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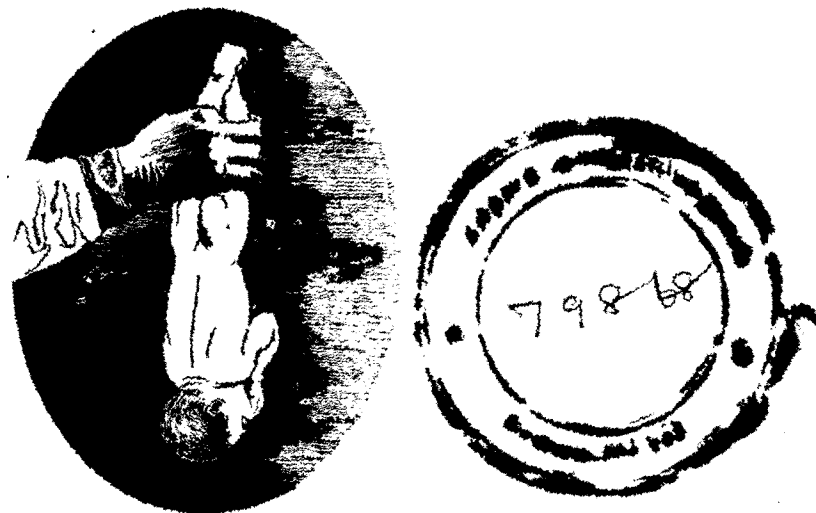
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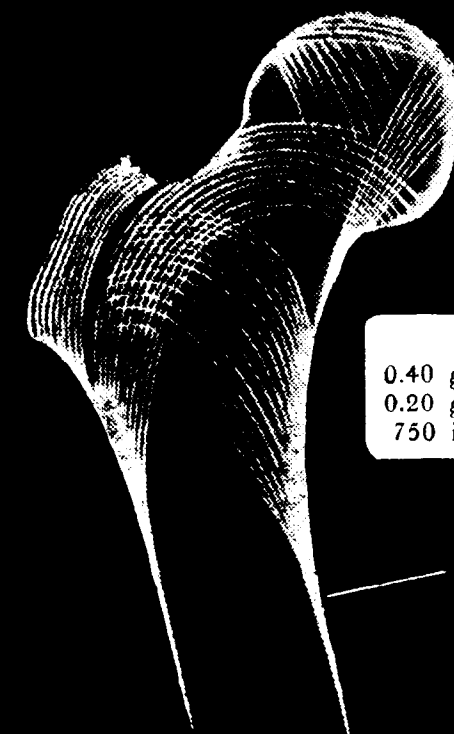
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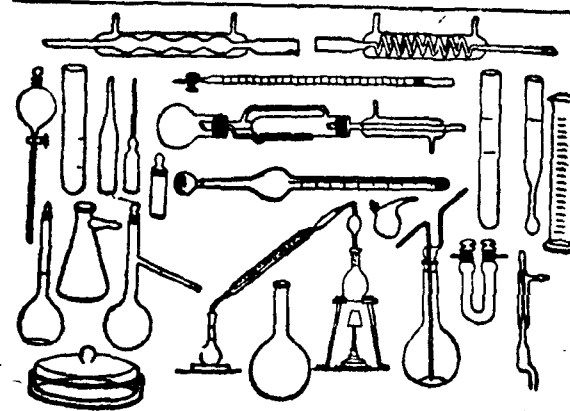


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SARA



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INDICATIONS: Nicotinic Acid is a specific in the treatment of pellagra and its administration in clinical doses produces striking results in clearing up the glossitis, stomatitis, gingivitis, pharyngitis, dermal lesions and mental stupor and depression of this deficiency disease.

Pellagra, indigestion, forgetfulness and insomnia respond to Nicotinic Acid Sara. Porphyrinuria, whether due to Pellagra or to the toxic effects of the Sulphonamide drugs is counteracted by Nicotinic Acid Sara. In association with liver extract, it gives good results in sprue and pernicious anaemia. It is also useful in the treatment of delirium tremens.

DOSAGE: Although optimal dosage varies according to the deficiency of the vitamin, oral administration of 500 mgms., in 10 doses of 50 mgms. each is safe and effective for the average patient with pellagra. Administration of 50 mgms., at one-hour intervals ten times a day is more effective than a single large dose.

In grown up children, the dosage varies from 50 to 300 mgms., and for children from 2 to 6 years, 25 mgms. are sufficient. Nicotinic Acid Sara is available as tablets containing 50 mgms., each packed in bottles of 25, 100 and 500 tablets.

REACTION: The absorption of this vitamin is followed by flushing, burning and itching. But these are harmless and disappear within a short time.

Note: This Vitamin—an important member of the Vitamin B Complex—is now prepared in India synthetically by Sarabhai Chemicals (Fine Chemicals Division).



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Shark Liver Oil (Madras Government Brand) has been tested by Dr. Aykroyd at the Nutrition Research Laboratories, Coonoor. It is guaranteed to contain when packed 1500 i.u. of Vitamin A and not less than 100 i.u. of Vitamin D per gram.

DOSAGE: May be taken in one or two tea-spoonfuls twice a day after the principal meals either separately or mixed with milk or orange juice.

It has been proved beyond doubt that Shark Liver Oil (Madras Government Brand) prepared at the Government Oil Factory, Calicut is a reliable substitute for Cod Liver Oil wherever it is indicated. This has been endorsed by Government Doctors and private medical practitioners after observing its effects on patients. A few medical opinions are given in extracts below:—

MEDICAL OPINIONS

The Superintendent, General Hospital, Madras. It is generally agreed that Shark Liver Oil is well tolerated and that patients generally have improved during its administration in a fashion comparable to that usually obtained with Cod Liver Oil. Shark Liver Oil can replace the Cod Liver Oil in cases of Vitamin A deficiency.

Medical Registrar, General Hospital, Madras.—Clinical trials show that the Shark Liver Oil is uniformly good. No complaints of indigestion or gastric upset. Average weekly gain of 2 lbs. in weight by each patient. No ill effects on temperature. Can be tried in all cases of pulmonary tuberculosis instead of Cod Liver Oil.

Professor of Therapeutics, General Hospital, Madras.—No gastro-intestinal disturbances. Patients have not complained or refused to take it on account of its taste and smell.

Surgical Registrar, General Hospital, Madras and Lecturer in Orthopaedics, Medical College, Madras.—All the patients took the Oil or emulsion without any difficulty. All the patients who have been under observation and treatment for a month now have put on weight (Maximum 9 lbs. in 2 months). All the cases have been immobilised. Temperature has been kept down.

Medical Superintendent, T. B. Sanatorium, Perundurai.—Tried on T. B. patients. Dosage 1 drachm. Tolerance and effect on temperature good. Maximum increase in weight in a fortnight 5 lbs.

Superintendent, King George Hospital, Vizagapatam.—Shark Liver Oil was given in the form of mucilage mixture in T. B. cases. All the patients tolerated the Oil very well. No one complained of any gastro-intestinal upset. In ten patients the weight increased by one to three pounds in a fortnight. Four patients volunteered to say that their appetite distinctly improved. Cod Liver Oil is given in T. B. more for its food value than for its medicinal properties. On that consideration Shark Liver Oil can very well be substituted for Cod Liver Oil.

Medical Superintendent, Union Mission Tuberculosis Sanatorium, Arongyavaram, Near Madanapalle, (Chittoor Dt.)—Dose 2 drams three times a day. No intolerance of the Oil. 15 patients gained in weight. Average weight gained in three weeks 1.93 lbs.

Superintendent, Government Tuberculosis Sanatorium, Tambaram.—Patients tolerate the oil well up to 3 drachms. The effect on weight has been satisfactory. There has been uniform increase in weight and in some cases marked increase, the maximum being 5 lbs. in two weeks in one case. Slight decrease in temperature was noticed in many cases. The oil may be given mixed with orange juice three drachms twice daily after food.

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Composition (Tablet)

Each tablet contains:—

Vitamin A	2,000 I.U.
" B ₁	100 "
" B ₂	1,000 "
" B ₃	2 mg.
" B ₆	1 "
" C	1,000 I.U.
" D	1,000 "
" E	1 mg.
Nicotinic Acid	10 "
Nicotinamide	6 "
Assimilable Ferrous Iron	4 "
Assimilable Calcium	15 "

Composition: (Emulsion)

Each fluid ounce contains:—

Vitamin A	50,000 I.U.
" B	5,000 "
" B ₂	5,000 "
" B ₃	10 mg.
" B ₆	10 "
" C	3,000 "
" D	13,000 "
" E	10 "
Niacin (Nicotinic Acid)	100 "
Nicotinamide	40 "
Assimilable Calcium	3,000 "
Assimilable Ferrous Iron	100 "
With Pepsin, Assimilable Phosphorus	
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Vitamin B ₁	9.0 mgm. per oz.
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Calcium Pantothenate	4.5 mgm. per oz.
Flavour Base	0.4%

Indications: Infantile gastro-enteritis, peptic ulcer, infections, protein starvation, burns, fractures, anaemia, pregnancy and lactation.

Dosage: One tablespoonful four times daily in lemonade, fruit juice, tomato juice, buttermilk or cereals.

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As a safeguard against imposition the letters MHS are embossed on the inner surface of each capsule, visible only when the capsule is cut in half as shown.

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Under the administration of Angier's these organs become pacified and retentive, digestion is strengthened, and the assimilation of food is normal and complete. It is oftentimes surprising how quickly pale, flabby, weakly infants and children gain flesh, strength and vitality when they are given the Emulsion systematically.

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Convalescent
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Overworked
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These are the patients who, neither seriously ill nor yet entirely well, often respond dramatically to the administration of a good tonic. Neuro Phosphates, palatable, assimilable, and easily tolerated, helps to restore appetite, vigour and general tone.

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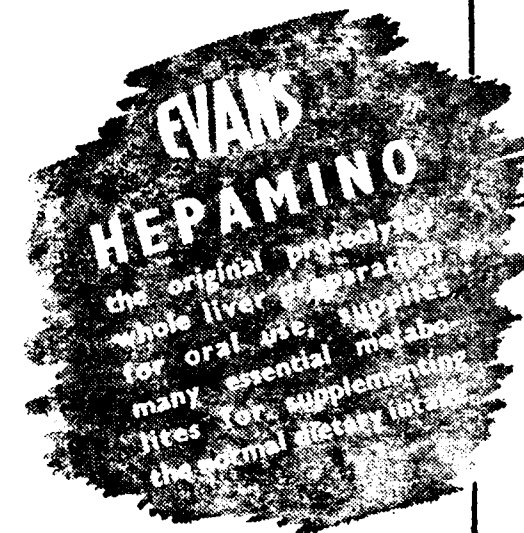
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—and these are immediately available for biological utilization. Also present are iron and copper, vitamins B¹⁰ and B¹¹, purine and pyrimidine bodies and anti-macrocytic anemia factors. Hepamino is issued as a dry, granular powder.

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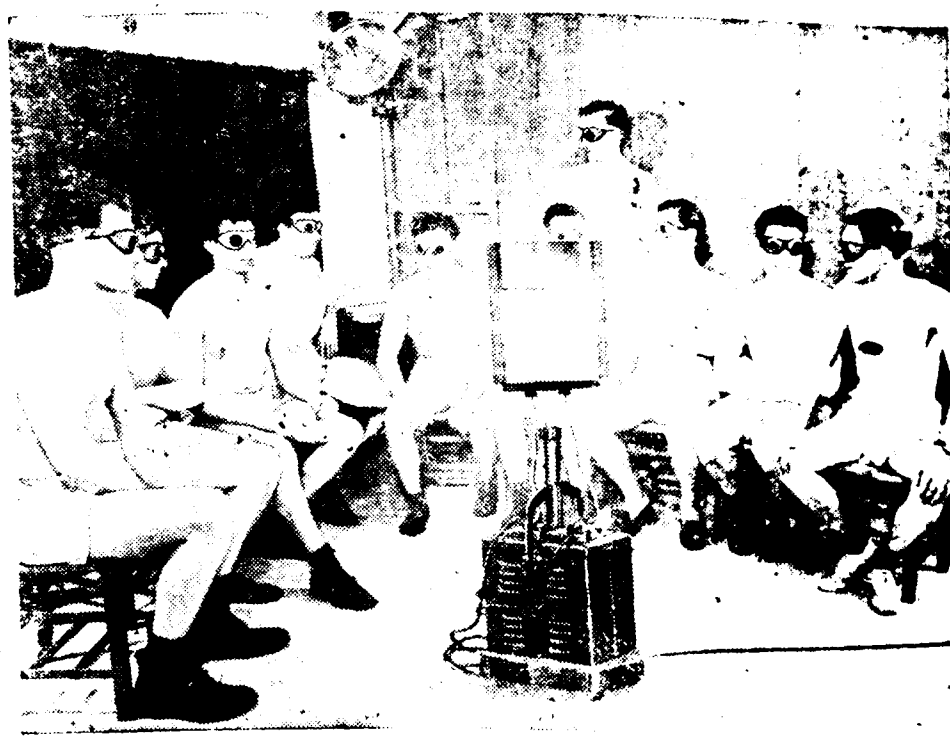


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M156/51

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VITAMINS A, B COMPLEX C, D
WITH
NATURAL MIXED TOCOPHEROLS

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Vitamin A	...	5000 U.S.P. Units
Vitamin D, (Irrad Ergosterol)	...	1000 U.S.P. Units
Thiamine HCl	...	3.0 mg.
Riboflavin	...	3.0 mg.
Pyridoxine HCl	...	0.25 mg.
Vitamin C (Ascorbic Acid)	...	75.0 mg.
Calc. Pantothenate	...	5.0 mg.
Niacinamide	...	20.0 mg.
Natural mixed Tocopherols equivalent in biological activity to Alpha Tocophe- rol in each capsule	...	5 mg.

INDICATIONS

Acute Vitamin Deficiencies giving rise to night blindness, beri beri, polyneuritis, pellagra, scurvy, glossitis, keratitis.

Minor Vitamin Deficiencies with symptoms of aching pains in the arms and legs, loss of appetite, anorexia, vague pain in the joints, swollen gums with buccal sores. Surgical and Medical Tuberculosis are benefitted by multi-vitamin treatment.

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One capsule twice or thrice daily.

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Bottles of 25, 50, 250 and 1000 Capsule.



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WITH
IRON AND LIVER

COMPOSITION

Thiamine HCl	...	1.5 mg.
Riboflavin	...	2 mg.
Vitamin C (Ascorbic Acid)	...	30 mg.
Calcium Pantothenate	...	1 mg.
Niacinamide	...	10 mg.
Liver Fraction	...	25 mg.
Ferrous Sulphate dried U.S.P. in each capsule	...	0.774 grs.

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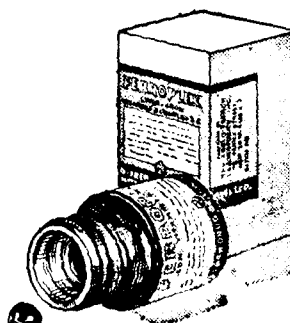
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1 to 2 capsules three times a day.

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Bottles of 25, 50, 250 and 1000 Capsules.



