. These years were of continued strain and difficulties all round and all praise to these men who continued to do good work under such conditions.

Research work in the Pathology Department and research work by the staff have been subjects of much criticism in recent years. Plenty of clinical material is available and there is adequate accommodation. Equipment, as and when required, is obtainable. Still one cannot deny the fact that these latter 20 years have not been as productive as the early period wherein persons like Vandyke Carter, Dimmock, Hatch, Haffkine, Row, Surveyor, Childe and Choksy, worked and produced work recognised even beyond the length and breadth of this country.

Belonging to the present generation, I must plead guilty to the charge.

Analysing the causes may be of some use to the readers. Men who worked have been capable. Endeavour, skill, desire to work and labour have not been lacking. Circumstances have been unfavourable. The nature of present day medical research is totally different.

The staff of the Pathology Department in outline remained unchanged for over 50 years though extensive extensions took place in the hospitals, the Department was responsible to serve. The University Regulations became more exacting and so also did the modern world. The demands, increasing without parallel additions to the personnel and finances, placed the Department in an almost impossible situation. These latter 20 years have been of growing ambitions and of unprecedented strain on the few men who strenuously worked to make the two ends meet.

Routine work is despised by some who think of research in terms of the fundamental sciences. Medical work involves many applied sciences and modern medical research therefore has to be a team work. Very high standard of routine work must be the basis for any institution to aspire to produce research. Our efforts in the last quarter of a century have been devoted to the many problems of maintaining this high standard. This will provide the background for further work.

A Society of Pathologists was started first in India in Bombay, thanks to Dr. Khanolkar for his lead and continued co-operation. Regular meetings have been held for over 14 years. The standard of papers read by the staff of the local institutions and post-graduates is undoubtedly such as to make one feel proud of. Nearly 100 meetings have been held so far, about half of which have been at the G.M.C. Papers published by this Department have been reviewed by the press, and quoted by standard authors. Drs. Row, Parmanand, Saldanha, Parekh, Manohar, V. V. Gharpure, Soman, Deshmukh, Tilak, Jhala, Salaskar, Mrs. Soman and others have contributed several papers of scientific interest in the Medical Journals. The total number of papers published and read at scientific meetings exceed one hundred. This has been in the period from 1926 to 1945, a combined effort of all of us of the Pathology Department. Yet one feels one ought to have done better with all the wealth of material available.

Let us then be proud of our heritage, let us be constructive in our criticism determined in our daily effort now, to lay the foundation for a more hopeful and prosperous future for the Motherland!

Gleanings From Medical Press

SURGERY

Six axioms to remember in acute abdominal emergency.—(*Amer. Jour. Surgery*, July 1950, p. 96).

1. Severe abdominal pain of six hours' duration in a previously well individual usually indicates surgical intervention.

2. If any patient with abdominal pain is found to have a temperature of 104 to 105 F. at the on-set of illness the thorax or kidney is very likely the seat of the disease.

3. A normal pulse does not necessarily indicate a normal condition of the abdomen, especially in the early stages of an abdominal emergency.

4. Irritation of the pelvic nerves causes no abdominal wall rigidity.

5. Movement and pressure increase pain in peritonitis but afford some measure of relief in colic.

6. The stethoscope is as important in surgery for abdominal auscultation as it is in internal medicine for auscultation of the chest.

Treatment of infections of feet in diabetics.—(Butler, E. C. B., *Lond. Hosp. Gaz.*, 53, 3, 1950).

In the clinical supplement, to the London Hospital Gazette, Butler, has recorded his observations on a series of cases admitted into his wards at the London Hospital, during 12 years ending 1949. He divides his cases into 2 groups:—(1) Patients who have all signs and symptoms of the so-called senile obliterative arterial disease, and in addition have infection as a constant feature.

(2) Cases of diabetes complicated by infected feet; usually circulation is good and the popliteal artery can readily be felt. Oscillometer tests show good pulsation below the knee.

GROUP 1.—Following irritation or mild trauma a small infected area starts on one or more toes, also sometimes on heel or elsewhere on the foot. The infection may resolve on treatment or may spread or proceed to an area of necrosis which in turn may be localized

or spread to the whole foot. Pus formation is unusual and no definite line of demarcation between healthy and diseased tissue is visible. These patients have signs of thrombosis in the femoral or popliteal vessels. Radiography often reveals widespread medial calcification of the main vessels. The average of the patients in this group was 64.

Treatment:—Penicillin-resistant organisms may be present. So a combination of drugs has often to be chosen. Affected limb should be rested on a soft pillow at room temperature; both heels should be taken care of to prevent pressure necrosis. Active physiotherapy to both limbs should be given to aid circulation. Slough should be removed and necrotic phalanges cut away. Formal amputation of toes through metatarsophalangeal joints is contra-indicated as it leads to rapid spread of infection and to necrosis. Local application of penicillin-sulphonamide powder is of no use as it cakes and prevents penetration. Hypertonic saline dressings or Eusol compresses are useful; part should be kept slough-free and dry; a spirit dressing is very good. A course of systematic penicillin is valuable as it prevents cellulitis; the infection will subside in most cases and necrosis may be limited to one toe; if patient is fortunate the dead area may separate spontaneously. The indications for amputation in this group are spreading necrosis, intolerable pain and fulminating infection. 35 out of 40 patients in this group recovered under this regimen.

GROUP II.—CASES WITH A GOOD POPLITEAL PULSE:—As blood supply in these cases is good, infection rarely leads to gangrene except where gas infection supervenes. Abscess formation is common and infection readily tracks up the layers of the foot causing sloughing of the tendon and fascia. Osteomyelitis with sequestration of affected toes frequently occurs.

Many of this group also have diabetic neuritis, as shown by perforating ulcers commonly at the ball of the big toe. X-ray shows underlying infective arthritis and osteomyelitis of the adjacent bones. The ulcers may remain quiescent for a long time except for a painless chronic discharge. A few cases in this

group suffer from increasing blindness due to diabetic retinopathy. Every effort must be made to avoid a major amputation on these patients, as it is difficult for them to use crutches. Butler found that retinopathy and diabetic neuritis occurred only in group 2 cases.

Treatment (of Gr. 2):—Chemotherapy is likely to be more useful than in Group 1, but an accurate bacteriological diagnosis should be made. Systemic penicillin with a course of sulphonamides has yielded good results. Aureomycin will be a most valuable addition in the most severe types of anaerobic infection. Abscesses should be drained freely and incisions must be adequate. The webs between toes need draining and the incisions must be prolonged on to the dorsum or sides of the foot. Drainage via the sole should be avoided as far as possible. Formal amputation of the diseased toes or metatarsals can safely be performed once the acute phase is over. These wounds may be sewn up with confidence, after all dead tissue has been removed. Systemic penicillin should be given in these cases till the wounds have healed.

The principles of treatment adopted in this series of 61 patients (with only 9 deaths) were:—

(1) Infection to be controlled with large doses of penicillin and if resistant with aureomycin.

(2) Immediate surgical intervention is unwise and as soon as pus has formed the drainage must be carried out.

(3) Emergency amputations before the infection has been controlled are dangerous and may be fatal.

(4) Should amputation be required the flaps must never be sutured; they should be loosely tied over a pack; secondary suture can be done on the 5th day if infection has not spread.

(5) Blood transfusions are valuable to counteract the progressive anaemia, usually present.

It was impossible to control the glycosuria in these patients until the infection had been overcome; the demand for insulin then fell with dramatic suddenness.

Carbohydrate required to prevent post-operative ketonuria.—(*Surg. Gynaecol. Obst.*, 90, p. 349, 1950).

The urines of 68 post-operative patients on varying parenteral carbohydrates were tested for the presence of acetone and glucose during the first three post-operative days. After operation under *spinal anaesthesia* the majority of patients receiving 100 or 150 gm. glucose a day as the sole source of nutrient showed acetonuria while the majority of those receiving 200 to 300 gm. glucose daily did not show acetone in the urine. After operations under *ether*, the incidence of ketonuria was much greater at a daily carbohydrate intake than it was after operation under spinal anaesthesia at the same intake. This indicates the superiority of the spinal anaesthetic for diabetic patients and those with liver disease in whom the maintenance of liver glycogen and the avoidance of ketosis may be a problem. An average of 4 to 6% of the glucose given intravenously was excreted in the urine, but there were marked and unpredictable variations in glycosuria from patient to patient.

Conservative treatment of massive gastro-duodenal hæmorrhage.—(*Am. J. Surgery*, 80, 7, pp. 883—887, Dec. 1950).

The remarkable hæmostatic effect reported by the use of gelfoam and thrombin in neurosurgery and urologic surgery prompted Cantor and his co-workers of the Detroit General Hospital to investigate the value of these two hæmostatics in gastro-duodenal hæmorrhage. After successful animal experiments, they have used these in the treatment of 73 consecutive cases of massive gastro-duodenal hæmorrhage.