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For the Treatment of
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50 TABLETS

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EACH TABLET CONTAINING:

VITAMIN A (Retinol)	5000 IU
VITAMIN B ₁ (Thiamine)	10 mg.
VITAMIN B ₂ (Riboflavin)	2.0 mg.
VITAMIN B ₆ (Pyridoxine)	1.0 mg.
CALCIUM PANTOTHENATE	10 mg.
NIACINAMIDE	20.0 mg.
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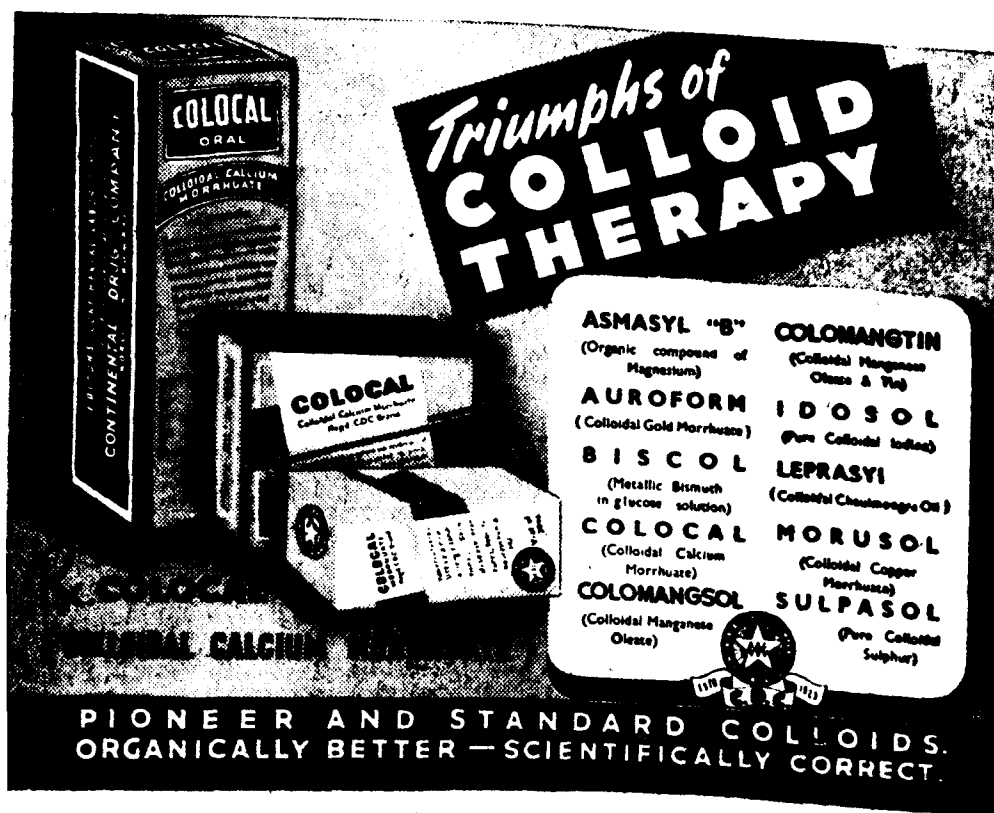
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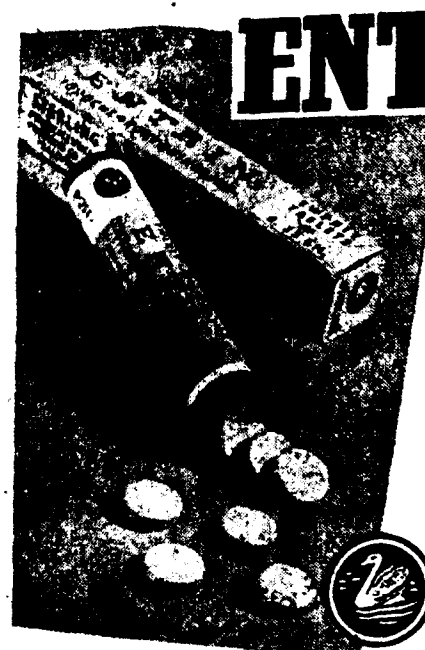
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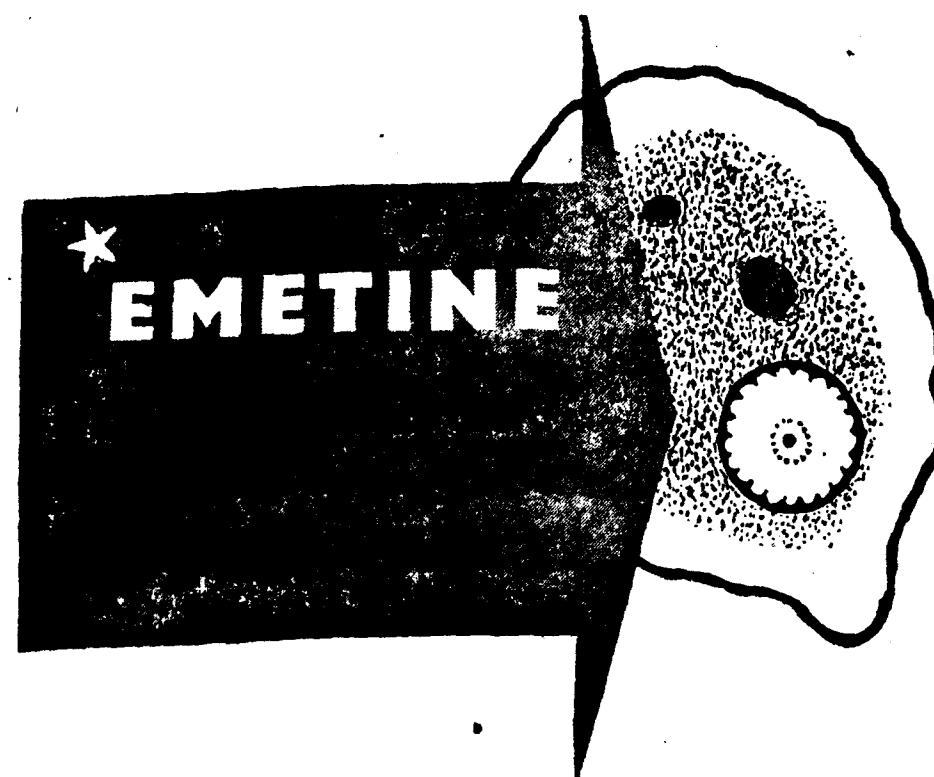
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Original Articles

Short Notes on the Diagnosis and Treatment of Kala Azar*

S. R. PANDIT,

Director, Pasteur Institute and Medical Research Institute, Shillong.

Diagnosis.—The diagnosis of kala-azar rests on the search for the causative parasite *L. donovani* in the tissues and on certain tried indirect tests.

The parasite may be found in various tissues such as the spleen, liver, bone marrow, peripheral blood, mucous membrane of the nose and fauces, lymphatic glands and the skin in dermal leishmanoid but it is in the first four tissues that it is usually looked for. Of these, spleen puncture is the method of choice.

Blood films.—In searching stained thin films of peripheral blood for the parasite, the chances of finding it are few unless several films are examined—as many as nine, according to KNOWLES.

It however facilitates the search if the films are properly prepared so that the smear ends in a straight edge across the slide. This is achieved by abruptly lifting up the second slide which is used to spread the drop of blood, when the blood is nearly exhausted. In such films the edge is somewhat thick, but most of the white cells are concentrated here and the examination of the edge alone suffices. L.D. bodies are found in polymorphonuclear leucocytes, in large mononuclears and sometimes free in the film.

Spleen puncture.—This is the most certain method for establishing the diagnosis of kala-azar. It is said that it is attended by a certain amount of risk from bleeding, but with due attention to details, it is a harmless operation. It should not be performed in a hæmophylic, in leukaemia, or in a patient who has jaundice or shows a hæmorrhagic tendency.

* These notes were originally prepared for the guidance of Medical Officers-in-charge of Kala-azar dispensaries in Assam.

The puncture material may be examined either directly in stained smears for the L.D. bodies or after culturing in Novy-MacNeal-Nicolle (N.N.N.) medium for the flagellate form of the parasite; usually both are employed.

The patient is prepared by giving three doses of half drachm each of calcium lactate in solution during the period of 12 hours preceding the puncture.

The syringe that is used for the operation, should preferably be a vaseline-sterilised Roux or Collin's 5 c.c. syringe with a medium bored needle about 1 to 1½" long (the method of sterilising the syringe is dealt with separately). The vaseline that might be blocking the needle and the syringe nozzle is first driven out by heating the parts in the flame and by repeated to and fro movements of the plunger. Other things kept handy are sterile citrated saline, clean glass slides, tubes of N.N.N. medium, spirit lamp and Collodion. It is advisable to have Adrenalin or Pituitrin handy, but it is hardly ever necessary. It is very important that the syringe should be dry, as otherwise the L.D. bodies may be distorted or lysed and thus difficult to recognise or even to grow in cultures. In a vaseline sterilised syringe, the question of moisture does not arise.

The patient lies on his back on his cot, preferably with his hands folded under his head, and a many tailed bandage is arranged under the splenic area. The border of the spleen is defined by palpation and the most prominent part of the spleen is selected for puncturing. The skin at the site is sterilised with rectified spirit or Tr. Iodine.

The operation is done in two stages. The needle of the syringe is first introduced through the skin and the greater thickness of the abdominal wall. The patient is then asked to hold his breath for a few seconds and then follows the second stage. The needle is thrust into the spleen and immediately thereafter, supporting the syringe with the left hand, the plunger is withdrawn to suck in the spleen juice and almost simultaneously the needle is withdrawn altogether from the patient. When it is remembered that the painful part of the operation is the puncturing of the skin and a tear of the spleen is only likely to result from its movement as in the act of breathing while the needle is still in it, the reason for the two stages will become apparent. The whole operation in the second stage to its finish, does not take more than a second or two. The withdrawal of the plunger more than once is unnecessary and is to be deprecated; the suction exercised by a tight-fitting plunger in its single partial withdrawal is quite adequate for sufficient spleen juice to be sucked in. In a properly performed puncture there should be hardly any material in the barrel of the syringe.

A drop of the material is then expressed on to a slide and with another slide, a thin smear is made on one or more slides. Thereafter a small quantity of sterile citrated saline is withdrawn into the syringe, and this is sown into two or more N.N.N. culture tubes.

The puncture in the skin is sealed with Collodion and the bandage is firmly applied over a pad. The patient should be kept in the lying position for a period of two to three hours. During this period it is advisable to count his pulse on one or two occasions to make sure that there has been no internal bleeding.

The smears are fixed in Methyl alcohol and stained with Giemsa and microscopically examined. The inoculated culture media are sealed with

rubber caps and paraffined and incubated in the cold incubator (22°C) to be examined at suitable intervals for flagellate forms of the parasite.

Liver puncture is carried out similarly, but from the point of view of easy diagnosis, it is less reliable than spleen puncture. The needle is introduced between the two lowest ribs in the mid-axillary line in a direction towards the left and slightly upwards. As in spleen puncture, the needle is introduced in two stages.

Bone marrow puncture.—The most convenient site for withdrawal of bone marrow is the sternum, just to one side of the middle line at the level of the second intercostal space.

Apparatus required:—Hypodermic syringe, 2% Novocaine or other local anæsthetic, sterilised Salah needle, a vaseline-sterilised Roux or other suitable syringe which will fit the end of the Salah needle, besides glass slides, N.N.N. medium, Collodion and Tr. Iodine or rectified spirit.

It is advisable to give the patient 10 grains of Aspirin an hour before the operation. With the patient lying on his back, the skin, subcutaneous tissue and periosteum opposite the second intercostal space are infiltrated with Novocaine and after about 5 to 10 minutes, the puncture is made. The Salah needle is held with the knob of the stylet in the palm of the sterilised hand and the needle between the thumb and index finger. By applying pressure the skin and subcutaneous tissue are pierced and the bone reached. The guard of the needle is then set at ¼—½ inch above the level of the skin and by a rotary movement of the needle the outer table of the sternum is punctured. There is a sensation of loss of resistance when the marrow cavity is reached. At this stage the stylet is removed, the syringe is attached and gentle suction is applied so as to aspirate about 0.1 to 0.2 c.c. of marrow fluid. That the needle is actually in the marrow cavity can be made out by the characteristic suction pain which the patient feels. The needle is now withdrawn and digital pressure applied over the puncture for a short while and a Collodion dressing put over the puncture. Smears on slides for microscopical examination are made and culture media are inoculated from the material, as in the case of spleen puncture material.

Other diagnostic tests.—The methods described earlier aim at establishing whether *L. donovani* is present or not in the tissues examined. There are other tests, more accessible to the rural medical officer, which are reliable in yielding presumptive evidence of kala-azar. Among these, the most important ones are Napier's aldehyde test, Chopra's antimony test and the Complement Fixation test for kala-azar. In all of these, and particularly in the last test, it is of great importance that the serum of the patient employed in the tests, should be clear and uncontaminated. In a later section, the method of sterilising the syringe, the despatch of the serum to the laboratory etc., are described in detail.

Napier's aldehyde test:—About 5 c.c. of blood is withdrawn from the vein of the patient and when the serum has separated, one c.c. of clear serum is placed in a small test tube, to which is added one drop of commercial Formalin (40% Formaldehyde). The tube is shaken to mix the two and set aside. The criteria of a positive reaction diagnostic of kala-azar are gelification and a dead white opacity resembling coagulated white of egg; either of them singly, is not enough. The changes usually take place in a few minutes to within half an hour, but it is advisable not to give a

negative reading until the tube is seen again after 24 hours. The aldehyde test becomes positive about the third month after the commencement of symptoms and is definitely positive about the fifth month. This is an excellent field test requiring little equipment. So is the test described below.

Chopra's antimony test:—In this test, the serum is diluted 1 in 10 with distilled water and placed in a narrow test tube. An equal quantity of 4 per cent solution of Urea Stibamine is then added and the tube rolled between the palms. A heavy flocculent precipitate is considered as strong positive, a fine flocculent precipitate as positive and a distinct cloudiness as a doubtful reaction in kala-azar. Absence of any precipitate is negative. A positive reaction is usually obtainable at the end of the second or third month after commencement of symptoms. But a false positive is sometimes obtained in cases of greatly enlarged spleen due to other causes; the test is therefore of value only in such cases as have a small splenic enlargement.

Complement fixation test:—Unlike the two tests mentioned above, the complement fixation test for kala-azar has to be performed in an equipped laboratory.

The antigen originally used for the test was prepared from the human tubercle bacillus by WITEBSKY *et al.* It had been prepared by these workers in the diagnostic test for tuberculosis, but the results were indifferent. Curiously enough, the complement fixation test with this tubercle antigen has proved to be of very great value in the diagnosis of kala-azar. Antigens from other acid-fast bacilli have since been successfully tried, and in Sen Gupta's latest modification of the test, the antigen is prepared from the so-called leprosy bacilli of Kedrowsky and of Lleras according to the method of WITEBSKY.

The technique of this test has not been described here, as the equipment etc., required for the test are not available at the Kala-azar hospitals and dispensaries. One c.c. at least of clear uncontaminated serum should be despatched to the Pasteur Institute, Shillong, for each test.

The test appears to be very sensitive and kala-azar can be diagnosed within 2 or 3 weeks of the commencement of symptoms and very much earlier than either the Napier or the Chopra test becomes positive. A positive reaction may be obtained in a very small proportion of clinically obvious cases of chronic pulmonary tuberculosis, in severe lepromatous leprosy and post-kala-azar dermal leishmaniasis. Except in the very early cases, a negative reaction is said to almost rule out kala-azar.

Treatment:—*Tartar emetic*.—The first drug to be tried successfully in the treatment of kala-azar was tartar emetic. In Assam, a beginning in the mass treatment campaign with this drug was made in 1919. It was soon replaced by the less toxic compound, Sodium antimony tartrate, which gave more satisfactory results. With the discovery of more potent and less toxic drugs, this antimony salt has receded into 'history,' but it is worthwhile mentioning its dosage. A standard treatment consisted of giving intravenously every third day a one per cent solution, commencing with 2 c.c. in an adult and working upto 8 c.c. This dose was maintained until a total of 200 to 300 c.c. had been given over a period of about three months. Apart from the severe local reaction that follows the accidental leakage of the solution into the subcutaneous tissue, signs of intolerance to the drug may be present. They are chiefly rigors, intense headache, irritability of the

gastro-intestinal, urinary and respiratory tracts, oedema of the extremities and occasionally joint pains.

Pentavalent antimony compounds.—The next advance was the discovery of pentavalent antimony compounds, of which Brahmachari's Urea Stibamine and "471" (von Hayden) are familiar examples. Both these drugs have been tried in Assam since 1923 and from 1927 onwards, Urea Stibamine has been used almost exclusively for mass treatment at all kala-azar dispensaries.

Urea Stibamine.—Urea Stibamine is administered intravenously dissolved in cold sterile distilled water, or water that has been kept on the boil for at least 5 minutes and then cooled. For an adult, begin with 0.05 gm. (dissolved in 1 c.c.) and increase by 0.05 gm. till 0.2 gm. (dissolved in 2 c.c.) is reached. This is usually the highest dose, which is then continued.

In children of five years, commence with half the initial adult dose and increase upto 0.05 or 0.1 gm. In children about 1 year of age, begin with one-fifth of the initial adult dose and increase upto 0.025 or 0.05 gm.

The total amount of the drug required to effect cure cannot be definitely stated, but is in the region of 2.4 to 3.0 gm. in the average adult. The clinical criteria of cure are cessation of fever, disappearance of splenic and hepatic enlargement, disappearance of oedema and anæmia and gain in weight. But the real evidence of cure, which however is rarely possible, is the negative cultural finding for flagellates from liver puncture material.

The contra-indications are:—(1) When dysentery develops during treatment, either stop the treatment or proceed with smaller doses. In leishmania dysentery the drug is efficacious. (2) Where there is marked nephritis and oedema, begin with the smaller doses and if oedema increases, lengthen the intervals between injections. (3) In very advanced cases of the disease, begin with small doses and increase them slowly.

The intravenous route is sometimes not possible, particularly in infants and young children with poor veins or when oedema masks the veins. In such cases there are drugs which can be given by the subcutaneous or intramuscular route. Neostibosan, di-ethyl para-amino-phenyl stibiate, is a compound which, dissolved in distilled water, can be given both intravenously as a 5 per cent solution, or intramuscularly as a 25 per cent solution. The initial dose for an adult is 0.2 gm. and subsequent doses 0.3 gm. each. Injection may be given daily.

Neo-stibene, (Brahmachari), is another drug that can be administered intramuscularly. Subcutaneous injections are said to be painless too. It is obtainable in ampoules ranging from 0.01 gm. to 0.15 gm. and with each ampoule of the drug is supplied by the makers a sterile "Stibo-solvent" solution. For adults the initial dose is 0.05 gm. which is increased by 0.05 gm. till 0.15 gm. is reached. This is continued till symptoms disappear. The injections are given twice or thrice a week. For children of 5 years, half the adult dosage and for children of one year one-fifth of the adult dosage, is well tolerated.

This drug and Urea Stibamine are stocked by the Officer-in-charge, Public Health Laboratory, Shillong, for distribution to the various hospitals and dispensaries.

The aromatic Diamidines:—This new group of drugs which have a high trypanocidal activity, have, in recent years, been used with remarkable

success in kala-azar. They do not contain antimony. An example of this group of drugs is Stilbamidine (M & B). This drug has been shown by NAPIER and his colleagues to be at least four times as effective, gramme for gramme, as any of the best pentavalent antimony compounds. Stilbamidine is dissolved in cold distilled water in a concentration of one per cent before administering; only fresh solutions should be used. It is given intravenously as the intramuscular and subcutaneous routes are painful.

The initial dose in an average adult is 0.025 gm. followed by 0.05, 0.06, 0.075, 0.09 and 0.10 gm. respectively. This last dose is kept up but may be increased still further up to 1 mgm. per lb. of body weight, if tolerated. Injections are given daily and in the average case ten injections totalling roughly 0.8 gm. is usually sufficient. In small children the initial dose is usually 0.01 gm., which is gradually increased to a maximum of 1 mgm. per lb. of body weight.

Immediate reactions are rather common. There is a fall of blood pressure with a fast and irregular pulse and as the solution is being injected, tingling or burning sensation over the body may be complained of. There may be headache, giddiness, palpitation, flushing and a feeling of faintness with sweating. It is of the utmost importance to inject the fluid very slowly, all the time keeping a watch on the pulse. A small dose of Adrenalin prior to the injection is often needed.

Late sequelae, coming on several weeks after the course of treatment, have been recorded in some patients, suggesting a cumulative effect of the drug. They consist of neuritis and hepatic damage. Neuritis is chiefly confined to the area supplied by the trigeminal, though other parts can be affected. The patient complains of numbness, tingling and loss of sensation. These may pass off in a few weeks or persist for months. The signs of hepatic toxicosis are nausea, vomiting and loss of weight.

Pentamidine Isethionate (M & B) belongs to the same group and is presented as a 10 per cent solution in ampoules and in rubber capped bottles. This can be given either intramuscularly and intravenously on ten successive days at the rate of 6 mgm. to 3 mgm. respectively per kilogramme (2.2 lbs.) of body weight. The intramuscular route is the method of choice, as the intravenous route causes symptoms due to a sudden fall in blood pressure, as in the case of Stilbamidine. When given intravenously, the solution should be administered slowly and may have to be preceded by Adrenalin.

These drugs are invaluable in cases that have become resistant to antimony preparations, but until further experience with these drugs is gathered, it is advisable to use pentavalent antimony preparations for routine treatment reserving the Diamidines for antimony-resistant cases. They are also useful in kala-azar complicated by tuberculosis in which antimony compounds are contra-indicated.

Sterilisation.—Syringe and needles:—These should be sterilised in hot vaseline or oil at 160°C. As "Record" or all glass syringes cannot be sterilised thus, a Roux pattern syringe with replaceable parts (rubber plunger and washers, glass barrel etc.) is to be preferred. The medical officer of a kala-azar dispensary should be quite familiar with vaseline sterilisation and the Kapadia outfit, consisting of a folding metal stand with a bowl for vaseline, spirit lamp and thermometer. It is therefore unnecessary to describe the method of sterilising the syringe in detail. The

drawing in of hot vaseline into the syringe with the needle attached, is to be deprecated; as it passes through the narrow calibrated needle the vaseline gets sufficient time to cool below the temperature recorded by the thermometer and further it takes long to fill the syringe, with the result that efficient sterilisation of the syringe is not achieved. The needle should be sterilised separately in the vaseline bath, picked up with forceps (any froth on the surface of the vaseline which obscures the view being driven out by the application of a flame or lighted match) and fixed on to the nozzle of the syringe. The hot vaseline should be drawn into the syringe and discharged at least three times and it is further advisable at each filling of the syringe to invert the syringe so that the vaseline comes in intimate contact with the upper end of the syringe, thus ensuring efficient sterilisation.

Spare parts for syringes of different sizes are available on application to the Officer in-charge of the Public Health Laboratory at Shillong.

Distilled water and other apparatus:—As regards other apparatus etc. required, in the absence of a pressure steriliser, sterilisation in boiling water will be the only method available. The articles should be kept immersed in water kept on the boil for half an hour.

In order to ensure that distilled water used for preparing solutions for intravenous use is free from pyrogens which are almost always responsible for the reactions, it should be distilled from a suitable still provided with a baffle which will hold back the spray that will otherwise escape with the current of steam into the distillate. Most of the older types of stills have no such baffle and for that reason, are defective. It is also necessary to sterilise the distillate speedily, preferably in the autoclave, because even pyrogen-free distilled water if exposed, will accumulate pyrogens by getting contaminated by organisms from dust in the air and their subsequent multiplication. For the same reason, if a sterile flask of distilled water (pyrogen-free) is opened without aseptic precautions, it should be re-sterilised immediately, if the contents are to remain free of pyrogens for subsequent intravenous use.

Cotton-plugged sterile test tubes of different sizes are available on demand from the Pasteur Institute, and these should be used ordinarily for making up the solution of the drug used in the treatment of kala-azar. In an emergency when such sterile containers are not available, the baker or other vessel intended for the solution should be thoroughly cleaned first and then sterilised in boiling clean water for a period of 30 minutes and finally rinsed out with sterile pyrogen-free distilled water. The vessel should be suitably covered. For measuring the distilled water, the sterilised syringe should be used. Distilled water should be sterilised by boiling for 30 minutes. Distilled water in a bottle may be sterilised by keeping it immersed in boiling water for the same period with the stopper detached and later stoppering it.

For sterilising the skin prior to injection, Tr. Iodine may be used, but in persons who have an idiosyncrasy for Iodine, rectified spirit is to be preferred to absolute alcohol because of its greater bactericidal action.

How specimens for complement fixation and other tests should be despatched to the Pasteur Institute, Shillong.—

For the complement fixation test for kala-azar, at least 1 c.c. of clear separated uncontaminated serum is necessary. For obtaining this quantity

of serum 3 c.c., and preferably 5 c.c. of blood should be drawn from the patient's vein. If the Napier and Chopra tests have also to be performed, 2 c.c. of serum should be despatched.

Whenever possible, serum should be sent and not blood, as the latter is likely to get hæmolyzed in transit and therefore unfit for the tests. Where venupuncture is not possible as in a child, blood drawn aseptically from the pricked finger into one or more Wright's capsules, may be sent.

Serum that is (a) hæmolyzed, (b) contaminated, or (c) chylous, is unfit for the tests.

The commonest cause of hæmolysis is the presence of water, alcohol or other fluid in the syringe or test tube that receives the blood. Contaminating organisms may also cause hæmolysis. If the syringe has not been allowed to cool down sufficiently after sterilisation before drawing the blood, or the whole blood is allowed to get frozen in the frigidaire, hæmolysis will result. Prolonged shaking of whole blood in transit, particularly in hot weather, or overheating of the blood in the process of sealing a Wright's capsule may also result in hæmolysis.

Contamination can be avoided by attention to asepsis, e.g. sterilisation of the skin and other apparatus, such as the surgical needle used in pricking the finger, the syringe etc., and above all by avoiding unnecessary exposure to air of the receptacle that receives the blood.

By drawing the blood from the patient on an empty stomach or at least two hours after a meal, the presence of chyle in the specimen can be avoided.

Directions for taking blood specimens.—Whenever possible, separated serum should be sent to the laboratory. 5 c.c. of blood (or 10 c.c.) is drawn from a vein with a vaseline-sterilised syringe and immediately transferred to a dry sterile test tube, which is then plugged and set aside on the bench in a slanting position with the plugged end resting on a low block of wood or a lump of plasticine. After a few hours, when sufficient clear serum has separated from the clot, this is carefully transferred to a dry, sterile capsule by means of a dry, sterile, glass pipette fitted with a rubber teat. The capsule is then sealed off immediately in the flame with the help of a pair of forceps. The sealed end should preferably be rounded off, as a sharp point is liable to break in transit. (Sterilised capsules and glass pipettes are available on demand from the Pasteur Institute.)

If a vaseline or oil-sterilised syringe is not available, and sterilisation in boiling water is resorted to, the syringe must be washed out in sterile saline, and if this be not available, the syringe must be completely dried before withdrawing the blood in order to prevent its hæmolysing.

If blood cannot be drawn from a vein, two or more Wright's capsules may be filled from a pricked finger. The hand is first warmed in hot water and the arm swung round and round several times to drive the blood to the fingers. A small bandage round the base of the finger helps to retain the congestion. The tip of the finger is then thoroughly sterilised with rectified spirit which is allowed to evaporate and then it is pricked with a surgical needle which has been sterilised in the flame. The Wright's capsule is then filled as follows: Both the ends of the capsule are filled off and sterilised by passing through the flame. The curved end of the capsule is applied to the drop of blood, when it will run in by capillary action. When

the capsule is about three-fourths full, the neck of the capsule at the straight end is quickly passed through the flame to warm it and thus expel the air and the straight end is immediately sealed off. Allow a few seconds for the capsule to cool, when the blood in the curved end will be drawn into the capsule. This end is then sealed off without in any way over-heating the contained blood.

Capsules of blood and serum should then be labelled and packed tight in a box with plenty of cotton wool so as to prevent breakage in transit. Full particulars such as the name of the patient, the examinations required, the address of the sender to whom the report is to be despatched, etc. should be clearly written on a paper, which is preferably enclosed in the box.

Pasteur Institute, Shillong.

Role of Radiology in the Diagnosis of Congenital Heart Disease*

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IN a large percentage of cases of congenital heart disease there is either very little X-ray evidence, or due to difficulty in properly examining an infant it is not possible to get sufficient X-ray evidence. ASSMAN, SCHALL, DIETLEN, ROSLER, MAUD ABBOT and WILFRED DAWSON have done pioneering work in this difficult subject of the diagnosis of congenital heart diseases. ROSLER in a study of 68 cases of congenital heart disease found positive X-ray findings in 88%. Of these only in 51% of the cases, was the radiographic evidence of any real value. If we take adults as well as children even 50% is too high (according to SCHALL and DIETLEN) since Rosler's patients were mostly adults. Most of the congenital heart diseases are multiple which add to the difficulty of diagnosis.

Even though PILLMORE and others prefer a classification based on embryology, the following classification worked by MAUD ABBOT and WILFRED DAWSON as modified by PETER KERLEY appeals to me as the best. Congenital heart diseases are grouped broadly into three groups:

GROUP I.—Cases in which there is no mixture of arterial and venous blood.

GROUP II.—Cases in which there is an admixture of arterial and venous blood without cyanosis or with late cyanosis.

GROUP III.—Cases in which there is an artero-venous shunt with definite cyanosis.

Under Group I come the following congenital heart diseases:—

- | | |
|-----------------------------------|------------------------------|
| I. Dextrocardia. | IV. Right sided aorta. |
| II. Idiopathic heart hypertrophy. | V. Coarctation of the aorta. |
| III. Bicuspid aortic valve. | VI. Fœtal endocarditis. |

* Specially contributed to THE ANTISEPTIC.

I. Dextrocardia (a mirror image of the normal heart) may be associated with or without transposition of other viscera. Those associated with transposition of other viscera are more common than those without transposition. On the whole dextrocardia is rare and both types are associated with no symptoms.

Chengan, aged 35, male, agriculturist, who came as an out-patient of the Stanley Hospital for chronic bronchitis was radiographed, and a dextrocardia was diagnosed. When a barium meal was given and a radiograph of the stomach was taken, a transposition of the viscera was also seen. Thus a dextrocardia with transposition of the viscera was discovered accidentally. Patient is leading an active life with no symptoms.

Another patient Mr. R....., a near relation of a surgeon, aged about 60 years, has a dextrocardia without transposition of other viscera and it was discovered accidentally during a routine X-ray examination and the patient is still leading an active life without any symptoms.

II. Idiopathic heart hypertrophy is a congenital condition in which there is hypertrophy of the heart without any causative anatomical defect. In a radiograph an enormous enlargement of the heart on both sides is visualised. Sometimes an enlarged thymus may also be seen in the radiograph besides the cardiac enlargement.

III. Bicuspid aortic valve is not an uncommon defect in congenital heart disease. This defect is of no importance and cannot be recognised radiologically. This defect may be associated with coarctation of the aorta.

IV. Right sided aorta is rare as an isolated anomaly. In this condition the ascending aorta runs to the right of the trachea and over the right main bronchus. There may be a well marked aortic knuckle on the right side. This case seldom causes symptoms. With advancing age the aorta may become atheromatous and dysphagia may be caused by irritating the oesophagus.

V. Coarctation of the aorta is a congenital malformation seen occasionally. In this condition, aorta is partially or completely stenosed in the immediate vicinity of the ductus arteriosus. Clinicians describe an infantile and an adult type. In the infantile type, the aorta is narrowed between the origin of the left subclavian artery and the ductus arteriosus, only an exaggeration of the foetal condition. In the adult, the aorta is stenosed just at or just below the insertion of the ductus arteriosus. The adult type is more common with distinct X-ray signs.

Due to the stricture, the pressure in the arteries in the upper part of the body is high and in the lower part of the body very low. The innominate and the left subclavian arteries are greatly dilated and collateral circulation is established between the internal mammary and superior intercostal above and the first three aortic, intercostal arteries below the stricture. Superior epigastric artery, a branch of the internal mammary artery may also get dilated. Symptoms depend upon the degree of stenosis. Even in mild cases with no symptoms X-ray findings are definite.

In a radiograph the following X-ray signs may be detected:—

(1) Ascending aorta is dilated and enlarged and may project beyond the superior vena caval shadow.

(2) The superior mediastinum may have a rectangular appearance due to the dilated innominate and left subclavian arteries.

(3) The aortic knuckle may be missing or is very small compared to ascending aorta.

(4) The dilated intercostal arteries may erode the inferior surfaces of the ribs causing the characteristic notching known as Rosler's sign.