All patients admitted were immediately seen by the resident surgeon and the following routine was promptly instituted. (1) History is taken and physical examination made to ascertain ætiologic basis for the gastric hæmorrhage. (2) Complete blood count is taken. (Dyscrasias are thus ruled out by tests). (3) Shock, if present, is next treated. (4) Blood pressure and pulse readings are taken every 2 hours for the first 48 hours. (5) Blood is replaced depending on the patient's condition and RBC count. Patient in shock is given 1000 c.c. of whole blood at once; patients with RBC count below 2 millions are given 1000 cc. and those with over 2.5 millions get 500 c.c. Blood transfusion is made as often as necessary; as much as 10 litres may be given in 24 hours. (6) In addition to adequate blood replacement and the conservative routine of Meulengracht's diet, antacid therapy, sedation and bed rest, the only new and additional therapy is the use of gelfoam and thrombin. (7) Gelfoam is prepared as a fine dry very light powder and 2 tablespoonfuls of gelfoam are mixed with 2 ounces of milk and cream and given to the patient orally every 2 hours; immediately following this, 250 units of thrombin (50 cc. of a solution containing 1000 units of thrombin dissolved in 200 cc. of water) is given after the gelfoam. (8) Amphojel (Aluminium hydroxide suspension) is given (following thrombin solution) in a dose of one tablespoonful every 3 hours.

There were no deaths in this non-surgically treated group of 73 patients. Gelfoam and thrombin are therefore very useful additions to our armamentarium in such cases.

*(Gelfoam supplied by Upjohn Company, Kalamazoo).

OBSTETRICS AND GYNÆCOLOGY

Streptomycin therapy during pregnancy.—(*Proc. National Acad. Med.*, Paris, 1950).

Bernard, Kreis and their co-workers reported to the National Academy of Medicine certain very important observations on the relative values of streptomycin and dihydrostreptomycin,

in the treatment of tuberculosis in pregnant women. The tolerance to streptomycin was good, the daily dose was 1 gm. in 4 cases, 1.5 gm. in 8 and 2 gm. in 2. Total dose varied from 20 to 180 gm. With the collaboration of Mrs. Grumbush of the Pasteur Institute, they studied the transplacental

passage of the anti-biotic in 12 women who were given in the course of labour 0.5 gm. dihydrostreptomycin. The examination of the blood of the umbilical cord taken immediately after delivery, revealed the constant presence of the anti-biotic. The average rate observed between 43 and 130 minutes after the injection amounted to 5.7 units, results agreeing with those of other workers. Bernard and his associates believe that this placental barrier indicates the harmlessness of streptomycin for the fetus. Prof. Moulouquet has some reservations regarding the children's future and recalled the recent report before the Society of Otorhinolaryngology, Paris, of a case of deafness following treatment of a child in this manner. He considers that on account of the difficulty of making an acoumetric examination in young infants, one cannot immediately state definitely that streptomycin therapy during pregnancy is harmless. For this reason, Bernard proposes avoiding administration of dihydrostreptomycin to pregnant women, reserving the streptomycin treatment for conditions with precise indications.

Placental transmission of chloromycetin.—(*J.A.M.A.*, 142, 17, p. 1361, 1950).

This is an important communication from the Research Foundation of the Children's Hospital, Washington. Ross *et al* carried out an experiment to determine whether chloromycetin passes through the placental barrier, like penicillin and streptomycin. An oral dose of 1 gm. was given to 8 patients and 2 gm. to 3 patients in active labour about one to 5 hours before delivery. Blood for chloramphenicol assays was obtained from the mother and cord at the time of delivery. In one case (out of eleven) twins were born and both were assayed. In 6 out of eleven patients, (including the twin case) chloramphenicol passed through the placental barrier in concentrations of 30 to 80% of that noted in the mother's blood. In the remaining 5, it was not detected in the cord blood; and in these the concentration in the maternal blood was 3.8 micrograms only per c.c. or less, while

in the other 6 it ranged from 10 to 30. To ensure the diffusion of the drug into the foetal circulation, it would appear necessary to maintain an adequate blood level in the mother of at least 10 micrograms per c.c. This could be achieved if a dose of 50 mg. per kg. of bodyweight per 24 hours in a four hourly divided dosage is given.

The significance of these observations assumes importance when chloromycetin is used in the treatment of susceptible maternal infections, such as, bacterial pneumonias, septicæmia, typhoid, rickettsias and genito-urinary tract infections. This anti-biotic has recently been acclaimed as effective in syphilis and hence would be effective in congenital syphilis and ante-partum when used instead of penicillin.

[Whether this drug will induce foetal anomalies (such as occur when certain virus infections like maternal rubella are treated with this drug is not however known.) The empirical use of chloromycetin is however desirable, in the opinion of Ross and his co-workers, in order to avoid foetal damage, in cases of atypical virus pneumonias.

Vitamin A in pre-menstrual tension.—(*J.A.M.A.*, 142, 16, p. 1312, 1950).

Argonz and Abinzano of the endocrinological service of the Revadavia Hospital, Buenos Aires, obtained successful results in 100 cases of pre-menstrual tension treated with vitamin A. Complete relief of mastodynia was effected. Abdominal pains decreased. Oedema, lumbar pains and nervous symptoms were not observed. The improvement of mammary disturbances was remarkable. A daily dose of 2,00,000 units is given orally during the second half of the cycle. The medication must be repeated for 4 or 5 consecutive monthly periods in order to obtain a prolonged result. Smaller doses and shorter periods do not give satisfactory results.

Prophylactic penicillin in obstetrics.—(*Am. Jour. Surg.*, 81, 2, pp. 168-171, Feb. 1951).

Dorgan *et al* of the department of Obstetrics and Gynaecology of the Naval

Hospital, Portsmouth (Va.), report on a study to determine whether or not the routine administration of penicillin to all patients early in the course of labour was an indicated procedure, calculated to prevent or minimise the incidence of puerperal infection and whether any untoward effects might be anticipated from such a routine. A total of 1131 vaginal deliveries was conducted from 8-3-1949 to 11-9-1949 and at the onset of active progressive labour, *i.e.*, 3 to 4 c.m. of cervical dilatation, 300,000 units of procaine penicillin G in sesame oil was administered intramuscularly to 509 of these 1131 patients. No one in this series received more than the one prophylactic penicillin injection. The alternate case method was employed and the only conscious selection was in placing in the control group those patients admitted to the delivery floor in advanced labour; this naturally placed a larger number of primiparas in treated group and multiparas in the control, but the difference was not significant. 622 did not receive penicillin and constituted the control group. 509 received penicillin prophylactically and comprise the treated group.

From the results of careful observations, it was evident that the prophylactic injection of 3,00,000 units of penicillin G in sesame oil early in labour resulted in a significant decrease in the incidence of puerperal sepsis and a considerable decrease in the number of febrile days. Morbidity and febrility were reduced by 70 per cent.

Systemic reactions to the anti-biotic did not occur in the series and local reactions were negligible; whether any patient in the treated series was sensitized by the penicillin, and whether any case of syphilis was there by masked and if any infant will suffer from its intrauterine dose of penicillin, are questions, though of not any serious or major import, are receiving due consideration from these authors and will form the subject of a later communication.

Hydriodic acid to overcome tubal occlusion in sterility.—(*Amer. Jour. Surgery*, 80, 1, pp. 131-132, July 1950).

In the treatment of sterility in women many cases of tubal occlusion are found to be due to the presence of thick mucus in the lumen of the tubes and to adhesions and scarring as the end result of inflammation. When repeated uterotubal insufflation fails to show patency of the fallopian tubes the outlook for the sterile patient is very dismal, or even hopeless. Yet women so afflicted continue to search for help. In considering what drugs might be of value in these conditions, Dr. Sharman S. Garrett of Illinois, hit upon the iodides as offering some hope for success. Iodides have the property of increasing the amount of secretion of the mucous membranes and of making the mucous secretion more watery and less tenacious. Iodides are used against thick sputum. Iodides are also believed to soften scar tissue—a resolvent action. Since these two actions are exactly the ones that might be of help in overcoming tubal occlusion, Garrett tried the use of a simple iodine preparation syrup of hydriodic acid on three patients who had persistent tubal occlusion, with success in two cases.

The patients were given syrup of hydriodic acid (two drachms) in water. In one case it was given *twice a day* after meals for two months and in another it was given four times a day for ten weeks. In both cases, tubal insufflation was done after three months, and was successful. The patients experienced shoulder pain; and the gas was flowing in good volume 30 to 40 mm. Hg. The first of these three patients became pregnant five months later. In a third patient aged 32, the iodide treatment for 2 months was not successful. She is undergoing further treatment. The two successful cases (aged 37 and 35 respectively) do not offer definite proof of the efficacy of a therapeutic measure; but it would seem worthwhile to give iodide therapy a trial in patients with persistent tubal occlusion. A warning is also given by the author:—"Iodide should not be used in any case suspected of tuberculosis because of the danger of its increasing the activity of the disease."