(5) In the R.A.O. view actual stenosis may be visible.

(6) Oesophagus may be stenosed or even slightly displaced by the dilated innominate and left subclavian arteries.

(7) In severe cases there may be an enlargement of the left ventricle.

A radiograph of one Mr. Jackson (*vide* reduction print attached), a case suffering from coarctation of the aorta, shows the following X-ray findings:—

(1) Characteristic notching of the ribs on both sides (Osler's sign).

(2) Absence of aortic knuckle.

(3) A vague shadow in the superior mediastinum caused by the dilated left subclavian and innominate arteries.

(4) An enlarged left ventricle.

VI. Foetal endocarditis is an extremely rare condition and is supposed not to play any part in the causation of congenital abnormalities.

GROUP II.—Cases in which there is an arterio-venous shunt without cyanosis or with late cyanosis:—They are:

I. Patent ductus arteriosus.

III. Patent inter-auricular septum.

II. Defect of the aortic septum.

IV. Patent interventricular septum.

I. Patent ductus arteriosus.—In this condition an enlargement of the pulmonary artery with enlargement of both ventricles may be visualised. Often the right ventricle may be more enlarged than the left. Clinically a case may show a rushing murmur in the second left interspace, louder in systole, a thrill, marked accentuation of second pulmonic sound and enlargement of the ventricles. During violent exercise, due to increased pulmonary pressure, some venous blood may be forced into the aorta causing a temporary cyanosis.

A female named Nagamma, aged 40 years, a patient under the Second Physician, Govt. Stanley Hospital, was sent for radiography for suspected mitral disease. Radiograph (*vide* reprint) shows the following characteristics:—There is a bulge in the pulmonary conus and a round caused by the enlargement of the pulmonary artery. Both lower borders of the heart appear enlarged. But there is no pressure on the barium filled oesophagus in the right anterior oblique position eliminating mitral stenosis. The radiographic appearance suggests a congenital heart condition, possibly, a case of patent ductus arteriosus.

II. Defect in the aortic septum which results in a communication between the base of the aorta and the pulmonary artery is a rare condition and very few cases have been recorded. The condition may be congenital or acquired due to syphilis or malignant endocarditis and it is not possible to say whether the condition is acquired or congenital. In a case recorded by PETER KERLEY, a large pulmonary artery with calcified plaques visible, atheroma of small pulmonary vessels and hypertrophy of the right ventricle

were noted and on autopsy a large defect between the pulmonary artery and the base of the aorta was noticed.

III. Patent inter-auricular septum.—A narrow patent inter-auricular septum due to incomplete closure of foramen ovale is not harmful as no interchange of blood takes place between the auricles and is seen in many normal people. If, however, there is a widely patent inter-auricular septum, there is gross enlargement of both sides of the heart (as seen in a radiograph), dilatation of the pulmonary artery, enlargement of the right hilar shadow and congestion of both lungs. There may be slight cyanosis. Aneurysmal enlargement of the right main branch of the pulmonary artery is a characteristic X-ray sign.

IV. Patent interventricular septum.—Clinicians name this condition *Maladie De Roger*. As an isolated defect this is uncommon but may be associated with other defects. If the opening in the septum is small, no interchange of blood takes place between ventricles and there are no symptoms except a small systolic murmur and thrill in the 3rd and 4th inter-space. If the defect is wide, blood is shot from the left to the right ventricle resulting in right ventricular hypertrophy. Later right ventricle also hypertrophies. But there is no enlargement of the left auricle at all. The enlarged right ventricle may push the apex well above the diaphragm. But unlike a Fallot's tetralogy there is no indent between the heart and aortic shadow, since the pulmonary artery may be normal.

GROUP III.—Cases in which there is a venous arterial shunt with definite cyanosis.

I. Pulmonary stenosis.

II. Cor triloculare.

III. Fallot's tetralogy.

IV. Eisenmenger's complex.

I. Pulmonary stenosis.—Rare isolated defect.

X-ray findings:—Pulmonary artery distal to the stenosis grossly dilated with dilatation of pulmonary cone and enlargement of right ventricle may simulate mitral stenosis but there is no enlargement of the left auricle. In some cases pulmonary artery may be small.

II. Cor triloculare.—Rare condition in which there is only one common ventricle due to absence of interventricular septum. Strangely enough this condition is not inconsistent with life, nature making special arrangements to prevent complete admixture of venous and arterial bloods. Heart part in each border. Suggests a bilateral apex with synchronous pulsation on both borders.

III. Fallot's tetralogy.—It is not an uncommon lesion. There is often a marked cyanosis. Even BEDFORD first described the characteristic X-ray signs. Tetralogy consists of pulmonary stenosis, ventricular septum defect, dextraposition of the aorta and hypertrophy of right ventricle. Heart takes up the well known *Coeur-en-Sabot* appearance. There is a bay or cavity in the region of the pulmonary artery due to hypoplasia of the pulmonary artery. Aorta is right sided and enlarged right ventricle pushes the left ventricle upwards and outwards.

I have seen two cases of Fallot's tetralogy with characteristic X-ray findings from the cases sent to the X-ray department of the Stanley Hospital for radiography. One was a female patient Rajeswari, aged 13 years, with a history of breathlessness and palpitation on effort from infancy. The

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Fig. 1. Characteristic shape of the aorta. MR. JACKSON. (See page 155)

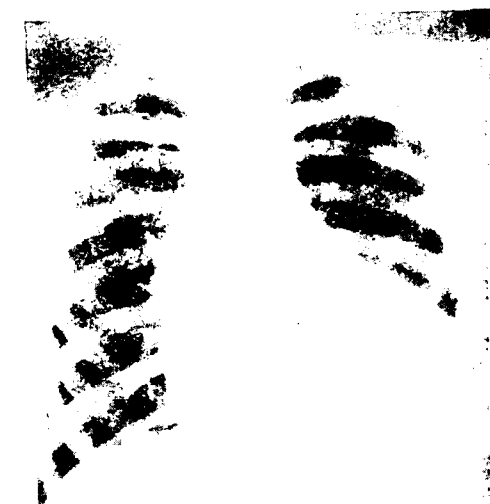


Fig. 2. Nagamma, female, 40 years. A case of patent ductus arteriosus.

(See page 155)



Fig. 3. Nagamma, female, 10 years. A case of patent ductus arteriosus. Radiograph with barium swallow. (See page 155)



Fig. 4. Chengam, male, 35 years, agriculturist. Dextrocardia with transposition of the viscera. (See page 15)

Role of Radiology in the Diagnosis of Congenital Heart Disease

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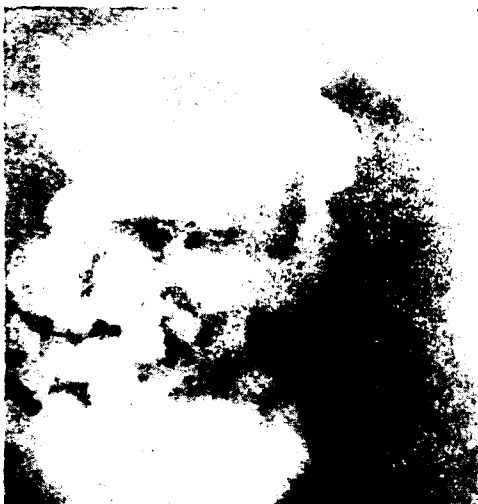


FIG. 5. Changan, Male, 37 years, agriculturist. Dextrocardia with transposition of the viscera. (See page 151.)



FIG. 6. Rajamurugan, Male, 17 years. Fallot's tetralogy. (See page 156.)

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girl is cyanosed, stunted in growth, no clubbing of fingers, and with no history of hæmoptysis. On auscultation a hollow crescendo murmur was heard all over the precordial area.

RADIOGRAPHIC REPORT.—There is enlargement of the transverse diameter of the heart. Apex of the heart appears to be pushed upwards and outwards. There is a definite depression at the pulmonary artery region (due to pulmonary atresia), and dextraposition of the aorta. All these X-ray signs are suggestive of Fallot's tetralogy. An electrocardiogram also confirms the findings.

Second case: Shanmugam, a male child of 3½ years, was sent for skiagraphy. Radiograph showed a definite depression at the pulmonary conus and artery region (exaggerated pulmonary bay), with dextraposition of the aorta, enlarged right lower border and with the apex of the heart pushed upwards. All these are suggestive of Fallot's tetralogy.

IV. Eisenmenger's complex.—In this condition there is a defect at the top of the ventricular septum, aorta is displaced to the right side and riding over the defect receiving blood from both ventricles. There is enlargement of right auricle, right ventricle and pulmonary artery. Aorta is not visible. There is no synchronous pulsation.

Thus Radiology very often helps in the diagnosis of congenital diseases. No enlargement of the heart is visible in many congenital heart lesions. But when it does occur, it gives a definite clue to the diagnosis of the exact condition. Radiology does play a definite role in the diagnosis of congenital heart diseases and ranks next to clinical examination in its importance as a diagnostic weapon in the physician's armamentarium in his crusade against disease.

I am thankful to Rao Bahadur Dr. M. G. KINI, M.C., M.Ch., F.R.C.S., F.R.S., Superintendent, Stanley Hospital, for permitting me to make use of Hospital records to write this article.

Reference:

Peter Kerley's 'Recent Advances in Radiology.'

Madras Medical College,
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Mineral Metabolism and Nutrition

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So much of medical energy to-day seems to be expended on vitamins, endocrines and chemotherapy, that little seems to have been left over for consideration of the role of minerals in the body. The interrelation between inorganic metabolism, endocrines and vitamins seems to demand a wider study. Barring calcium in relation to parathyroid and vitamin D, iodine in relation to thyroxine, no further inter-relationship is much in evidence. The suprarenal cortical activity has lately been found to be related to Sodium Chloride and Potassium metabolism.

The inter-dependence of mineral metabolism endocrines and vitamins gradually unravels itself and promises to be a fruitful field for future research. Said HAROLD SCOTT in reviewing the work of VEDDER on the

* Specially contributed to THE ANTISEPTIC.

study of deficiency of polished rice in relation to beri beri: "We are inclined to regard polished rice as deficient in Thiamine and to ignore or at least gloss over other deficiencies such as mineral salts, protein, fat etc."

Ninety-six per cent of the body tissue is supposed to consist of carbon, oxygen, hydrogen and nitrogen alone. The rest of the four per cent includes a good slice of the inorganic elements of Chemistry. They include calcium, phosphorus, potassium, sodium, sulphur, chlorine, iodine, magnesium, iron, manganese, traces of copper, fluorine and silicon. Some workers add to this list zinc, nickel, cobalt, boron and bromine. The food-stuffs protein, fat and carbohydrate in a pure condition only supply five of the sixteen essential elements. Is it strange then that a diet free from inorganic substances kills animals more rapidly than absolute starvation which is comparable to complete sleeplessness killing animals sooner than complete starvation?

It is interesting to note that the ratio of potassium, sodium and calcium in all the vertebrates approximates the ratio in which these salts occur in sea water; yet another weighty reason for the assumption that life emerged out of the sea and that Providence fixed the inorganic content of blood in mammals to be the same as the salt content of the sea. Says SHERRINGTON in his *Life's Unfolding*,....."the great adventure by which marine animals adapt themselves to a terrestrial existence and yet carry the salt of the archaic sea in their internal economy."

But as time lapsed from his marine days, man tended to show signs of depletion of some inorganic elements in his system. Whether he has adapted himself to the lack of these or there are incipient symptoms and signs due to their lack is for the biologist to say.

Experiments with piglings, cattle and fishes revealed that lack of some one or other of the inorganic elements is responsible for their undernourished condition. The reserved forests in India that maintain wild animals, as in Travancore and Mysore contain natural waters where the animals slake their thirst. By adding to these natural waters certain mineral salts (salt licks) some facts are revealed regarding the necessity for inorganic elements to animals and therefore to man. SIR ARNOLD THEILLER observed in South Africa that the two mysterious cattle diseases 'Lamsiekt' and 'Styfsiekte' are due to deficiency of phosphorus. Depraved or perverted appetite of cattle leading to the eating of carcass was sometimes the cause of disease in them. This perverted appetite is due to instinctive seeking of food that supplied the necessary inorganic substances that should normally be found in pasturage. (In this locality one has seen cattle eating paper, dry leaves, rags and sometimes plants ordinarily avoided like winca rosea, nerium oleander, thevetia, caladium etc. Need one wonder that not only is the milk poor in quantity but dangerous in quality). The two aforementioned diseases of South African cattle were cured by bone meal diet containing phosphorus and by not letting them eat putrefying carcass. Flesh of dead animals certainly supplied phosphorus but in addition other unwanted poison. Children and infants who depend on cow's milk for their cent per cent nutrition therefore are directly or indirectly affected by the ways and habits of milk-yielding animals. Incidentally, CELSUS observed that animals fed on drinking water used by blacksmiths for drenching white hot iron (by immersion) had unusually small spleen. He therefore advised treating human beings with enlarged spleen by this same water used by blacksmiths for drenching hot iron.

This subject is of further special interest in these days of rationing of food commodities. Grow more food campaigns should take stock of these factors under consideration. Four salts are needed for growing plants i.e. those of nitrogen, potassium, phosphorus and calcium. When these salts are found in the soil in optimum amounts the soil is deemed fertile. Fertility is often with reference to a particular vegetation. An ordinary crop of rice is said to use up about 20 pounds of nitrogen per acre. The more of rice is said to come out of the earth through crop, the more has it to be replenished by fertilisers or manure. Mr. MASANI in his lucid little book for school children has brought home these facts in a readily comprehensible manner. Manure that consists of ashes, bones, dung etc. has the essential things of the mineral kingdom to replenish the diminishing minerals of the earth. Rotation of crops is another means to reduce the rapid consumption of certain minerals from the earth. Mr. MASANI has incidentally pointed out in a telling manner the gross misuse of cow-dung cakes as fuel in South India when they are much needed as manure. He compares this misuse to using a currency note to light a cigarette.

The role of inorganic substances in the body may now be considered.

Sodium.—Sodium in the body is invariably in association with chlorine. In a sense sodium is pharmacologically inert. Sodium is the kation of the extracellular fluid of the tissues and is present in the body in fairly large amounts. Its function is mainly an osmotic one. Any change in Sodium concentration leads to serious bodily disturbances with abnormal fluid distribution in the body. When sodium salts and water are lost from the body, say after excessive diarrhoea, sweating or vomiting, the extracellular fluid compartment is affected and there is reduced circulatory blood volume. This accounts for most symptoms of dehydration of the body. The role of sodium chloride in the body apart from water retention is with reference to hydrochloric acid of the stomach and alkali reserve of blood. More sodium chloride is instinctively imbibed on a herbivorous diet than on animal diet because of the high potassium content of herbivorous diet.

The use of coarse salt as against purified salt due to war conditions, one feels is a blessing in disguise. Coarse salt in addition to sodium chloride has substances like Iodine, Bromine, Calcium and Magnesium. Table salt is not chemically pure sodium chloride but by the addition of sodium phosphate to render the crude salt non-hygroscopic, tends to remove some calcium and magnesium as chlorides. On the analogy of coarse rice being preferred to highly polished white rice, it is reasonable to prefer crude salt to highly purified table salt.

While salt restricted diet is advised in some kidney diseases, complete deprivation may do more harm than the disease. (It may be mentioned here in passing that sodium rather than chlorine is thought to be responsible for the evil effects in kidney diseases). Administration of about 15-20 grams of sodium chloride per day (normal from 8-10 grams) has been found lately to produce definite beneficial effects in some diseases of suprarenals. Suprarenal cortical secretion is essential for carbohydrate assimilation of cells. A stage in the metabolism of carbohydrate potassium hexosephosphate and inhibition of this process upsets not merely potassium but also sodium, chloride and water metabolism. After suprarenalectomy in animals there is fall in sodium and chloride content and a proportionate rise in potassium content of the body. Clinically Addison's disease as

already mentioned is treated by oral sodium chloride intake and the acute phase of it by intravenous saline.

Potassium.—This is the basic constituent of muscle tissue and blood corpuscles. To a small extent it is found in the blood plasma and the extra-cellular fluids. It regulates the reaction of blood and tissue fluids. It is important to realise that the ratio of sodium, potassium and calcium is an unalterable figure and any upset of this ratio is immediately followed by deleterious effects.

Many fruits like bananas, oranges, apples, cherries, apricots, pulses like beans, lentil, chocolate and animal food like fish and egg yolk supply potassium. But fortunately, any diet, and more so the vegetarian diet, contains five to ten times the optimum potassium and sodium that the fear of lack of these is hypothetical.

HAWKES JEAN *et al*, experimenting with school children found that an increase in protein diet without a simultaneous increase in minerals does not cause as much muscle build as an increase in both protein and minerals. They point out that potassium as it is primarily found in muscle tissue may be the main determining factor in muscle growth. No other ion can take the place of potassium in the cell. It therefore follows that the daily intake of potassium must be as great as the excretion in order that the composition of cells be kept constant. Growing animals must be in a positive potassium balance.

Potassium ion is necessary for normal cardiac action. In the absence of potassium the heart will not respond to vagal stimulation. This fact is related to the role of potassium in the transmission of the nerve impulse. Some forms of familial periodic paralyses are said to be markedly benefited by potassium as potassium ion aids acetyl choline production or action in voluntary muscle. Potassium ion also reduces excitability of sensory nerve endings and tend to potentiate local anaesthetics. For all tissue activity in general potassium and sodium ions go hand in hand.

Calcium.—Too much stress has perhaps been laid on calcium as an essential accessory food factor. By many lay men and a good few medical men, calcium is deemed the main inorganic substance of value perhaps next to iron. To many a doctor, calcium is a handy stand by for many ailments of doubtful etiology or diagnosis.

Calcium is not merely associated with bone formation but regulates nerve, muscle and gland activity. There is also a hypothesis to-day that the utility of digitalis therapy in heart diseases is mainly determined by calcium metabolism.

Pregnancy and lactation need extra calcium not to speak of a growing child. Milk, wheat, oatmeal, almonds etc., are some of the substances yielding calcium. The old 'farm-house' diet of whole meal bread, milk and cheese is excellent for any calcium demand, even of pregnancy. Present day war rations are bound to manifest calcium deficiency symptoms. A litre of cow's milk (worth the name) is essential for a growing child—are we aiming at the moon these days? But the snag about calcium is that even healthy persons absorb calcium with difficulty. If about 50% of food calcium is absorbed, it is deemed satisfactory. In war-time ration in the U.K., brown bread ration was thought to interfere with calcium absorption. The phytic acid in brown bread is said to precipitate calcium and

sometimes even iron in the gut, thus preventing absorption. Addition of calcium carbonate to the bread was found to effectively remove all the phytic acid and leave the calcium in the food available for absorption. Here is an example of war-time ration for reasons other than inadequacy of essential food tending to affect health.

Magnesium.—Magnesium is a constituent of muscle tissue, blood and lymph. Nuts, whole grain cereals, legumes, not to speak of meat extracts, supply magnesium. There is little fear of magnesium lack as the body needs a minute amount. Magnesium is present in the chlorophyll molecule of plants. There is also evidence that magnesium is necessary for the activation of animal phosphatases and is an important substance in the dephosphorylation process in muscle. Excessive magnesium adversely affects calcium utilisation. Pharmacologically magnesium ions in excess in blood cause necrosis or paresis of voluntary muscles.

Copper.—Copper with manganese is known to be essential for the formation of haemoglobin of R.B.C. Copper is fairly widely distributed in animals and plants. Water and soil also contain copper. Certain types of plant and animal cells have copper in large amounts. Copper is associated with the formation of chlorophyll. BOBANSKY demonstrated that human brain contains copper to the extent of 6 mgm. per kilo. Liver and spleen contain relatively large amounts of copper. The amount of iron and copper storage seems to be in inverse proportions. Milk, human and cow's, contain copper. Copper containing food-stuffs are legumes, cereals, poultry fish, tubers, leafy vegetables, fresh and dried fruits. Infants with nutritional anaemias have been noticed to lack copper in the diet, but in adults no copper lack has been observed. Pharmacological copper and silver exert 'oligodynamic' action *i.e.*, an antiseptic action in very high dilutions.

Manganese.—This has also been found fairly widely distributed in plant and animal tissue. Manganese also seems to be essential for nutrition. In plants it is associated with oxygen consumption and oxygen release. Experimentally, manganese deficiency in animals caused atrophy of testes and infertile ovum. Bony abnormalities were also noticed in manganese deficiencies. No definite evidence is available for its role in higher mammals and man. Iron assimilation normally and in anaemias is associated with copper, but whether manganese is also essential for iron assimilation is a subject of study in many laboratories. A point of interest about manganese is its toxicity. Workers in industries where manganese is used for steel making, dry batteries etc., have frequently been poisoned slowly by manganese dust inhalation. They are suspected to manifest symptoms of degeneration of part of the brain as a result of manganese intake.

Cobalt.—In a study of the so-called trace elements this rare mineral cobalt was found to be essential for the regeneration of haemoglobin. Injections of Cobalt experimentally increased R.B.C. in animals by 20% and the haemoglobin content by a similar amount. This is supposed to be due to a stimulant action of the metal on the bone marrow which is the cradle of red blood corpuscles.

Zinc.—Zinc is a constituent of most foods and is essential for plants and animals. In animals growth is retarded on zinc deficient diet. Physiologically in man zinc is of very great interest. The highest concentration of zinc is found in the pancreas which produces insulin which in turn is

responsible for carbohydrate and fat metabolism. It is not possible to crystallise insulin in the absence of zinc. In therapeutics to-day zinc is used in combination with insulin for diabetes mellitus, to enhance and stabilise the action of insulin. In a similar way zinc is combined with other hormones for enhancing or prolonging the action of the hormone. It may be of some interest to know that the active ingredient in some of the "specifics" for infantile biliary cirrhosis advertised by indigenous medical men is zinc in some form.

Iron.—Like calcium, iron has never been neglected either by the laity or by the medical profession. Iron deficiency was getting more and more prevalent due to war conditions. According to DR. SINCLAIR, blood transfusion services have aggravated iron deficiency in a mysterious manner. He said that an overwhelming case has been made for adding iron salts to the dough before bread making. Though iron in daily diet is needed only in very small amounts yet it is of great importance. Iron content of food does not necessarily determine the haemoglobin regeneration. The milk of to-day in these parts is notoriously low in iron content. Infants are born with a surplus of iron which is expected to last the first six months of life, until other foods are added to the diet. The mechanism by which the intestinal mucosa senses internal iron deficiency and responds by allowing some of the elements to pass from gut into the blood is not yet understood but its beauty is impressive.

It is thought that vitamin E or the so-called anti-sterility vitamin is associated with iron assimilation, like vitamin D with calcium and phosphorus. In the U.K. the change from white bread to whole meal wheat bread is expected to compensate for the restricted meat diet at least as far as iron is concerned. It may be mentioned here that the S. Indian aversion for wheat and preference for rice based on diet habits is irrational and untenable from the point of view of mineral metabolism, not to speak of protein deficiency.

Only three more inorganic substances need be considered before concluding, *i.e.*, Iodine, Fluorine and Sulphur.

Iodine.—Iodine is well known to be essential for the healthy functioning of thyroid. Sea weed, some green leaves, cabbage, peas and water near the sea contain iodine or its salt. Endemic goitre and iodine deficiency are associated with soil iodine in places like New Zealand, water iodine as in Alpine valley and Derbyshire and general sanitation as in Nile valley. MACCARRISON has revealed an interesting fact after experimenting with animals that a new type of goitre unassociated with iodine exists. According to him, white flour used extensively in war time which is said to be devoid of many vitamins, with reduced protein, fat and inorganic salt is responsible for this goitre with hypofunctioning of thyroid. He is of the view that a well-balanced rich diet rather than iodine, determines the cure.

Recently it has been noticed that not merely lack of essential food principles but certain foods themselves are goitrogenic. The effect of the goitrogens in food can be neutralised by iodine. In many countries with endemic goitre, the necessary iodine is supplied by table salt with an added iodine moiety to conform to the requirements. Endemic goitre seems to threaten certain regions in America and a legislation is proposed for the manufacture and use of iodised common salt.

Fluorine.—The role of this strange element in the 'politics' of the human body was forcibly brought to the notice of medical men in India as a result of observations by public health workers in certain rural regions, the condition subsequently named "Endemic fluorosis." Premature petri-faction of ligaments, tendons and cartilage was the main sign of fluorine poisoning. The toxic manifestations subsequently revealed their role in Physiology. Excessive fluorine intake caused mottling of the enamel of the teeth, discolouration, pitting and chipping. It was noticed particularly in children who have been consuming water containing more than one part per million of fluorine for a prolonged period before cutting the permanent teeth. But in minute doses, fluorine is a good disinfectant and was once used as a preservative of fruit in tins. It has been found to be a preventive of dental caries probably by the disinfectant action.

Sulphur.—Of late sulphur has come to assume considerable importance in the human body. Many of the drugs are also thought to exert their action as a result of the affinity of the drugs to the sulphur containing tissue cell or the parasite (sulphydril). Recent work on sulphur containing protein has revealed their further importance in diseases.

Physiologically sulphur as a constituent of glutathione plays an important part in the oxidation process of cells. Sulphur enters into the composition of insulin, amino acids like cystine, methionine etc. Sulphur plays also an important part in the detoxicating processes in the body by what is termed 'Sulphosynthesis.'

Sulphur-containing foods include cabbage, cauliflower, wholegrain cereals, nuts, eggs, fish, meat etc. In a sense sulphur lack goes hand in hand with protein lack.

Conclusion—The watchword in Medicine to-day is not Heredity or Infection but Nutrition. "We are beginning to acquire knowledge which is power for creative wealth," not the knowledge that aids destruction or disintegrates personality.

Maharani-pet P.O.,
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Fluorosis Problem*

A Critical Review

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FLUOROSIS is a state of intoxication by the element fluorine. Fluorine is a non-metallic element of the halogen group. It is a monovalent element with atomic weight 19. It is the most active of all chemical elements. The other members of the halogen group are chlorine, bromine and iodine with descending order of activity. Free fluorine is a yellowish gas and is extremely poisonous and does not exist in a free state owing to its high activity. It combines with hydrogen to form hydrogen fluoride with explosive violence even in the cold and in the absence of light. Its toxicity is well known as several investigators attempting to prepare fluorine have lost their lives.

Fluorine occurs in nature abundantly in inanimate world, while it occurs sparingly in animate world.

* Specially contributed to THE ANTISEPTIC.

Inanimate world:—It occurs in nature as minerals, (1) Fluorspar or fluorite CaF_2 in U.S.A., England and Germany; and (2) Cryolite Na_3AlF_6 in Greenland in large quantity. Fluorspar and cryolite contain 48.7%—54.5% of Fluorine. Minerals like biotite, muscovite and apatite are present in earth's crust and account for fluorine in the soils. Apatite contains 3.8% of fluorine, $(3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2)$ and occurs in eruptive rocks. Another mineral phosphorite or native phosphate, amorphous calcium phosphate and occurs in different deposits, sometimes of great thickness, in U.S.A. (Florida, Tennessee, South Carolina); North Africa (Tunisia, Morocco, Algeria); West Indies and several islands in South Seas. Fluorine is found in great deposits of bone fossils in the deserts of North Africa.

Earth's crust in volcanic areas has been found to contain more fluorine either as a constituent of lava, or in the soils contaminated with the effluvia of volcanic eruption. Fluorine is communicated to the soil by the weathering of rocks containing the element.

It occurs in nature dissolved in water. Ocean water contains 12 parts per million, (P.P.M.). Water from rivers, lakes, wells and springs contains fluorine either as trace or in high concentration according to the soils in which they are situated. Mineral spring water is relatively high in fluorine. The higher the temperature of the water the greater is the fluorine content. Water especially in the mining areas of cryolite, apatite and fluorite contains relatively high amount of fluorine. Several districts of U.S.A., Bauxite, Idaho, Illinois, Chekiang of China, some places, like Maldon (Essex) in South of England, Nellore and Central Districts of Madras Presidency, South India, have water with high fluorine content. In calcareous areas the fluorine content of water was relatively low. Upland surface water and running river water have rarely fluorine in them. It may be present in water of slow, small shallow streams, spread over river beds of fluorine bearing soils as was found in some place in the Nellore District.

In gaseous form it is found in nature in gases and air surrounding active volcanoes. GAUTIER found 0.11 mg. of fluorine in the form of hydrogen fluoride per litre of air at Vesuvius eruption in 1913. Most volcanoes in Italy, Canary Islands, Martinique, Hawaii, Alaska and Iceland have been supposed to be fluorine ejecting volcanoes either as hydrogen fluoride or silicon tetra fluoride.

Animate world.—Fluorine occurs in animate world, both in vegetable and animal kingdoms. Fluorine content of plants depends upon fluorine content of soils. It varies from 0.1 mg. to 5.9 mg.% of fresh tissue (GAUTIER and CLAUSMANN). Natural Fertilisers like rock phosphate and acid phosphate have high fluorine content and all vegetables grown with the help of these fertilisers have a high fluorine content. Vegetables are also contaminated with fluoride containing dust. Fluorides have been used as insecticides for spraying the plants.

Fluorine is present in animal kingdom also. Animal tissue contains less fluorine than vegetable tissue. As early as 1802 MORCLUN found that fossil teeth contained fluorine and in 1805 GAY LUSSAC and BARTHOLET found it in normal teeth. In the fossil teeth of elephants CARNOT in 1892 found 25—30,000 P. P.M. Bones are also rich in fluorine. JODLBAUER considered fluorine as a normal constituent of bone. It is now generally

agreed that calcium phosphate of bone and teeth is not only tertiary phosphate of calcium, but it exists as a phosphate of apatite type, $3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2$ (Bower and Murray 1935). X-ray analysis of bones and apatite supports this view. The bone ash of terrestrial animals normally contains 0.1—1% fluorine. The bones of older animals contain more fluorine than those of the young. The fluorine of the bone is mostly in the cancellated portion of the bones. The bones of marine animals are found to contain about 10 times the quantity of fluorine found in non-marine animals. Teeth also contain fluorine (human teeth 0.19—0.3%), while those of shark contain 8.9%. Formerly it was thought that enamel contained more fluorine than dentine, hence its hardness. But Roholm's investigation has shown that fluorine is deposited principally in dentine and to a smaller extent in enamel. Fluorine is present in other normal tissues. According to GAUTIER and CLAUSMANN (1912), the concentration in different tissues was as follows:—Epidermis 164; hair 61/197; thymus 39/111; testicle 12/42; blood 23/44; cartilage 4/14; muscle 0.4 4.6 P.P.M. of dried substance. They found fluorine in human milk as well as cow's milk 1.8 P.P.M. of the rest of internal organs. Kidneys and spleen were found to contain far more than heart, brain, lung and liver. According to GOLDENBERG and SCHRAIBER the fluorine content of human serum is 0.05—0.08 mg.%. R.B.C. contains nil or trace.

Fluorine compounds.—These may be divided into four groups:—

- (1) Gaseous—as hydrogen fluoride HF ; Silicon tetra fluoride SiF_4 .
- (2) Solutions as hydrofluoric acid HF ; Hydrofluosilicic acid H_2SiF_6 .
- (3) Soluble compounds—fluorides and silicofluorides of alkalis. NaF ; KF ; Na_2SiF_6 ; etc.
- (4) Relatively insoluble compounds (slowly soluble compounds) as cryolite, sodium, aluminium fluoride Na_3AlF_6 and Calcium Fluoride CaF_2 .

Gaseous and soluble fluorides are highly toxic causing death to all animals. The first three play an important part in acute intoxications, while all of them in smaller doses in chronic intoxication.

D.M.L. for rats, dogs and rabbits varies from 13.46 mg. by injection and 23–90 mg. of fluorine by mouth per kg. of body weight. D.M.L. for man 6–8.6 mg. per kg. weight of body has been found to be fatal for man. Man has been found to be more sensitive than other animals. Pigs have been found to be the least sensitive.