Further study of the effect of iodides

on patients with persistent tubal occlusion is warranted.

Chloromycetin in the therapy of granuloma inguinale.—(Robert B. Greenblatt, Virgine S. Wamrock, Robert B. Dinest and Robert M. West, Augusta, Ga., *Am. J. Obst. and Gynec.*, 59: 1129-33, May 1950).

Twenty-three women with granuloma inguinale were effectively treated with chloromycetin. The total dosages necessary for cure varied from 20 to 70 Gm. It appeared that the ideal dosage was 500 mg. every six hours for 10 to 20 days. If healing was incomplete or the lesions were extensive it seemed advisable to continue chloromycetin until 50 to 70 Gm. were given. Recurrences were few and these responded to a second course of therapy. Donovan bodies, in most instances, disappeared from the lesions in 2 to 4 days after therapy was begun. Untoward effects were not observed.—*Obstetrics and Gynaecology*.

Penicillin in the treatment of uncomplicated gonorrhoea.—(A. J. King, F. R. Curtis and C. S. Nicol, London Hospital, London, England. *Lancet*, 1: 701-03, April 15, 1950).

It is pointed out in this paper that widespread optimism exists concerning the efficacy of penicillin in the treatment of uncomplicated gonorrhoea. The authors agree that penicillin is the treatment of choice in this condition but they stress the fact that cure is difficult to determine with certainty and that criteria vary in different clinics and may be quite unreliable through brief duration of observation and lack of detailed clinical and laboratory examinations. In male patients it is most important to examine an early morning smear and the urine which has been retained in the bladder overnight. This method often demonstrates evidence of residual infection. When obvious clinical relapse occurs with gonococci reappearing in the urethral smear or culture, then treatment failure is often attributed to re-infection, whether or not the patient admits to further sexual intercourse. In truth there is no way of deciding between re-infection and relapse, and it

is safer in these cases to assume that treatment has failed to cure in assessing the value of a comparatively new drug. It is therefore suggested that all cases of gonorrhoea in which gonococci are found again within three months of treatment should be regarded as relapses.

There is little evidence to support the theory that penicillin treatment failure is due to 'penicillin-resistant' organisms; tests in vitro alone cannot be relied on for they cannot take into account the factor of tissue immunity in the host.

An analysis of 1788 male and 481 female cases is presented. All the females and 805 of the males had a first attack of acute uncomplicated gonorrhoea. All were treated with sodium penicillin (aqueous), 150,000 units given intramuscularly in five equal doses two-hourly; 1447 of the males and 432 of the females attended for tests of cure. Ninety-four men (6.4 per cent) and 15 women (3.5 per cent) were regarded as immediate failures of treatment because gonococci persisted in the secretions or reappeared within two weeks, or because acute complications of the infection developed. In the remaining men, 276 (19.1 per cent), acute purulent urethritis developed during observation; 216 of them (14.9 per cent) showed gonococci in the secretions. A further 270 (18.6 per cent) showed evidence of residual infection in the genital tract either by rectal examination or by smear and culture of prostatic secretions. The total "late" failures in the male were 546 (37.7 per cent); if patients giving a history of previous gonorrhoea were excluded the total was 405 (27.9 per cent). Of the remaining women, 56 (13.4 per cent) showed gonococci in the secretions, while only 79 of 265 passed final tests of cure. In all the other cases there were abnormal clinical or microscopic signs in the urethral, cervical or rectal tests. The authors express the opinion that "re-infection" did not account for the major proportion of the failures. If all such cases occurring within three months of treatment are considered to be treatment failures then penicillin is less effective in the treatment of acute uncomplicated gonorrhoea than is generally accepted.

MEDICINE AND THERAPEUTICS

Typhoid and chloromycetin—Study of minimum dosage.—(Medina, I., Payne, E. H., Sharp, E. A., *Jour. Trop. Med.*, 53, 6, 199-125, 1950).

For communities in poor economic circumstances the expense of treatment is a considerable factor and, therefore, consideration of the most economical dosage that may be employed is important in order that the drug may become available to the greatest number of patients possible. Medina and his co-workers working in the Isolation Hospital at Guayaquil, Ecuador, treated 79 patients between March and Nov., 1949. Chloromycetin was not used for mild cases. Of 65 cases treated with one course of chloromycetin, one died and 64 were successfully controlled. Ages varied from 3 to 65 years. Of 11 patients who relapsed, ten were given either the same or a smaller dose than that used in the first course and they all responded promptly. 3 patients, on account of the seriousness of their condition, were given chloromycetin intravenously. It was dissolved in propylene glycol in a 15 per cent concentration and on an average 0.3 gramme was given every 3 to 4 hours. None of these three relapsed. All the 79 patients gave a widal reaction in dilutions of 1:100 or above.

By reviewing the dose schedules the following statistical summary is furnished by the authors, by selecting an arbitrary dose of 15 grammes of chloromycetin for patients in the first decade and 18 grammes for those in the second decade and above. Of 16 patients under 11 years of age, 14 were cured with 15 gms or less; 2 relapsed after 12 gms.

Of 23 patients in the second decade (11 to 20 years of age) 18 were cured with 18 gms. or less; 5 relapsed after 12 to 18 gms. Of 22 patients over 20 years of age 18 were cured with 18 gms. or less of chloromycetin; 4 relapsed (3 after 12 gms. and 1 after 18 gms.)

Contrary to previous ideas held by the authors from earlier observations, there appears to be no correlation between length of time the person had been ill and the rate of response to

therapy; nor was there a correlation between age and response to therapy. No troublesome reactions to the drug were met with in these 79 cases. Those who relapsed gave a better response to second treatment with chloromycetin. Early and rapid disappearance of the toxic state was the first effect noticed following chloromycetin. An initial "loading" dose, advocated by some, was not used in the treatment of these 79 patients. The authors believe that such an initial heavy dose causes several "antiphylactic" reactions which have been noted. Massive and rapid death of bacteria in the body results in release of endotoxins. This explains the untoward reactions of antiphylaxis.

Clinical experience with P.A.S.—Preliminary report.—(*Dis. Chest*, Vol. 18, 5, pp. 413-429, Nov. 1950).

DeJanney, Cox and Grindell-Balehum of the Herman Keifer Hospital at Detroit, in a very exhaustive illustrated article, record their experience with 42 patients (40 with pulmonary tuberculosis and 2 with tuberculous meningitis) treated at their hospital with P.A.S. They state that the absorption of this drug is rapid and almost complete from the gastro-intestinal tract, and that it is rapidly excreted, 50% or more being removed by the kidneys. It is not found in urine 20 hours after discontinuing it. In one hour, urinary concentration reaches 400 mg. level. Transitory urinary casts and transitory albuminuria have been observed but no permanent renal damage has so far been reported by any observer. The free acid has a rather unpleasant acid taste, difficult to disguise and liable to cause mild gastric irritation. The sodium salt solution of this drug, though bitter, is not unpleasant, and the bitterness may be masked by flavouring agents. The material used was Pamisyl (P.D. & Co.'s P.A.S.) given in tablet form. Dose used was 9.6 to 10.5 gm. daily, administered five times, every 4 hours, during the day. 6 gm. was used to begin with and gradually increased to 9 or 10 gm. in seven days. Where clinical and X-ray improvement occurred and were

maintained the drug was continued for 90 to 120 days. The shortest was 30 and the longest 150 days. The age of the patients varied from 17 to 58, and 21 of these were in the 20 to 30 age group. Toxic manifestations noticed in this study were anorexia, nausea, diarrhoea, loss of weight and vomiting, all intermittent. There was no tinnitus vertigo and no evidence of haematopoietic renal or hepatic damage. Definite symptomatic improvement occurred in 22 of 37 patients who had any symptoms when P.A.S. was started. Some showed improved appetite instead of anorexia, and the symptomatic benefits consisted of improved sense of well being, reduction of fever, decrease in cough and sputum, and these occurred within one month of starting the treatment. Of 40 patients with pulmonary lesions 27 showed significant X-ray improvement while 13 showed no change. Six of these 27 had other treatment in addition to P.A.S.; the other 21 unquestionably represent a response to P.A.S. Bronchoscopy showed subsidence of oedema, and reddening and healing of endobronchial ulcers in one month of P.A.S. treatment. Pulmonary tuberculosis which failed to respond to streptomycin, improved with P.A.S. in 67% of cases.

Peripheral neuritis and bronchial carcinoma.—(Leading article, *Lancet*, 8.7.1950, p. 61).