Cryolite and calcium fluoride have been found to be less toxic probably due to their less solubility than sodium fluoride.

Modes of entry of fluorine into the body.—Fluorine is taken into the body in several forms and ways:

1. *Gaseous form:*—That intoxication in gaseous form is an acute one is seen in the famous fog disaster²² in the Meuse Valley in December 1930, as reported by KAJ ROHOLEM. Then several thousands suddenly fell ill one day due to a fog formed and several died of pneumonia. Several were laid up seriously with respiratory troubles. On investigation it was finally traced to gaseous fluorine compounds emanating from certain factories in the valley to gaseous fluorine compounds forming dense fog which invested the valley for a few days. In these different factories calcium fluoride was intensively employed in iron smelting processes, glass and pottery manufacture, zinc works and

super phosphate factories. They all emanated fluorine compounds in gaseous form as hydrogen fluoride and silicon tetra fluoride. Workers working in aluminium factories where gaseous fluorine compounds emanate from the open melting baths, were found (reported by FROSTAD) to be suffering from fluorine intoxication with symptoms like those of bronchial asthma.

Where plants in the neighbourhood of these factories were corroded by gases, it happened that animals accustomed to be grazing there were found to be suffering from chronic fluorosis by having bone affections, stiff laborious gait, muscular restlessness, spasms, nodose thickening of the extremity bones, with frequent fractures, in addition to cachexia and emaciation. For many centuries Iceland, time after time, subsequent to volcanic eruptions, was visited by above and tooth disease called *Gaddur* among the sheep that had eaten the grass contaminated by effluvial ash. KAJ RONOLM has shown in 1934 that this disease is a chronic fluorine intoxication that arises in the same way as cattle diseases near the aforesaid factories. Gaseous fluorine compounds are ejected and dissolve in tiny droplets of moisture, which condense round ash particles. This rain of ash contaminates the plants and soil with fluorine.

2. *Liquid form*:—It is taken either as soluble salts in water or as hydrogen fluoride or silicon tetra fluoride in solution. Acute poisonings are only due to accidental swallowing of materials in large quantities. Homicidal poisoning also has been recorded. In such cases death is sure and certain in spite of treatment.

3. *Solid form*:—Acute intoxication is due to swallowing of salts, and is surely fatal. It is rare and generally due to accidents. Food materials contaminated with dust containing fluorine salts are also eaten. Fruits, vegetables and plants sprayed with insecticides containing fluorine compounds may also be eaten. Preserved foods like fruits etc., are also sources as fluorides are used as preservatives. Food materials like Chinese-tea, baking powder, and other substances have been found to contain various quantities of fluorine ranging from 9–399 P.P.M. McCLEURE¹¹ prepared a summary of fluorine content of foods and beverages reported in literature by several people. It may range from traces to 10 P.P.M. REID analysed one fresh sample of Chinese-tea grown in fluorite mining area in China and found it to contain 1757.8 P.P.M. of fluorine. A 2% tea infusion contains enough fluorine to give tooth changes in rats in 4 weeks.

Fluorine intoxication.—Acute and chronic.

Acute intoxication:—It is generally produced by inhaling hydrogen fluoride or silicon tetra fluoride or swallowing toxic doses of soluble fluorides in water. It is a very powerful gastro-intestinal irritant, like arsenic, mercury and barium salts and produces gastro enteritis and toxic nephritis. Almost all cases are fatal even after washing out of the stomach and proper treatment. It causes hæmorrhagic vomiting, diffuse abdominal pain, diarrhoea, painful spasms and pareses localised or general; weakness, thirst, salivation, perspiration, dyspnoea, weak pulse and death. In cases of inhalation all mucous membranes are irritated.

Chronic fluorine intoxication:—Chronic form is due to ingestion of soluble salts in water in very small non-lethal doses for some time. Chronic form is generally present when waters found in wells, rivers or springs, containing small quantities of fluorine are ingested for years. The people

as well as the cattle are affected with a disease of chronic fluorosis. Chronic form is also due to taking in of fluorine compounds in small quantities along with food materials for long periods. Food materials preserved with fluorides, vegetables grown on fluorine rich soils, thereby containing high fluorine content, or vegetables contaminated with dust from fluorine rich soils, vegetables grown with water containing fluorine and manured with natural super phosphates, vegetables sprayed with fluoride containing insecticides and unwashed, all cause chronic intoxication when consumed regularly for long periods. Pigs fed on winelees (the bottom materials of wine vats) developed chronic fluorosis. People working in the aluminium factories developed chronic fluorosis in addition to their lung symptoms of siderosis, by inhaling regularly small quantities of cryolite dust while working. Animals eating contaminated fodder around these factories developed chronic fluorosis. Chronic fluorosis is characterised by several symptoms: (1) mottling of the teeth and (2) in prolonged cases bone affections. Fluorine in addition to other effects on general system and other organs has specific action on osseous and dental tissue. The effect on the teeth results in the formation of hypoplastic, badly-formed and calcified enamel and dentine. The effect on bones is seen in two forms (a) Osteosclerosis, and (b) osteomalacia. Chronic fluorine intoxication is found in the following diseases. The same disease is called in different places by different names.

1. *Mottled teeth*:—An affection of the teeth, which is endemic in man, in certain parts of America, Europe, Africa, Asia and Australia.
2. *Osteosclerosis*:—An occupational disease among cryolite workers or a disease of bones found in people drinking water with high fluorine content as people in some parts of Nellore District.
3. A disease like osteomalacia endemic among herbivora in the surroundings of infected areas.
4. *Darmous*:—A dental and mandible disease, among herbivora in certain parts of North Africa.
5. *Gaddur*:—A dental and bone disease, among herbivora in Iceland after volcanic eruption.

In chronic fluorosis the general symptoms observed are cessation of growth, loss of weight, lowered vitality, sluggishness and loss of agility, skin becoming rough, coat becoming coarse and shaggy in rats and animals, cachexia. GOLDENBERG gave the name "fluoride cretinism" to retardation in growth. VELU observed cachexia in white rats by feeding them on calcium fluoride. GOLDENBERG and later CRISTIANI also have emphasised on cachectic condition. CRISTIANI experimenting on lambs observed that he was struck with the decrease in vivacity, diminution in agility, calm, and dull attitude. He found their skin parchment-like, wool stiff, devoid of flexibility and loose and subcutaneous fat very much reduced.

BERGARA found changes in cornea and discharge in conjunctiva in his experiments on rats. CHARLES observed xerophthalmia in rats even on adequate diet. SLAGSVOLD observed photophobia and serious secretion from conjunctiva.

Other symptoms observed were:—*Alimentary system*:—Loss of appetite, vomiting, constipation or diarrhoea. SOLLMAN, SCHOTTLER and WETZER found diminution in appetite. Changes in the teeth of white rats were

found by ROOST, SCHULZ, LAMB, MCCOLLUM and SIMMONDS, BECKER and BUNTING, BENGARA CHARLES and others.

VELU and ZOTTNER found in the liver microscopically changes of non-inflammatory character and of fatty degeneration around the hepatic vein like changes found in arsenic, mercury or phosphorus poisoning. SMYTH and SMYTH found microscopically degenerative changes in liver in rats on cryolite and barium fluosilicate. PHILLIPS and his co-workers found fatty degeneration of parenchyma. CRISTIANI has shown that the enzyme extracts of the stomach were less effective in proteolytic action.

Circulatory system:—Pronounced intoxication produced hypochromic anæmia. There was no change in white cells. Coagulation time was clinically found unaffected. CRISTIANI observed animals growing hemophilic, blood being deep red and less coagulable. This fact was verified by STUBER and LANG. CRISTIANI and GAUTIER found reduction in fat in bone marrow and development of hyperæmic tissue. SCHWYZER and CRISTIANI found changes in bone marrow blood picture coagulability. VALIYAVAC after intravenous injection of sodium fluoride in rabbits found reduction in R.B.C. and hæmoglobin and no change in white cells. LEAKE and RITCHIE observed fall in R.B.C. number and oxygen binding capacity of blood, picture being one of anæmia. Spleen contained iron pigment due to destruction of R.B.C. SLAGVOLD saw considerable anæmia develop in sheep. PUNDIT and NARAYANA RAO¹⁰ observed intense anæmia in monkeys in chronic fluorine poisoning.

Urinary system:—Albuminuria and hematuria have been produced in dogs. The symptoms were those of chronic nephritis.

Musculature:—A stiff laborious and probably painful gait is a frequent symptom. Big animals find difficulty in rising from a sleeping posture. There is fibrillation of muscles of the extremity. BERGARA found gaits of rats stiff and dragging. BRANDL and TAPPEINER found in dogs stiff gait, especially hind quarters. MCCLURE and MITCHELL found pigs had difficulty in standing. KICK, BETHKE and EDINGTON found stiff and toilsome gait. DUTOIT observed painful and laborious gait and even paralysis in heifers.

Bony system:—Curving of spine and thickening of the extremities of long bones is the most interesting symptom. CRISTIANI observed exaggerated curving of spinal column in guinea pigs typical of chronic fluorine intoxication. Painful exostoses exclusively of long bones were observed by BAROLUCCI. Painful exostoses of long bones were noted by N. SETTE in animals living near a fertiliser factory. He found pathologically decalcification. SMITH LANS and SMITH found differences in the retention of calcium and phosphorus as compared with controls. They found retarded bone development. PUNDIT and NARAYANA RAO found exostoses of long bones in monkeys suffering from chronic fluorine poisoning more early in the absence of vitamin C.

Endocrine glands:—Thyroid.—CRISTIANI, by feeding guinea pigs (average life after feeding being 53 days) found proliferative changes of the parenchymatous tissue, more rarely of interstitial tissue. CHARLES was unable to find any changes. PHILLIPS and LAMB found some changes in only half the number of rats i.e., slight parenchymatous proliferation and occasionally fibrosis. GOLDENBERG and PIGHINI found hypertrophy of

thyroid. Kaj Roholm²¹ observed no changes in cryolite workers suffering from chronic fluorine intoxication. Pundit and Narayana Rao¹⁰ found slight hyperplasia of the thyroid in monkey which died of chronic fluorosis. Chang¹ *et al* found the fluorine content of thyroid doubled in dairy cows after fluorine intoxication. Phillips *et al* showed in chicks and rats that the fluorine content of thyroid increased even though animals did not show toxic effect.

Parathyroids:—Pavlovic and his associate noted changes (fatty degeneration and hæmorrhage) in parathyroids during experimental intoxication in rabbits. But Hauck^{12a} and co-workers examined parathyroids in rats and chickens after feeding them on sodium fluoride, but did not note any changes.

Hypophysis:—Cristiani found that in animals dying of chronic fluorosis there were changes in the dimensions of the pituitary. He found them smaller in size, less thick and were looking flattened. Histologically he found changes, viz, atrophy of specific cells and relative increase of connective tissue. But others investigating in rats, Phillips, Lamb and others found that it was normal.

Suprarenals:—Phillips found increased weight in suprarenals with changes of hyperæmia and fatty degeneration microscopically.

Gonads:—Phillips and Lamb observed tendency to atrophy in testes and ovaries in rats with fluorine intoxication. Hauck,^{12a} Strenback and Parsons observed atrophy of specific tissue in testes and absence of sperma. Kaj Roholm observed reduction in fertility and cessation of reproduction when nutrition is severely interfered by intoxication. Suppression of sexual cycle was observed by Del Castillo Bergara and Charles. Goldenberg observed rapid death of young ones born of fluorided mothers.

The most important effects are on teeth and bones.

Teeth:—Mottled teeth or mottling as it is generally called in America, Europe and other places. In North Africa it is called *Darmous*, in Argentine *Dientes Veteles*²³.

This disease is found to be present in America—U.S.A., Mexico, Argentine, Barbados, Bahama Islands; Europe—Spain, Italy, England,²⁹ Holland; Africa—Algeria, Tunisia, Morocco, Azores, Cape Verde Islands, South Africa; Asia—Sinai Peninsula, India, Nellore²⁴ and Kadapah Districts,²³ Travancore¹⁵ in South India,²⁴ the Punjab, North China and Japan.

The changes produced in experimental animals were almost the same as those found clinically in people suffering from natural chronic fluorine intoxication. They were hypoplastic and insufficiently calcified enamel and dentine. In the rats the incisors lose their normal orange brown colour. Transverse stripes of chalky white enamel appear under small doses. In cases of bigger doses the enamel becomes chalky white and shows hypoplasia; the enamel becomes brittle and easily chips off. Incisors show abnormal growth, retardation and binding of teeth. Pigmented brown spots also appear on these teeth. There is defective calcification of teeth as shown by X-rays. In sheep where dental changes were studied there has been observed brownish black pigmentation of opaque enamel which has an uneven and almost corroded appearance. Besides a defective, pigmented, non-resistant enamel, abnormalities in size, shape and position of teeth have been observed in animals suffering from disease *Darmous* and *Gaddur*.

In man mottling attacks the permanent teeth and rarely milk teeth. It has been shown that deciduous teeth also are affected. *Mottled teeth* are characterised by enamel having opaque chalky white colour in spots or diffusely, and irregular brownish black pigment. The teeth exposed to light are more prone to be affected. In more severe cases, enamel is hypoplastic, often causing pits in restricted areas. The teeth are brittle and less resistant. In both men and animals severe affections were accompanied by difficulty in mastication and the teeth are very sensitive to cold. Secondary inflammation of gingiva often develops. Dental caries are rare among these cases.

The affected teeth of chronic fluorosis have been classified by H.T. Dean,¹⁰ Dental Surgeon, U.S.A., Public Health Service, who studied in great detail. He classified the teeth according to severity and his classification is classical and is generally accepted. He described various forms in great detail:—(1) Normal; (2) Questionable; (3) Very mild; (4) Mild; (5) Moderate; (6) Moderately severe; and (7) Severe.

Ref.—(1) U.S.A. Treasury Dept., Public Health Service Publications, 1935, Mottled Enamel in Texas, H.T. Dean *et al.* (2) Texas Dental Journal, March, 1937, Summary Mottled Enamel in Texas, H.T. Dean. (3) Classification of Mottled Enamel and Diagnosis, H.T. Dean, J.A.D.A. 21, 1421–1426, Aug. 1934.

Mottled enamel is associated with the use of water containing toxic amounts of fluorine during the period of tooth calcification. It has been shown that there was no mottled enamel in certain areas in Texas before the introduction of deep wells. After the introduction of deep wells those who consumed that water developed, but those living in the same locality but using other surface water source were unaffected. Also the well water of St. David when fed to experimental animals produced teeth changes similar to mottled enamel found among the people using it. Mottled enamel has been produced by several workers by feeding various animals on fluorides, rock phosphate containing fluorine or other minerals containing fluorine.

The mineral threshold has not been definitely worked out but it is generally found that waters containing less than 1 part per million of fluorine in domestic supply do not cause mottling and below 0.5 P.P.M. never.

The cause is operative during the first eight years of life, third molars excepted. If a child consumes fluorine water for two years after weaning of the child, she develops mottled teeth even after removal from endemic area.

Incidence of mottled teeth is proportional to the fluorine content of waters consumed. Where fluorine content is 6 P.P.M. incidence of 100% has been observed. There is no colour, race or sex differentiation. Only those who use the fluoride water for drinking and cooking are affected. In Texas and other parts of U.S.A. almost all deep wells have been found to contain high fluorine content.

In Nellore District even small puddles in the river beds, and shallow wells have been found to possess a high fluorine content according to survey by K. I. Guindy. In Podili village a deep well was bored through rock going as far as nearly 300 feet deep; even that water has been found to contain a high fluorine content.

The *Darmous* is the mottled appearance of the teeth of the lower animals. In the case of human *Darmous* described by Velu²⁷ in North

only occasionally fibrosis.

Africa, the condition is just the same as that of mottled teeth of chronic fluorides. Just like mottled teeth of fluorosis, it affects individuals who are in their infancy or in the period which precedes the appearance of second dentition, exposed in an endemic area. It was discovered by Velu²⁶ who proved by feeding rats with calcium fluoride that chronic fluorine intoxication just resembled that of natural phosphate as they contained 3–4% of calcium fluoride. He also showed that waters from phosphate regions was the cause of *Darmous*. Velu²⁸ has shown that *Darmous* was present in all phosphate-bearing areas in Morocco, Algeria and Tunisia. The natural phosphates did not exist on the surface of the soil, they could not directly enter the organism, but only through water percolating through those phosphate beds which contained the mineral products resulting from cadaverous decomposition of marine animals—squalls and rays. These phosphates contain a high proportion of calcium fluoride. The mud contained in these waters conveys more fluorides into the body than otherwise. Velu produced *Darmous* by feeding sheep with calcium fluoride and the same symptoms of chronic fluorosis were produced.

The effect of bones.—Continued ingestion of fluorine not only acts on the teeth but acts also on the bones and bone formation. Both diffuse and sclerosing process and a generalised condition resembling osteomalacia are observed. These forms were observed both in man and in cattle in the endemic area. Osteosclerosis is a disease known in cryolite workers (Kaj Roholm)²¹. It is also found in advanced cases of fluorosis in endemic areas, having high fluorine content in drinking water—Nellore District, South India^{24, 25}.

Clinically subcutaneous bone surfaces present an irregular nodose surface. There is a restriction of motility of vertebral column and thorax. There is no bone tenderness. Fracture frequency is not markedly increased. On X-ray examination osteosclerosis is characterised by an increased and periosteal bone formation, with thickening of cortex and processes; narrowing of medullary cavity and more or less obliteration of the structure of spongiosa. The disease which has been observed only in adult individuals principally attacks the cancellated bones. Side by side with osteosclerosis there is a widespread calcification of osseous ligaments—tends Achilles, hamstring tendons, vastus muscles of the thigh. In rats experimental sclerosis displayed great similarity to spontaneous variety in X-ray pictures, only ligament calcifications were not definitely present. The condition resembling osteomalacia has been extensively studied in several animals, rats guinea-pigs, pigs, sheep, oxen, buffaloes and dogs, both in immature and in adults. Clinically it is characterised by a more or less widespread tendency to form exostoses, especially in the mandible and on the long bones. The exostoses are hard and indolent. The animals give the impression of suffering, as limping pseudoparesis are sometimes observed. Epiphyseal regions present nothing abnormal to the clinical examination. The fracture frequency is not definitely affected in the experiment. Curving of the extremities has been seen in the rat. X-ray pictures show that the condition is characterised by a diffuse atrophy of compacta and the spongiosa, and the enlargement of medullary cavities. In addition there is a widespread periosteal deposition of definitely calcified osseous tissue. The epiphyseal regions may exhibit signs of inhibition of endochondral ossification (atrophyline of arrested growth); but more marked changes of configuration of epiphyseal lines do not seem to be the rule.

The spontaneous disease resembles the experimentally produced osteomalacic condition known in herbivora. The tendency to form exostoses often exceeds the experimental condition. The exostoses are localised to the same bones, (mandible, long bones, ribs, and cranial bones). The bones do not seem to be tender. The spontaneous disease in animals like sheep is called *Gaddur* in Iceland, *Darmous* in North Africa. Although bones are affected in several degrees in different kinds of poisoning, as a rule the joints are intact in both clinical as well as X-ray examination. Only intervertebral joints are affected giving rise to stiff back and rigid neck so that people have to turn the whole body to look behind.

Pathology of the teeth.—Microscopically rat teeth have been examined. The enamel epithelium exhibits signs of atrophic and degenerative processes; irregularities in the position and appearance of ameloblasts increasing to localised necrosis. The enamel shows localised hypoplasia or defects occupying more or less the thickness of enamel, or an abnormal striping parallel to the surface and produced by alternating calcium poor and calcium rich layers. The pathological enamel is both hypoplastic and deficiently calcified.

The changes affect both the enamel prisms and interprismatic substance, corresponding striping occurs in dentine also. The predentine is wide. The odontoblasts lining the pulp cavity do not seem to suffer marked changes nor does the pulp. The microscopic and macroscopic changes agree. The alternating bands of light and dark enamel observed with the naked eye on the incisors of a rat correspond to alternating layers of poorly and well calcified enamel seen in very oblique sections. Macroscopically distinct contrast is due to varying pigment content between the two kinds of enamel. The dental changes in the spontaneous fluorine intoxication were not well studied. But in a few cases where sections of mottled teeth were examined they agree with the experimental results, as regards the anomalies in structure and calcification of enamel and dentine.

Pathology of bones:—In spontaneous human osteosclerosis, the bones are gross but otherwise unchanged in shape. The surface is chalky white and uneven with widespread ligament calcifications. The weight and hardness of bones are increased. Histologically there is increased endosteal and periosteal apposition of an irregularly structured osseous tissue with secondary narrowing of medullary cavities. Calcification of the osteoid tissue is increased with the deposition of calcium salts in irregular manner as granules and lumps of considerable size. Granules have been observed in Haversian canals and medullary spaces. Sometimes crystals of calcium fluorides have been found. In addition there is calcification of periosteal ligaments. Bone absorption by osteoclasts is sparse. Experimental osteosclerosis produced in rats resembled macroscopically and radiographically spontaneous osteosclerosis. Microscopically there is an increased and irregular periosteal apposition with pronounced granular deposition of calcium salts.

The osteomalacic condition varies with the species and age of the animal. Certain features are common. The osseous system is attacked diffusely and the changes consist of a combination of (osteoporotic) atrophic and hyperplastic processes. The bones are often coarser. The weight is reduced and so also the resistance. The compact and spongy portions are reduced and the marrow cavities are enlarged. The hyperplastic processes are mostly localised to periosteum. These periosteal deposits are loose and poorly calcified and they form exostoses and are localised to long bones and

mandible. Macroscopically there is lack of endosteal bone formation and the epiphyseal lines do not exhibit marked changes. Histologically the condition is characterised by: (1) atrophy of spongiosa and central compacta; (2) lively periosteal apposition of osteal tissue of irregular structure; (3) retarded calcification of a rachitic type of osteoid tissue as well as quantitatively abnormal calcification, the calcium salts being deposited in the form of discrete, coarse granular masses which fuse to gather in completely; and (4) considerable bone absorption by osteoclasts from a fibrously transformed marrow.

Osteosclerosis is excessive precipitation of calcium in the form of coarse granules and osteomalacia is breaking down of calcareous bone and formation of poorly calcified osseous tissues. The joint cartilage and the bone cartilage show no pathological calcification.

Pathology of bone marrow:—In cryolite workers where osteoclastic changes reduced the medullary cavities in the cancellated bones, there was diffusion of red marrow to the diaphyses of the long bones, probably compensatory. In osteomalacic conditions accompanied by general toxic symptoms, the gelatinous degeneration of bone marrow was noticed especially in herbivora. Protracted intoxication of dogs and rats was accompanied by hyperplasia of the myeloid and atrophy of erythropoietic marrow, combined with limited degenerations and fibrous transformations. The marrow reacts differently though degenerative changes of erythropoietic tissue are predominant in severe intoxication.

Biochemistry.—**Absorption:**—Fluorine is absorbed from gastro-intestinal tract and is excreted through the kidneys. As to the form in which it is absorbed and found in circulation little is known. It has been found to be excreted in milk as the children of cryolite working women were found to possess mottled teeth by Roholm. Also rats living on the milk of the mothers suffering from fluorosis were found to contain greater fluorine in their bones than controls (Cheng and Reid)¹⁹. Fluorine is found in circulation and conveyed to the offspring through mothers' placenta (Cheng and Reid). Some workers found negative changes on radiographing children of cryolite working women. But Cheng and Reid¹⁹ have shown that the new offspring of the albino rats fed on fluorine gave higher fluorine content than that of controls (*Chinese Journal of Physiology*, 1937).

The fluorine content of blood in fluorosis as well as in normals is not well worked out. The normal fluorine content is supposed to be 0.05 mg. per cent. The fall of calcium content in blood well seen in acute cases of intoxication was not so well seen in chronic fluorosis. But in young animals in chronic fluorosis the fall was observed while in other cryolite workers²¹ and other individuals of chronic fluorosis calcium fall was not evident according to Roholm. Increased fluorine content of thyroid and kidney were observed. In cryolite workers lungs were also found to possess high fluorine content due to inhalation of dust.

Fluorine was found to be deposited in the body tissues as follows:

(1) Blood	...	54 mg % of dry substance	} Bandl and Tappeiner's classical experiment on dogs.
(2) Muscle	...	59 "	
(3) Liver	...	267 "	
(4) Skin	...	149 "	
(5) Teeth	...	452 "	
(6) Bones	...	2348 "	

Among the bones fluorine has got the greatest predilection for being deposited in vertebrae.

Analysis from bones of a case: Bishop—*Am. J. of Roentgenology and Radium Therapy*, May, 1936.

Femur Centre ...	0.29%	Vertebrae Medulla ...	0.70%
Skull upper parental...	0.37%	Cortex ...	0.69%
Ribs 2nd and 3rd ...	0.56%	Vertebra lumbar osteo-	
Sternum ...	0.69%	phyte. ...	0.68%

It has been shown that most of the fluorine is stored in the teeth and bones by Sonntag, Bethke *et al*, Kick, Bethke and Eulington. Normally bone contains traces of fluorine. The increase in fluorine content in bones is very considerable upto 10-30 times the normal quantity and was found to be directly in proportion to the amount and duration of intake. The deposition in the teeth is more moderate and does not exceed 10 times the normal content. The relatively high fluorine content of bones and teeth is an important sign of the organism absorbing fluorine over a long period. The highest fluorine content observed was 36.9% by Bandl and Tappeiner in a dog. The amount nearly corresponds to fluorapatite of formula $3\text{Ca}_3(\text{PO}_4)_2\text{CaF}_2$ with fluorine content 3.77%. The above findings were not confirmed by modern investigators. Gaud, Charnot and Langlais analysed the organs of an ass of chronic fluorosis (*Darmous*) and found upto 2 mg% of dry substance, a content very nearly the same given by Gautier and Glausmann as normal. Boissevain and Drea were unable to demonstrate the presence of fluorine in organs of individuals whose bone fluorine content was as high as 8% by means of spectrographic examination. In organs of cows subjected to fluorine intoxication for a long time Chang *et al* found the normal fluorine content was doubled, while in thyroid it increased to 24 fold.

From Tappeiner's analysis and other findings it is found that fluorine is deposited to a considerable degree in organs other than bones and teeth. Tappeiner who interpreted the results of his experiment observed that faeces contained fluorine that was excreted by gastro-intestinal tract and not fluorine that was left unabsorbed as he found fluorine in urine and no fluorine in faeces at all in the first three weeks of his experiment. Other channels of excretion were uncertain though Gautier and Glausmann found relatively high fluorine content in epidermis, hair and nails. This was unconfirmed. Fluorine was found in the milk and saliva. Tanaud showed it in saliva but it was not confirmed by Boissevain and Drea who showed by spectrographic examination that fluorine was present in urine and not in saliva and milk.

Forbes and others observed less calcium and phosphorus retention in pigs fed on rock phosphate 1921. McClure and Mitchel performed metabolism experiments on rats by feeding with NaF and calcium fluoride and found when small doses were given there was not much calcium disturbance but when the dose was increased they found slight calcium retention 1931. In 1934 Lantz and Smith did experiments on young rats on a diet of 1% NaF. During rapid growth calcium retention was only half of that of controls. So also phosphorus retention was reduced to a slight extent. This was changed after the period of rapid growth and calcium retention was just as high as that of controls or even higher. On fluoric diet rats excreted much more calcium and phosphorus in faeces than controls. At the same

time there was retardation of growth and the rats presented a short stunted build of typical calcium deficiency. As animals grew their legs became curved. Phillips fed heifers with fluorine and found plasma phosphates increased in proportion with fluorine intake, while Hauck and others found it unaltered in chicks.

Goldenberg says when a lamb was fed with 300 mg. of sodium fluoride daily, it was found to develop glycosuria which disappeared spontaneously after some months, without the dose being altered.

Pundit and Narayana Rao found that the fluorine concentration in blood did not prevent the glycolysis *in vitro* as against control animals.

Factors influencing fluorosis.—1. *Dose*:—The effect of chronic ingestion of fluorine depends upon the dose. The greater the dose the sooner the symptoms develop, the dose being less than M.L.D. The ratio of the quantity of fluorine to the body weight is an important factor. It is a measure, and so it is expressed as so many milligrams per kilogramme of body weight. Teeth are easily affected with smaller doses while osseous system is only affected with bigger doses over prolonged periods. Kidney is also affected with big doses. With big doses anaemia and cachexia are produced and finally the organism dies of general pronounced degeneration.

2. *Nature of fluorine compounds*:—Toxicity depends upon the fluorine content of different compounds. Even among substances containing the same fluorine content, it depends upon the solubility of the substance as sodium fluoride is more toxic than calcium fluoride which is more insoluble.

3. *Time*:—Time is also a factor in the production of symptom (H. T. Dean, *J.A.M.A.*, Oct. 17, 1936). Clinical manifestations of dental changes depend upon the time and the rate at which the development of the teeth proceeds. In a rat put on fluorine bleaching occurs in 2 weeks, bands develop in four weeks, in man it takes months if not years. In monkeys mottling appeared in 5 months (unpublished data). Human osteosclerosis develops only after years of fluorine ingestion. In cryolite workers recognisable sclerosis was observed in 9½ years and for pronounced affections 21 years.

4. *Nature of the individual*:—Intoxication depends upon the sensitivity of the organism to fluorine. Different animals differ in their resistance to the fluorine effect. Pigs are the most resistant and man is the least resistant, dogs and cattle being intermediate. Chickens are the most insensitive to the effects of fluorine and so demand very big doses.

5. *Age of the individual*:—In young animals teeth are sooner affected while in older animals bones are affected. In a growing animal osteomalacic conditions are observed showing that rapid growth finds deficiency of calcium supply while in an adult animal osteosclerosis is more often seen along with osteomalacia.

6. *Meteorological factors*:—(a) Temperature, (b) hygrometric state, and (c) velocity of winds etc.

(a) Higher temperatures cause more consumption of water. Similarly the dry climate of a place causes the people and animals to drink more water. The people living in hot and dry climates as those in North Africa, Nellore, Kadapah consume more water than people of U.S.A.

Similarly hot winds increase the consumption of water as body loses moisture by rapid evaporation. Drinking more water means more ingestion of fluorine. In hot months water becomes scanty in tanks and wells and becomes more concentrated. Muddy waters carry solid mineral matter along with it. This process is hastened by hot winds. Fluorosis caused by drinking water alone is more common in torrid zone than in temperate zone. The people in cold climates are mostly affected through industries (cryolite or aluminium factory workers in Denmark) or through ingested food materials as in Iceland. People living in the neighbourhood of these factories are also affected.

7. *Feeding and drinking habits*:—Consumption of dirty water increases the fluorine content as the sediment contains a high fluorine content. Feeding habits like taking solid foods and culinary habits like consumption of large quantities of tea, soup etc., increase fluorine consumption. Civilised people drinking clarified water consume less fluorine than primitive people who consume muddy waters and who consume earth also with their foods. Gaud estimated in weekly ration of food of a sheep as fluorine by water 1.25 mg.; by sediment 7.50 mg.; by plants 33.80 mg.; and powdered earths 11.360 mg.

This applies equally to man if his habits are dirty.

8. *Other habits*:—Injury or strain to ligaments or periarticular tissues cause hyperaemia and then calcification in the situation. As a general rule periosteal bone formation is said to be connected with mechanical conditions (muscular work, load carrying or hard labour) and is regarded as a compensatory attempt to strengthen the weakened bone. In Icelandic sheep which roam about climbing hills, the *Gaddur* attack produces more periosteal production than that produced in experimental animals of fluorine intoxication. Animals which go about briskly while grazing on the mountains have more periosteal deposits than those kept indoors. Something like this might be the factor in different grades of above affections in Podali taluk; two villages where members of better class consuming the same water containing fluorine as those of depressed classes have less bone affections than those of depressed classes.