To the many causes of peripheral neuritis must be added bronchial carcinoma. Denny Brown in 1948 (*J. Neurol. Neurosurg.*, 11, 73) described 2 cases in which these two disorders were associated. In each the neuritis was the presenting feature and the carcinoma was discovered only post-mortem. Wyburn-Mason described (*Lancet*, 1948, 1, 203) the same 2 cases and added a third in which the clinical involvement was motor rather than sensory. Lennox and Pritchard have now (*Quart. J. Med.*, 1950, 19, 97) described two further cases of this strange association. Clinically motor elements of the peripheral nerves were mostly affected; at necropsy demyelination of motor fibres was observed. These authors further found records of three further cases of bronchial carcinoma associated with peripheral neuritis and

the symptoms in these three were neurological. Denny Brown impressed by the unusual clinical and pathological features of the peripheral nerve disorders concluded that the two diseases were intimately connected; Lennox and Pritchard's cases were five among 299 of bronchial carcinoma; that the association is not fortuitous is strongly suggested by their review of the incidence of peripheral neuritis in cases of carcinoma at other sites and of other types of chronic chest disease. This association of diseases indicates the importance of radiography of the chest in cases of peripheral neuritis of obscure origin; and it will be interesting to study the course of the neuritis if a case is found in which the bronchial carcinoma can be removed completely.

Medical management of acute lung abscess.—(Jewett, J. S. and Dimond, G. E., *Dis. Chest*, 18, 5, pp. 478-500, Nov. 1950).

During 2 years, the authors have observed 28 cases of lung abscess, 11 of these with acute suppuration in a previously healthy lung and one with an acute abscess in a bronchiectatic lobe. The management of acute uncomplicated lung abscess has been greatly modified in the last few years. The pendulum has swung away from early pneumonotomy in favour of antibiotic therapy. It has been recorded (*J. Thorac. Surg.*, 18, 618, 1949) that surgical interference is generally of no value in the management of acute, uncomplicated nonputrid lung abscess and that in many cases it may be absolutely harmful. Six factors have to be taken into account in deciding on the therapy: (1) Cause of abscess; (2) duration of abscess; (3) condition of patient; (4) nature and virulence of infecting organism; (5) site and extent of lesion; and (6) presence of complications in the lung of pleura.

Of the 12 cases all but one were "primary". Eleven responded to parenteral aerosol penicillin. In 10 of these, radiographic cure resulted. Penicillin therapy offers an entirely satisfactory means of treating acute uncomplicated lung abscess. Early pneumonotomy is no longer necessary

as long as an abscess remains uncomplicated. Penicillin treatment should be continued until complete healing has been demonstrated by roentgenologic analysis. The authors conclude by saying that their experience has impressed the necessity for a thorough investigation of every case of lung abscess for bronchogenic carcinoma, as well as bronchiectasis.

Infarction of the heart.—The role played by cholesterol in diet.—(Malmros, H., *Report to Swedish Med. Soc.*).

Figures quoted by Dr. Hagiru Malmros of the Orebro Central Hospital, Sweden, tend to substantiate the claim that coronary thrombosis with infarction of the heart is fast becoming a common ailment. He found that there were only 23 deaths from this cause per 1,00,000 in Norway in 1945, as compared with 150 such deaths in Sweden per 1,00,000. In other words, the death rate from this cause was more than 6 times higher in Sweden than in Norway.

These and various other challenging

observations have led Dr. Malmros to seek explanations in the differences in the diets of the 2 nations. He wonders whether diets rich in cholesterol could be responsible for the arteriosclerosis and infarction of the heart. He questions the current overproduction of eggs in Sweden; could this be a threat to the health of the nation, at least that section which is predisposed to xanthematoses or Muller's disease? The 50 million eggs in storage in Sweden at one time in 1949, may perhaps be a *national danger*, rather than a national asset, and Dr. Malmros suggests that if the problem cannot be solved by exporting the surplus of eggs it would be well to kill off many of the hens producing them. The Swede who is predisposed to this class of disease would also do well to ration himself with regard to butter, eggs and other foods rich in cholesterol. Evidently there are many in this class, as judged by the 27 cases of xanthelasma of the eyelids and arcus corneae discovered by Dr. Malmros during a fortnight's survey of the occupants of the medical department of his hospital.

NEWS AND NOTES

Key Factor in Life Process (chemical) Isolated in U.S.A.—An American scientist has isolated a chemical compound that appears to be vital in the fundamental mechanisms by which plants and animals live and grow.

Called triphospho-pyridine-nucleotide (TPN), the compound is believed to be a factor in photosynthesis—the process by which plants synthesize sugar and other foods from water and carbon dioxide by using the energy of sunlight. Enzymes, or natural catalysts, guide the process. In the animal, conversely, TPN may aid in changing digested foods into water and carbon dioxide with the release of energy.

During photosynthesis, TPN appears to work by temporarily "holding" hydrogen after water has been split into oxygen and hydrogen by chlorophyll, the green colouring matter in plants. With the highly reactive hydrogen removed, oxygen enters into the building of complex food substances.

When plants use their own stored food or when animals eat plant foods, TPN again appears to play the role of hydrogen acceptor as food is broken down into water and carbon dioxide.

In recent experiments, scientists placed animal TPN in a flask with enzymes from pigeon livers and added chlorophyll from spinach and carbon dioxide. Under a strong light a complex sugar was produced, indicating

that the process similar to the one that occurs in natural life had been duplicated.

For a long time TPN has been known to be a component of plant and animal tissues. Its purpose, however, had not been known. The recent experiments were conducted by Dr. Severo Ochoa of the New York University Medical School.—*U.S.I.S. Extract.*

New Heart Drug.—Tromexan, a new drug, has been found in recent tests to be the most effective agent used to prevent clotting of the blood. It is quicker and gives fewer apparent side-effects than any other anti-coagulant used to date, the American Heart Association reports.

At the Los Alamos Atomic Energy Project in New Mexico, the action of Tromexan was compared with that of dicumarol, another anti-coagulant. Both drugs were treated with radioactive carbon 14 so that their absorption, metabolism and excretion could be observed in laboratory animals. Scientists found that Tromexan was used more rapidly and with less prolonged effects, decreasing the danger of hemorrhage.

At the Cornell College of Medicine at Ithaca, New York, Tromexan later was used successfully with 112 human patients who had thrombosis—the clotting or blocking of a blood vessel. Studies with anti-coagulants are a major part of the stepped-up

make, says the Report, both to the health of the workers and to productivity. By taking care of his health, these services help to keep the worker at his employment, contribute to his confidence and thus increase his satisfaction with his work and conditions. "They are thus an important element in promoting and maintaining good morale in industry," says the Report.

One of the recommendations of the Committee, on which two representatives of the trade union movement served is, that a new permanent advisory council of doctors, nurses, workers and employers should be set up along with the representatives of the Ministries of Health, Fuel and Power, and Labour, to act as a link between the national public, and industrial health services.—*B.I.S. Extract.*

More Women want to be Doctors.—It is estimated that there are about 8,000 women doctors in Britain who are qualified to practise the calling of a physician. Each year more and more young women students enter the various medical schools attached to Universities and hospitals in England and Scotland—2931 in 1950 as compared with 1,930 in the year immediately before the outbreak of World War II.

Trials with PAS yield striking results.—Hitherto it has been the policy not to give streptomycin to patients who can reasonably be expected to recover merely by prolonged rest, on the ground that it may breed resistant bacilli which could not be attacked by the drug if a relapse occurred later. PAS, the results of the trial of which have been striking, seems capable of reducing this risk so much that it may prove practicable to use streptomycin in a much earlier stage in pulmonary tuberculosis than is now customary. The appearance of some drug-resistant bacilli at a late stage in treatment need not necessarily make this unsuccessful, for if the degree of infection can be substantially reduced the body's own natural defences may well prove capable of dealing with the residue which the drug will not attack.—Dr. Trevor, I. Williams, Deputy Editor of the Scientific Journal "*Endeavour*"; *B.I.S. Extract.*

Production of PAS in India.—Replying to an interpellation in the Indian Parliament on April 10, 1951, the Health Minister stated that a former research scholar of the University College of Science of Calcutta had evolved a method for the technical production of PAS, a specific for tuberculosis. The doctor was working with a firm now producing PAS.

Madras Medical Service—Single Cadre of Assistant Surgeons formed.—The Government of Madras have passed orders unifying Classes I and II of Civil Assistant Surgeons in the Madras Medical Service into a single cadre of Assistant Surgeons.

The Order states that as there has been no licentiate course in Medicine in this State from about 1939, only medical graduates will be available for appointment to the posts of Civil Assistant Surgeons, Class II. It has also been found that the scales of pay of Civil Assistant Surgeons Class II, are not sufficiently attractive for graduates, and that, in view of the large number of posts in Classes I and II, much administrative inconvenience is caused. The Government have, therefore, decided that the cadres of Civil Assistant Surgeons, Classes I and II, shall be unified to form a single cadre of Assistant Surgeons with effect from April 1, 1951, on the scale of pay of Rs. 150—252—400, medical graduates being allowed to start on Rs. 200/- in the scale.

The pay of every officer holding a post in the cadre of Civil Assistant Surgeons Class II, at the time of the unification of the cadre of Civil Assistant Surgeons, Classes I and II, shall be fixed in the scale of Rs. 150—252—400 at the stage next above his pay in the old scale of pay, subject to the exercise of the option allowed under Fundamental Rule 23. This option should be exercised on or before March 31, 1952, failing which their pay will be fixed in the new scale of pay with effect from April 1, 1952. Medical graduates, drawing pay of less than Rs. 200 per month, shall be eligible to draw Rs. 200 in the new scale of pay from April 1, 1951. Officers who hold appointments in this cadre of Civil Assistant Surgeons, Class I, at the time of the unification shall continue to draw the pay they are drawing in the existing scale of Rs. 200—252—400.

Assistant Surgeons, whether licentiates or graduates, who have been entirely debarred from engaging themselves in private practice, shall be allowed to draw a compensatory allowance of Rs. 80/- per mensem. Assistant Surgeons, whether licentiates or graduates, whose private practice has been restricted to consulting practice, shall be allowed to draw a compensatory allowance of Rs. 50/- per mensem.

The Organising Secretary, Inaugural Meeting of the Anatomical Society of India, Department of Anatomy, Nilratan Sircar Medical College, Calcutta writes:—

The Inauguration Ceremony of the Anatomical Society of India will be held on the 20th May, 1951 at 9.30 a.m. at the Medical College of Bengal, Calcutta.

Dr. M. N. Bose, Principal, R. G. Kar Medical College, Calcutta, will preside over the function and the Hon'ble Dr. B. C. Roy, Chief Minister of the State of West Bengal will formally inaugurate the Society.

On behalf of the persons interested in the subject in India the Secretary extends to you a very cordial invitation to attend the function.

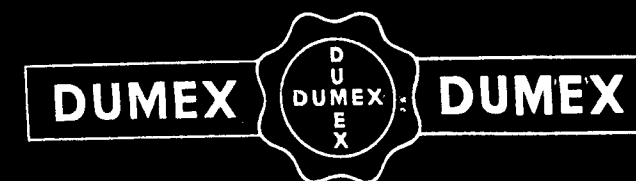
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Bouckaert & De Duve-Physiol. Reviews 27: 39-71 (1949)



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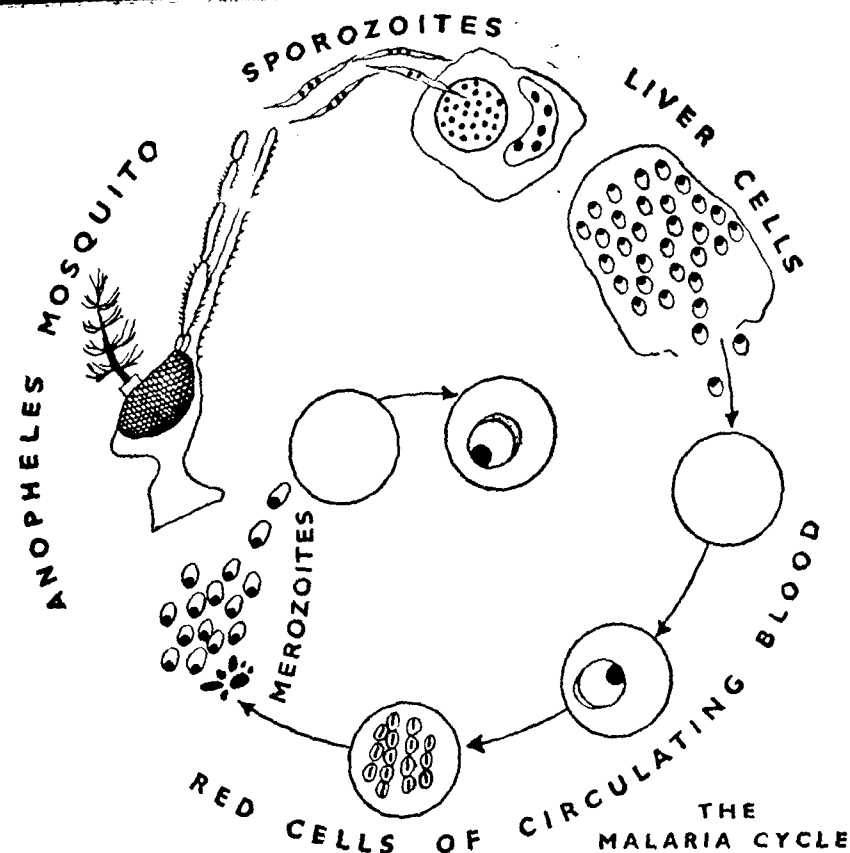
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Containing 2% (w/v) Aluminum Monostearate
or
Crystalline Procaine Penicillin G
for Aqueous Injections
or
Penicillin Potassium
(Crystalline Procaine Penicillin G
and Buffered Crystalline Penicillin G
Potassium for Aqueous Injections)

D
Crystalline Dihydrostreptomycin Sulfate
or
Solution of Crystalline Dihydrostreptomycin

S
Streptomycin Calcium Chloride Complex

Above is a partial list of the many conditions in which these products may be indicated. The symbols D, P, and S are used to designate the antibiotics which are likely to be useful in most cases of the conditions specified. The particular agent to be employed will, of course, depend upon the nature of the disease process and the specific susceptibility of the infecting micro-organism.



'unanimous'

Opinion is unanimous on the need for acid control in the treatment of peptic ulcer. It is the action of pepsin in an acid medium which prevents healing and predisposes to recurrence.

This corrosive environment can be neutralised instantly by 'Aludrox' therapy, which stabilises the stomach contents at pH. 3.5-4.0, the optimum condition for healing since normal digestion is left unimpaired.

'Aludrox' quickly relieves pain and in conjunction with a bland diet and rest promotes rapid healing of the ulcer.



'ALUDROX'
BRAND REGD.
AMPHOTERIC GEL

Available in 12-oz. bottles and sold in boxes of 60 10-grain tablets

JOHN WYETH & BROTHER LIMITED, LONDON

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P. A. S. "WB"

Sodium Para-amino Salicylate

In the Ambulatory Treatment of TUBERCULOSIS

Containers of 100 and 250 g. Sodium Powder
Containers of 100 and 250 tablets of 0.41 g. sugar and enteric-coated.

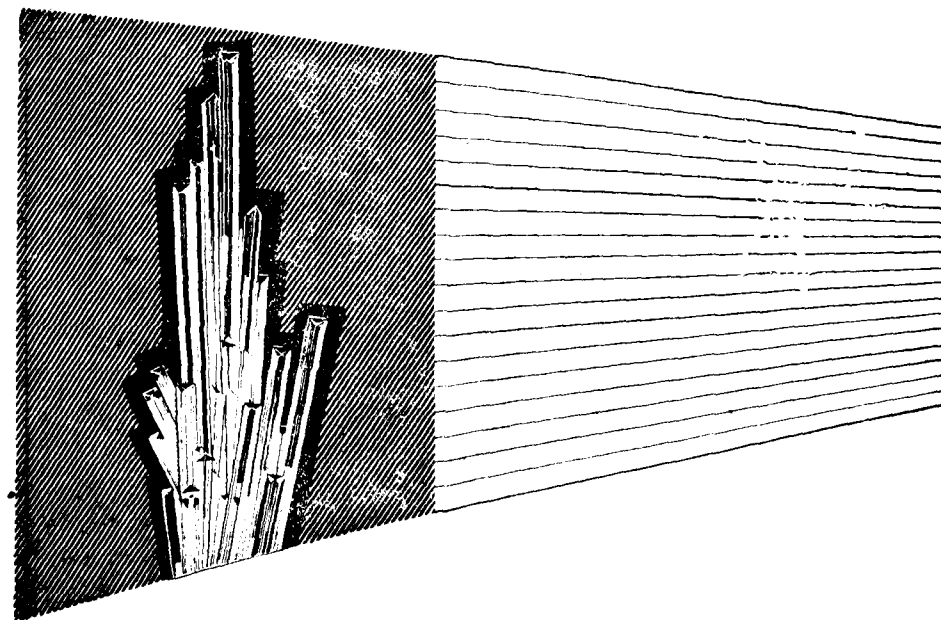
"WB" Specialities

ANAPELLIN	Nicotinic acid 50 x 100 mg. ampoules	Pellagra and associated symptoms.
ANTHROXIL	Thiouracil 0.05, 0.1, & 0.2 gm. tablets	Hyperthyroidism therapy.
DITHRANOL	"WB" Brand, 1 oz. powder	Fungal infections of the skin.
KETOCET	Acetomenaphthone 2 mg. & 10 mg. tablets	Treatment of all hæmorrhagic conditions.
PELLACIN	Nicotinamide 50 & 100 mg. tablets 0.1 mg. ampoules...	Prophylaxis and treatment of deficiency states, pellagra, glossitis, diarrhœa etc.
STERAMIDE	"WB" Sulphacetamide 10% & 30% solutions 1 drachm. Eye Ointment. 15 g. Skin Ointment.	Ocular infections. Blepharitis, conjunctivitis.
STIMULIN	25% Nikethamide 2 cc. ampoules 15 cc. liquid oral	Skin infections. Impetigo contagiosa, keloid acne etc. Circulatory and cardiac stimulant.



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B₁₂—the anti-anæmic factor . .

independent of liver sources

VITAMIN B₁₂ CONCENTRATE GLAXO is derived from a new source, the mould streptomyces, and produces all the known effects of liver extracts in the treatment of pernicious anæmia and the macrocytic anæmias of sprue and pregnancy. It can be given even in cases already sensitized to liver. The high Vitamin B₁₂ equivalent — *20 — 50 micrograms per cc. — is microbiologically standardized, ensuring consistent therapeutic activity. Moreover, Vitamin B₁₂ Concentrate Glaxo substantially reduces the cost of treatment.



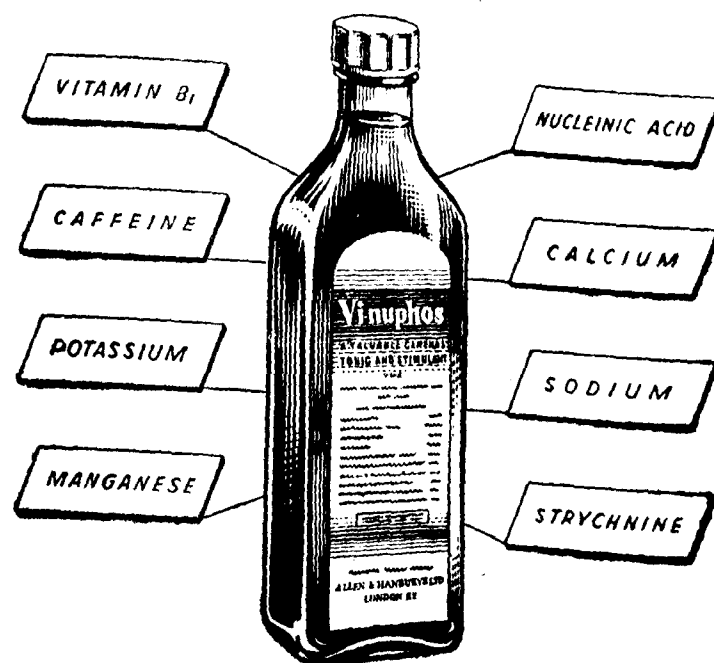
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In boxes of 6 x 1 cc ampoules.

GLAXO LABORATORIES (INDIA) LTD., BOMBAY • CALCUTTA • MADRAS

Stomachs



Formula for rapid recovery



When the patient describes symptoms of lassitude, loss of appetite, nervous exhaustion and lack of body tone, and needs a tonic, Vi-nuphos is indicated. The formula of Vi-nuphos provides glycerophosphates, nucleinic acid, mineral elements and vitamin B₁ for the restoration of normal vitality.

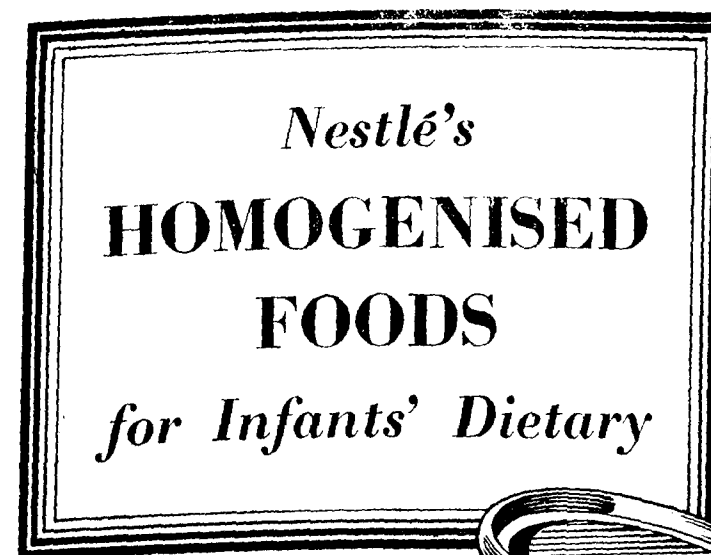
Vi-nuphos is the ideal tonic for patients who are needing a stimulus to the nervous system particularly those who are convalescing from illness or who have undergone mental or physical strain.

Vi-nuphos

In bottles of 4 fl. oz. and 8 fl. oz.

ALLEN & HANBURY LTD
CALCUTTA (INCORPORATED IN ENGLAND) BOMBAY

PEDIATRICIANS...



NESTLÉ'S HOMOGENISED FOODS may be recommended with confidence as gradual additional substances into the diet when weaning.

The easy digestibility and assimilation of infants' first solids are assured by the Nestlé process of homogenisation and infants taking them during weaning have very few gastro-intestinal upsets.

NESTLÉ'S HOMOGENISED FOODS are invaluable in cases of constipation in infancy.



NESTLÉ'S HOMOGENISED FOODS are available in several varieties of fruits, vegetables and broths.



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STANDARDISED PREPARATION OF
GARLIC (ALLIUM SATIVUM)


 Tasteless and odourless dragees
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 Useful against flatulence, consti-
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Bottles of 25, 100, 500 and
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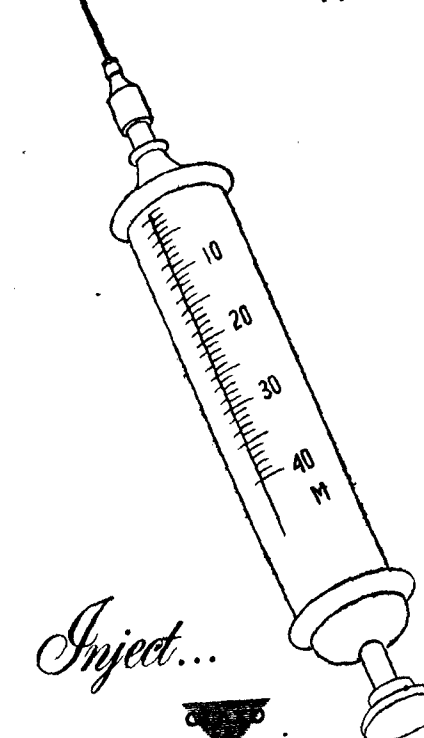


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Stronachs

adjunctive treatment
for Streptomycin
Therapy.

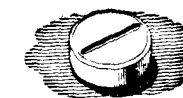


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sterile solution of colloidal calcium
with vitamin D (Calciferol)
5000 i.u. per cc.

Ampoules of 1 cc: Boxes of 6.
Rubber-capped phials: 15 cc.

To



control pain

reduce fever

relieve insomnia

Codopyrin Tablets, a combination of aspirin, phenacetin and codeine, afford one of the best practical examples of an analgesic and antipyretic, positive in action and free from unpleasant side-effects. Non-habit forming, Codopyrin Tablets provide an extremely efficient analgesic for general use. They are particularly valuable for relief of pain in neuralgia and neuritis, dysmenorrhoea, fevers, headaches and colds, after injury or operation and in mild cases of insomnia.

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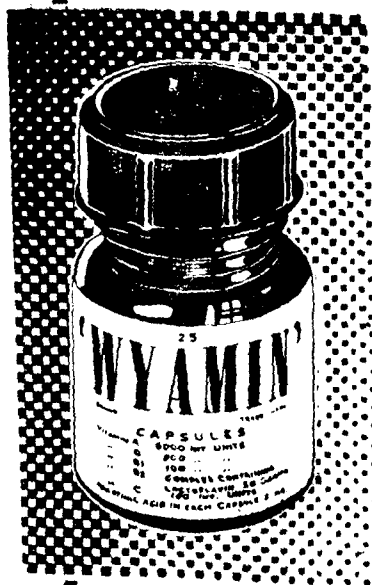
TABLETS

In tubes of 10 & 20 and
bottles of 80 tablets.

Each tablet contains: Ace-
tylsalicylic Acid 0.20 gm.
Phenacetin 0.50 gm.
Codeine phosphate 0.01 gm.
Excipient to 0.64 gm.

GLAXO LABORATORIES (INDIA) LTD., Bombay. Calcutta. Madras.

**Abnormal requirements
Inadequate diets
more often than not
result in vitamin deficiencies**



The diet of the pregnant woman, lactating mother, growing child, hyperthyroid individual, or the patient with a wasting disease, may not meet requirements. Intake must equal output to prevent vitamin deficiency. Multi-vitamin therapy is, therefore, indicated. But even when requirements are normal, today's diets often result in an inadequate intake of essential nutrients.

'Wyamin' supplies an effective quantity of six different vitamin factors. It is, therefore, indicated to replace abnormal nutritional requirements and supplement inadequate diets.

'WYAMIN'
TRADE MARK
MULTI-VITAMIN CAPSULES



JOHN WYETH & BROTHER LIMITED, LONDON
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"prompt and rapid improvement"

IN ACUTE BRUCELLOSIS

A "representative" case from a series of 9 successfully treated patients is that of a 12-year-old boy, very acutely ill with brucellosis and Br. melitensis bacteremia. On Terramycin therapy, instituted the 30th day of illness, the patient became afebrile within 3 days and showed negative blood cultures by the 5th day. Therapy was continued for 28 days. Observation for a 3-month period showed no relapse.*

treated with **Terramycin**
CRYSTALLINE
HYDROCHLORIDE

The growing clinical literature continues to stress:

1. The broad-spectrum activity of Terramycin against organisms in the bacterial, rickettsial and spirochetal as well as certain viral and protozoan groups.
2. The promptness of response to Terramycin in the treatment of acute and chronic infections involving a wide range of systems, organs and tissues.

Terramycin is available in a variety of oral, intravenous and topical dosage forms: CAPSULES, 250 mg., bottles of 16 and 100; 100 mg., bottles of 25 and 100; 50 mg., bottles of 25 and 100; ELIXIR (formerly Terrahon), 1.5 Gm. with 1 fl. oz. of diluent; ORAL DROPS, 2.0 Gm. with 10 cc. of diluent and specially calibrated dropper; INTRAVENOUS, 10 cc. vial, 250 mg., 20 cc. vial, 500 mg.; OINTMENT, 30 mg. per Gm. ointment; tubes of 1 oz.; OPHTHALMIC OINTMENT, 1 mg. per Gm. ointment; tubes of 1/4 oz.; OPHTHALMIC SOLUTION, 5 cc. dropper-vials, 25 mg. for preparation of topical solutions; TROCHES, 15 mg. each troche; packages of 24.

*Knight, V., Ann. N. Y. Acad. Sci. 53: 354, Sept. 15, 1950.

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HEALTH

[ESTD. JAN. 1923]

AN ILLUSTRATED MONTHLY DEVOTED TO HEALTHFUL LIVING
Published on the 1st of every Month

Editors and Proprietors:

Dr. U. RAMA RAU, and U. KRISHNA RAU, M.B., B.S.

Editorial and Publishing Office:

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"Health" aims at bringing into every home, in a simple and informal way, the truths about health and disease as discovered by eminent Medical and Public Health authorities. It advocates vegetarianism, temperance, purity, simplicity and moderation in all phases of life—in short, nature's way to better health and longer life. The social and health worker will find it as the best means of keeping him informed of the progress made in kindred subjects throughout the world.

We invite from the Medical Profession and Public Health authorities in India and abroad, contributions on Vital Health Topics, such as Diet, Nutrition, Prevention of Disease, Care and feeding of infants, Child training, Management of the sick, Guidance for the prospective mother, Healthful beauty, Exercise, Occupation, Recreation, Contagious diseases, School Hygiene, Sanitation, First-Aid in Accidents, Health News, Views and Inventions, Vital statistics, &c. Each article should not exceed about 2000 words in length.

The contributions may be in the usual form or in the form of Dialogues, Dramas, Poetry, Court Proceedings, or Personal stories of health building or even pen pictures (line drawings), condensed extracts of useful contributions appearing in other journals with or without comment, practical hints, recipes, healthy menus, experiences, statistics, communications, etc. The choice of the subject is left to the contributors so that they may select the best subject in their own special line. Contributions should be in an entertaining, non-technical style, and must pass the acid test of scientific approval before being published. No questionable or unproved theories can find a place in the Journal. Contributions are accepted on the distinct understanding that they are sent solely to "Health."

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NATH & COMPANY,

MEDICINE DEALERS

Estd. in year
1943

Princess Street, Bombay-2.

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Term:—By V.P.P. or Bank. 25% advance from New Clients

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German 3-12; Cheap 3-13	Sulphathiazole Boots 1000 50-0; Ciba 54-0
Penicillin G. Sodium or Potassium	ICI. Sulphamezathine 100 7-0; 500 32-0
Merck 1 2 5 10 lacs.	Yeast Tab. B.D.H. 1000 7-8; Eng. 6-8
or Pfizer 0-15 1-0 1-12 2-13	Liver Ext. USP. 4-12; 5 USP. 8-12; Combex
Procain Penicillin 3 lacs x 10 cc. Merck, Pfizer	BW. Sulphotrone 100 11-0; 500 55-0 (10-cc 7-8
3x1 cc. Eng. 2-4; 4x1 cc. 3-6; [11-8	Sandoz Cal. 10% x 10cc. x 5, 6 8; 20 amp. 23-0
Penicillin Eye Oint. 8-8; Skin 14-0; Lozengia	Ind. Cal. Glu. 10% x 10cc. x 100 18-0; 5cc 16-0
Procain Penicillin 20 lacs 9-8 Merck (doz. 14-0	Redoxon 6x2cc. 7-0; 3x5cc 6-8; 25x5cc. 48-12
Terramycin 16 Caps. Pfizer each 40-8	50x2cc. 59-0; Tab. 20, 2-4; 250, 28-0
Chloromycetin Caps. 12 29-0	Cytotropin IV, IM 5-0; Atophthal IM, IV 10-8
Quinine Bengal or Madras 51-0; Stand lb. 45-0	Ephedrin Tab. Agr. x 1000 Ind. 12-8; Eng. 15-12
Sulph. Roche 80-0; Java 70-0; Howds 75-0	Saridon Tab. 10 20-0 doz. 250 34-0; Thymol oz.
oz. Ind. 4-0; Howds 7-0; Bihydro oz. 9-0	Sulphanilamide Cream 4 oz. 7-8; doz. Lilly (5-0
Quinine Bihydro Amps. 10 grs. x 2cc. x 100	Vitamin B ₁ Tab. 500 USA. 1-8; Vitamin Compl.
Ind. P.C. or B.D.H. Evans B.W. P.D.	Nicotinic Acid 500 Eng. 1-8 [USA. 500 5-0
20-0 32-0 33-0 33-0 43-0 55-0	Potas Chloras tab. 500 6-0; Powd. lb. 4-0
14-0 28-0 32-0 BDH. 100x5 grs. x 1 cc.	Omnopon Amps. with Needles Comp. 1cc 1-0
Quinine Amps. Italy 15grs. x 2 cc. x 5 1-12; 100 30-0	Hemocyteserum 12-0; Campolan 6x2cc. 6-4
Bihydro 2gr. x 100 4-8; Howds 5gr. 10-0	Entodon amps. 14-0; Feradol 11 lb. 8-12
Bisulph 2 gr. x 100 3-8; 5 gr. 8-0	Motatone 12 oz. 8-0; Gentian Violet Jelly doz.
5 gr. x 1400 Howds 90-0; 1000 75-0	Platus Folie doz. 75-0; Liver 50-0
5 gr. x 1000 BDH. 50-0	Hypo. Syringe (S.N. Re. one more)
3 gr. x 500 Java 20-0	2 5 10 20 30 50cc.
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6-8 13-0 15-0 13-12	Ideal 5-12 7-8 10-8 11-8 18-8 25-0
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Aerisilavine 25 grm. L.P. Boots 5-0	B.D. Lear Lock 7-12 12-8 14-0 17-8 22-8 33-8
Codena Phosphate oz. 28-0; lb. 27-0 oz. dr. 5-0	Japan 3-8 4-8 7-8
Menthol oz. 9-0; Santonine dr. MB. 11-0	Indian Metal case 1-6 2-0 2-8 3-0 5-12 5-12
Argyrol Orig. 17-0; Eng. 6-0; Protargol Tab.	Italian 1-12 2-8 3-8 4-8
Protargol oz. 6-0; Oil Chinopodium 7-0 [500-6	Backelite case 1-8 2-12 3-0 3-0
Nepacrine ICI 11-8; Eng. or U.S.A. 1000 8-4	Record Noodle D.B. 1-12; German 3-0; Japan 2 12
Quinacrine Tab. M.B. 500 6-0; 1000 10-4	U.S.A. 5-8; B.D. doz. 10-8; Saturo 4-0
Atebrin Tab. Bayer 15 doz. 12-8; 300 11-8	All Glass Mount, Japan 3-8; German 4-0
Amps. 1 grm. x 5 4-0; 50 amps 35-0	Rubber Gloves Superior 7 1/2 pairs USA. dz. 12-0
0-3 gr. x 5 8-4; 25 27-0	Stethoscope Tubing Ord. 1-4; Plastic yrd 2-4
Paludrin 3 grms. 500 28-0; 1 grm. 1000 26-8	F.L. Durox or Silver tex. Superior 2-8
amps. 25 11-8; 5 amps. 4-0	Tooth Forceps Universal 5-0; U.S.A. 8-8
Vitamin B ₁₂ amps. Glaxo 6, 5-8; 50 mic. 10-0	B.D. Stethoscope 22 8; Triple 35-0; German 11-0
Rubramin amps. 13-0; Berubigen 10 cc. 14-0	Thermometer Hick 1-12; Zeal. 3-4; Eng. 2-0
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N.A.B. 15 1-2; 3 1-5; 45 1-8; 6 1-11	Tycoos Blood Pressure 100-0; Baunometer 130-0
Neosalvarsan 15 1-15; 3 2-12; 45 2-13; 6 3-8	German Instruments Erkameter 75-0
Sulfarsinol 1 1-1; 2 1-4; 3 1-7; 4 1-10	Personal Weighing Machine U.S.A. 15-0
Acetylarsen adult 8-8; Child box 5-8	STETHOSCOPE POCHE PLASTIC each 6-8
Neptal 6 x 1cc. 3-12; 6 x 2cc. 2-8	First Aid Box 10-8; Alotaris 14-0
Emetin Hydro Endo 6x1 gr. USA. 8-12	Wampole Phospho 13-0; Waterbury's Red. 6-12
BW. 1x12 8-12; 6x1gr. 8-12	Distil Water 5cc. x 100 7-0; 10cc. 8-8
1 gr. x 100 65-0 1 gr. x 100 BDH 110-0	Penicillin Tab 1 lac. 3-8; 1 lac. x 12 tab. 6-12
PD. 1 gr. x 6, 6-4; 6x1 gr. 8-12	Saline Apparatus 300cc. 9-0; 500 cc. 11-8
Cibazol. tab. 250 17-6; Sulphatriad 100 10-0	Fountain pen Battery 4-0; Gripe Water dz. 45-0
Enterovioform 20 2-14; 100 11-4	Dispensing Seal Brass 4-4; Nickle 5-12
Berin 25 mg. 2-14; 50 mg. 4-8; 100 mg. 7-4	Glycerine Syringe Metal 2 oz 6-4; 1 oz. 7-4
Sulphanilamide tab. Eng. 7 1/2 gr. 12-8; 5gr. 6-8	Sterilizer 6" 15-0; 8" 23-0; Asparino 1000 7-8
MB 500 7-8; Glaxo 1000 15-0; Powder oz 1-8	B.W. Cal. Gluconate 100 Amp. 10% 10cc. 65-0
Sulphaguanadine Aust. or Eng. 1000 28-8	
500 Eng. 15-0; M.B. 20-8; BW 17-0	

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With **Pen-Aqua**

Penicillin for Injection in an aqueous vehicle at 24-hour intervals, with a rapid peak penicillin blood level to over-whelm infection at the outset.

Procaine Penicillin G. 300,000 u./cc. and Potassium Penicillin G. 100,000 u./cc., for suspension/solution in aqueous media.

Five-Dose Vials, 5 cc.; Single-Dose Vials, 1 cc.

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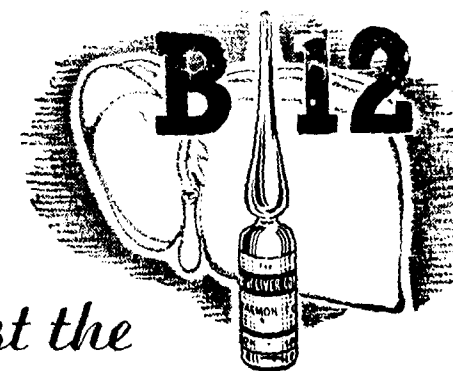
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Taka Combex cap.		5-14
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Elixir Benadryl Syrup 4 oz.	bot.	4-0
Livibron 6-6; Metatone USA. 12	oz.	7-4
P.A.S. 100 grm Italy 6-6; Ledago		6-8
" 100 x 5gr. Italy 7-8; 100 x 7 1/2 gr.	bot.	8-0
" 500 x 5gr. 29-0; 500 x 7 1/2 gr.		31-0
" 500 tab. Ledago		36-0
Eng. Belladonna Plaster 6-8; JJ		10-8
Sterns Bicolates 45-0; Hormotone 40 tab.		99-0
Gets it 42-0; Anusol Ointment		38-0
Veganin 10 tab. 16-0; Thymol	lb.	57-0
Penicillin tab. Pfizer 1 lacs 7-4; 50000 ea.		3-12
Mephadrine 1000 tab. Boots	tin	10-0
" " I.C.I. tin 10-4; B.S. "		8-8
Atophan 20 tab. 33-0; Potas Bromide		3-14
Atophas IV & IM amps.	box	11-0
Crookes Vit D 15 cc.		45-0
" Manganese 6 x 1 cc.		3-10
Liquor Sedans P.C. 4 oz.	bot.	8-0
Calcium Sandoz 10% 10 cc.		6-4
" " 10% 10 cc. 20	amps.	22-0
Glycerin Trinitrin 100 B.W.	doz.	25-0
Maclean's Stomach Powder Med.		21-0
Hypodermic Syringe 2 cc. 5 cc. 10 cc. 20 cc.		
Allglass Japan 1-4; 2-0; 3-4; 4-14		
Record Boston 5-12; 7-0; 8-4.	each	
Needles D.B. 4-12; German 2-10; Japan		2-8
Asperin 7-12; Soda Salicylate	lb.	8-4
Soda Bicarb 1 lb LP. 0-8; Eng.	lb.	1-8
Calcium Lactate LP. 3-8; Eng.	lb.	5-0
Potas Citras LP 6-0; Eng.	lb.	7-0
Potas Nitras 1-6; Salol	lb.	7-0
Sulphadiazine Eng. or Italy 1000	tab.	95-0
Sulphaguinadine 1000 tab.	bot.	30-0

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Golden Eye ointment	"	5-0
Bronchial Lozenges 85's	"	10-8
Gripe Mixture 6 oz.	"	20-0
Mexa Ringworm ointment	"	8-0
Smelling salt	"	9-0
Penetrol Inhalers	"	12-0
Emp. Belladonna 4 oz. stick Indian	lb.	1-10
" " Resina 4 oz. stick Indian	lb.	9-0
" " " " "	lb.	1-6
B.W. Sulphatrone 100's 12-8; 500's	bot.	53-0
" Soamin 100 x 1 gr. tab.	doz.	24-0
" Digoxin 25 tab 22-0; 100's	"	60-0
" Borofex Sm. 6-12; Large	"	13-0
" Carbanon 80's 7-8; 500's	bot.	35-0
" Emetine 12x 1 gr. or 6 x 1 gr.	each	9-0
" Sodamint 100's	doz.	16-8
Keplar malt 36-0; Hypo.		50-0
Hewlett's Mixture 4 oz.	doz.	45-0
Huxleys Wintogeno		32-0
Redoxon 6x2 cc. 8-14; 50x2cc.	box.	56-0
" Fort 3x5 cc. 7-0; 25x5 cc.	"	49-0
Saridon 10 tab 20; Yeast 1000	tab.	6-0
Protargol Eng. 8-8 oz; LP	oz.	5-0
Silver Vittelal	"	5-10
Ethyl Chloride 100 grms pray		46-0
Silver Nitras Crys	oz.	5-12
Berin 10 cc. x 100 mg. 7-0; 50 mg.	each	4-8
Adexolin Liq. 14 cc. 24-0; 2 oz	bot.	5-8
" cap. 25's 26-0; 100's		5-12
Becadex 25's		50-8
Erbolin Cap. 10's 11-3 100's	bot.	5-0
Fersolate 100's 19-0; 500's	"	6-12
Ostocalcium 50 tab. 25-0; 250's	"	7-8
Septanilum 1000 tab.	tin.	15-0
Vitamin B-12 Glaxo 6x1 cc.	box	5-0
Gynomin tab. 36-0; Randells		30-0
Curity Plaster 1 yd. 1" 5-4; 1"	doz.	4-4
" 5 yds. 1" 18-8; 2" 28-8; 3"		42-0
Valda Pastilles 10-0; Alludrox		46-0
Potter's Throat Pastilles tin	doz.	6-0
B.B. Menthol Cyp. tabs 11-8 oz.;	"	8-0
Bland Pills Eng. 1000 tab.	lb.	150-0
Scotts Emulsion sm. 26-0; Large	bot.	7-0
Atebrin 15's 1-2; 300's	doz.	40-0
Matchless Hotwater 39-0; Ice bag	bot.	13-0
Calcium Lactate 1000x5 gr		20-0
Paragon Washable	bot.	6-0
Acid Boric LP. 1-6; B.D.H.	doz.	8-4
Sodium Citras LP. 4-8; Eng.	lb.	1-12
Kaolin LP. 0-12; Eng.	lb.	6-4
Calcium Gluconate LP. 4-4; Eng.	lb.	2-4
Potas Bicarb LP. 1-14; Eng.	lb.	6-0
Sulphanilamide Powder	lb.	2-8
Indian Hydrogen 4 oz. 8-8; 8-8;	1 lb.	9-12
Sulphathiazole 1000 tab.	bot.	30-0
Sulphanilamide 1000 tab.	bot.	12-8



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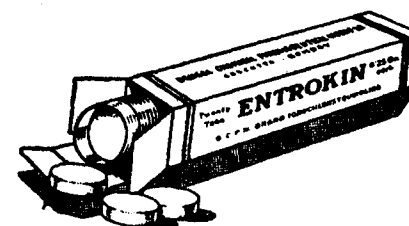
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