9. *Diet and nutrition*:—Velu (1933) says that fluorine loses its toxicity when fixed by vegetable and animal organism. He suggests that *Darmous* disappears with the improvement of food regime of man and animals. More nourished people are less affected. Toxicity depends upon the presence and availability of calcium phosphorus, and vitamin D. Toxicity was greater in rats with low calcium than in rats with average quantity. Bone symptoms were more readily produced in growing young individuals. Toxic effect increases in conjunction with pregnancy and lactation, when calcium depletion is taking place during foetus formation and calcium excretion in milk. To produce the same toxicity greater fluorine as calcium fluoride is required than fluorine of sodium fluoride. Aluminium fluoride much more. Addition of Vitamin D reduced the toxicity of fluorosis, in cases where calcium was deficient than in cases where calcium was rich.

Charles² showed that ultra-violet irradiation in rats during the period of fluorine intoxication, counteracts the intoxication (*C.R.S. Biol.* 1929, 102). Phillips and co-workers found that fluorine produced scurvy in guinea pigs in spite of heavy doses of vitamin C in the shape of orange juice. It looks

as if the fluorine inactivates and inhibits the action of vitamin C. Neither clinical symptoms nor bone changes are the same as in vitamin C deficiency.

Pundit and Narayana Rao¹⁶ have shown that vitamin C deficiency increases the toxicity and severity of fluorosis. Vitamin C plays some part in calcium metabolism. Kaj Roholm also observed in his experiments that vitamin C played some part in peculiar precipitation of mineral salts.

The fluorosis problem is assuming greater importance as more places are being found to be affected. As the disease incapacitates and lowers the vitality of the people affected, it affects the standard of labour in the villages affected. It has become an economic problem also, as useful labour is being incapacitated and many useful animals are rendered useless for husbandry.

Research is being done by King Institute¹⁷, Guindy, in mapping out areas by systematically examining all waters of this presidency for the presence of fluorine, and also in assessing the standard of nutrition in the affected areas as it is found that nutrition plays a very important part in withstanding the bad effects of the chronic fluorine poisoning.

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The Place of Vasectomy in Leprosy Control*

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Introduction.—Human sterilisation has been used in certain fields of preventive medicine. To a limited extent it has been used in leprosy also. During recent years, opinion has been growing in India that this method should be utilised for the control of spread of leprosy in this country, but this feeling has not found ventilation for various reasons. On the other hand, there are people strictly opposed to this measure. It will be interesting and profitable to discuss the place of this measure in an anti-leprosy campaign.

Since in this country the information on the subject of human sterilisation is very limited, we will first consider the subject in general, and then pass on to the consideration of sterilisation in cases of leprosy.

Sterilisation in general.—*What is sterilisation*:—The word sterilisation means to render "sterile" or "barren." From the early days some kind of surgical operation has been used to prevent the birth of children for various reasons. The old time operation is known as "castration," and it consists in the removal of the sex glands. The modern method of sterilisation does not entail the removal of the sex glands, but depends on obstructing the passage of the germ cells from the sex glands to their destination. The term "sterilisation" in modern days, therefore, means the blocking of the spermatic cords in males and the fallopian tubes in females. The operation is called vasectomy in males, and salpingectomy in females. In the male the operation is easy as the ducts lie in the scrotum just below the skin. In the females, however, the operation of salpingectomy is more serious as it involves opening of the abdomen.

The technique of vasectomy:—The operation of vasectomy is a minor one and can be performed painlessly in a few minutes under local anaesthesia. All that is required is to make a small incision on either side of the posterior surface of the scrotum, and to cut out about 1 c.m. of the spermatic cord of each side.

The effect of vasectomy:—The effect of vasectomy is to make the individual "sterile" or "barren" so that no children are produced. Apart

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from making a person "sterile" it has no effect on the general health or the sex desire of the person. This is because the sex glands are left intact and continue to produce their hormones or secretions which are absorbed in the blood and affect the activity of other parts of the body. The old operation of castration, by removing the sex glands, stopped the production of these special secretions and thereby caused marked changes in the castrated persons; the sex desire was lost or reduced and the growth of sex characteristic was interfered with.

Grounds for sterilisation:—The grounds for sterilisation may be eugenic, medical or social. It is on eugenic grounds that the operation has been most commonly used, with a view to preventing inheritance of any mental or physical defect. Hereditary mental defects and abnormalities such as feeble-mindedness and insanity, have constituted the most important grounds for eugenic sterilisation, although it has sometimes been used for the prevention of inheritance of physical defects and abnormalities. Any illness, physical defect or weakness, which makes it likely that the strain of pregnancy and lactation may result in serious harm to physical and mental health, constitutes a valid medical ground for sterilisation; cardiac disease, pulmonary tuberculosis and contracted pelvis, etc., are some of the most important medical grounds for sterilisation. Social grounds for sterilisation include mental or physical defects and abnormalities which make a person incapable of taking care of the children. Habitual criminals and chronic alcoholics have also been sterilised on social grounds regardless of their mental state; for this type of people, however, the operation of castration is used.

The practice of sterilisation:—Sterilisation has been practised in various countries, the most important of them being the United States of America and Germany. In the United States, during recent years, there has come into existence an organisation for educating the public regarding the need of a nation-wide programme of sterilisation. The organisation has collected information on the number of sterilisations performed in the State Institutions in the States with a sterilisation law. The reports indicate that up to the beginning of 1944, 30 States with a sterilisation law had reported the sterilisation of over 42,000 persons, mostly insane and feeble-minded. This number does not include the operations done in the hospitals by private physicians.

Laws about sterilisation:—Most of the countries where sterilisation is practised have laws legalising the operation. The operation is done on a voluntary basis, the consent of the patient or his guardian being essential, and the laws provide for adequate safeguards against its use in any but bonafide cases. In the United States such laws exist in most of the States; they apply to the institutions taking care of the feeble-minded, and persons with mental defects and abnormalities. Early laws in some of the States provided for compulsory sterilisation, but there is now a tendency to remove the element of compulsion, as it has been found to operate unfavourably. The present laws in almost all the States provide for the consent of the person concerned, if he is able to give it, or else the consent of the guardian or spouse to be obtained before the operation is performed.

In Denmark the law provides for sterilisation of a feeble-minded person if he or his guardian applies for it. The law also provides for the sterilisation of a person who repeatedly commits sexual crimes. In every case

sterilisation must be sanctioned both by the Minister of Health and the Minister of Justice.

In Norway the law provides for sterilisation of the feeble-minded, provided an application is made to and sanctioned by the Medical Director.

In Finland the law provides for the sterilisation of persons likely to give rise to defective offspring. It is, however, necessary to obtain the consent of the person concerned and of the Medical Council. The law also provides for sterilisation of persons committing sexual crimes due to some physical abnormalities.

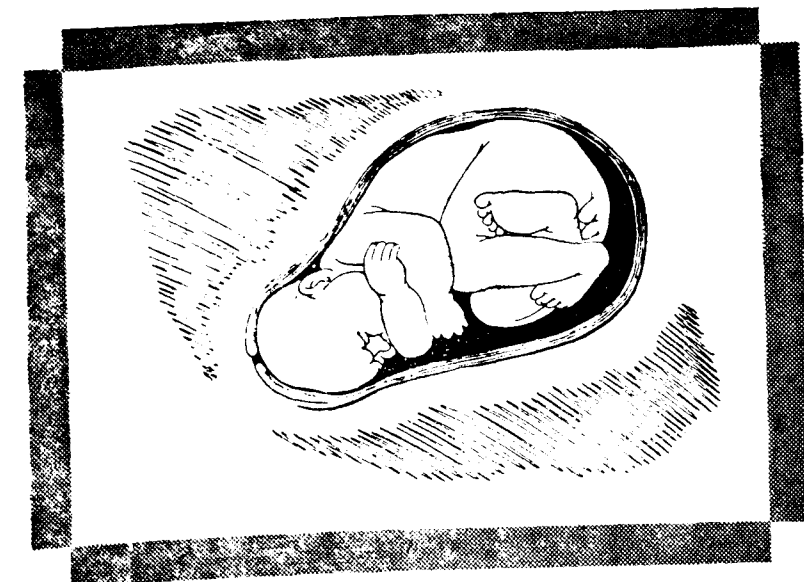
The Swedish law provides for sterilisation with the consent of the person, if he is capable of giving it, and for the operation to be done without the consent in those incompetent to give it. In every case, however, the consent of the Medical Council has to be obtained, except when the operation has to be done on urgent medical grounds which seriously endanger life and health.

In Germany the law provides for sterilisation in the following hereditary diseases:—(1) Inborn mental deficiency; (2) Schizo-phrenia; (3) maniac-depressive insanity; (4) hereditary epilepsy; (5) hereditary chorea; (6) hereditary blindness; (7) hereditary deafness; and (8) severe hereditary physical abnormality. In addition, persons suffering from severe alcoholism may be sterilised. The person concerned, or his guardian, has to apply for the operation; the application which should be accompanied by a declaration by a medical man belonging to the panel approved by the State, is considered by the Local Eugenic Board consisting of medical and legal members. The Eugenic Board has to give its decision in writing and there is provision for appeal to the higher court against a decision of the Eugenic Board.

Sterilisation in leprosy.—*The practice of sterilisation in leprosy:*—Sterilisation has been advocated and practised in cases of human leprosy in some countries, especially Japan.

Araujo De Souza (1929) writing about the separation of sexes in the National Leprosarium, Tokyo, states that the co-habitation of married lepers is allowed, and that the unmarried adult lepers are separated although the separation is not rigorous, but to avoid procreation every adult leper is sterilised by vasectomy. Hayashi (1933) says that the patients are not forced to undergo the operation of vasectomy but they voluntarily apply for the operation. Mitsuda (1937) on the basis of his 20 years' experience of vasectomy in lepers states that vasectomy in lepers is indicated as a preventive method, and that it has no influence on sex desire of the patients, while it prevents pregnancy which leads to progression of the disease. Kamikava (1939) writing on his experience in vasectomy in cases of leprosy concludes that the simple operation performed for the purpose of birth control has no influence on the sex desire. Fujita (1939) states that between 1915 and 1939 the operation of vasectomy was done on 385 cases in the National Leprosarium, Tokyo, that the measure has proved effective in preventing conception, but that sterilisation does not influence the disease.

Fernandez (1934) advocated the sterilisation of patients in leprosy institutions in Argentina. He considers that marriage cannot be avoided in the isolation colonies, and that contraceptive methods, including the sterilisation of cases, should be made known to the patients beforehand.



ADDED IRON and VITAMIN B₁
WITH CALCIUM and VITAMIN D
during PREGNANCY and LACTATION

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Wilson (1935 and 1936) reports on the successful application of the operation to a number of patients in a leper colony in Korea. He found that the strict segregation of sexes in the leprosy institutions was difficult or impossible with the result that many illegitimate children were born who were liable to be infected. Moreover, many patients left the institutions because of the restrictions on married life, lived in camps and produced many children, a large number of whom got infected. He, therefore, started an experiment by allowing marriage in the institutions under controlled conditions. A group of 11 couples, in whom the disease was arrested, was carefully selected and these persons were allowed to marry on the condition that the male partner submitted to vasectomy. The couples were allowed to adopt a leper child from the colony. They were lodged in a separate section of the colony, and were made as self-supporting as possible. In 1936 Wilson reported on the successful working of the experiment for three years. Amongst the group of 11 couples who were allowed to marry after vasectomy of the male partner, no children were born, and there were no relapses of the disease. In another group of 17 couples who married without any previous vasectomy of the male partner, 9 couples have had babies, and in 4 of the women concerned the disease had relapsed on account of the strain of pregnancy and lactation.

Rogers and Muir (1940) state that owing to the difficulties in backward tropical countries in the separation of infants from their leper parents early enough to prevent the possibility of their infection, the most effective method of preventing married patients begetting children is by sterilisation of the male partner by vasectomy.

Speaking of the backward tropical countries where leprosy is common, Rogers (1941) emphasises the difficulty of preventing married life in leper villages and colonies, and of removing the children from infectious patients at or soon after birth. He, therefore, strongly advocates voluntary sterilisation by vasectomy on the lines worked out by Wilson in Korea.

Grounds for sterilisation of cases of leprosy:—We have stated that, in general, the grounds for sterilisation may be eugenic, medical or social. Let us now see if sterilisation in cases of leprosy can be justified on any of these grounds, or some other ground.

It is now generally recognised that leprosy is not a hereditary disease, and that it is an infective disease caused by *Mycobacterium leprae*. It is true that there are inherent individual differences in susceptibility to leprosy: after exposure some persons get it more easily than others. It is possible that this difference in susceptibility runs in families, members of certain families being more susceptible than members of other families. However, the existence of the familial differences in susceptibility, and the role these differences play in the transmission of the disease, are still disputed matters. The sterilisation of lepers cannot therefore be justified on eugenic grounds.

The strain of pregnancy and lactation is known to influence unfavourably the course of the disease, and to bring about relapses in arrested cases of leprosy. There is therefore some justification for the sterilisation of cases of leprosy on medical grounds.

In several instances sterilisation of cases of leprosy can be justified on social and economic grounds, where the parents are not in a position to take care of the children they produce.

The most important ground for sterilisation in cases of leprosy, however, is the prevention of spread of the disease. It is now generally recognised that children of infective leprosy parents, if not removed from them soon after birth, are exposed to great danger, and a large percentage of them (up to 50% or more) develop the disease later. These children of leprosy parents create a real problem. The solution of this problem has been attempted in two directions; firstly by separating these children from their infective parents as soon after birth as possible, and secondly by discouraging and preventing the birth of children to leprosy parents.

Separation of young children from infective parents is beset with many practical difficulties. The danger to the child increases with the increase in the length of exposure; if removed at the age of one year about 25 per cent of the surviving children have been reported to have later developed leprosy; this percentage increases with the increase in length of time that the children are allowed to remain with their parents. The ideal method would, therefore, be to separate the children at birth, or as soon after as possible, in any case not beyond six months after birth. The separation of these children necessitates special arrangements for feeding and looking after the infants, and later special homes for them when they grow up.

The prevention of production of children by leprosy patients has been attempted in two ways. Firstly, by disallowing and discouraging marriages between patients, as is done at present in most institutions in India, and, secondly, by allowing marriages after the male partner has been sterilised by vasectomy, as is the custom in leprosy institutions in Japan.

Disallowing married life in leprosy institutions has much to be said for it, although it is not always possible to enforce strict separation of sexes. This often leads to illegal intercourse and birth of illegitimate children. Moreover, patients often leave the institutions where married life is not allowed and go to other institutions where such facilities exist or go and live in camps and bustees, which become a breeding place for leprosy, as children produced in these bustees are exposed to intimate contact not only with their parents but also with other infective inmates. Many of the leper beggars found in big cities had been inmates of leper institutions, and have absconded because of lack of liberty and married life.

Outside the institution the separation of sexes is much more difficult than in the institutions. It needs an exceptionally strong will-power to practise abstinence for years together, or may be for the whole of the remaining life.

Apart from the difficulties of maintaining it, strict and compulsory separation of sexes may not be quite justifiable if it be possible to allow married life (to those who desire it) without the production of children. Isolation in leprosy has to be maintained for long, may be for life time. Patients of leprosy are human beings and share with them their weaknesses and desires. It would certainly lighten the burden of many patients and make their lives happier and isolation more complete, if they could be allowed to lead married life provided steps are taken to see that no children are born.

The experience in Japan and Korea shows that it is possible to allow married life without the production of children. If marriage is allowed after the male partner is sterilised by vasectomy, the couples enjoy married life without the risk of producing children. The operation of vasectomy

is a very simple operation, and it could be available to patients both in institutions and in their homes.

Types of cases suitable for sterilisation:—It appears that sterilisation of cases of leprosy has a place amongst preventive measures against the spread of the disease. On this ground, however, sterilisation of only infective cases can be justified. It is not justifiable in bacteriologically negative "neural" cases which are not infective. In the bacteriologically positive neural cases the bacilli are usually present only for short periods, and therefore sterilisation is not called for. It is the lepromatous case that usually remains infective for a long time, and which specially calls for sterilisation. (It is now becoming apparent that in a small number of the lepromatous type the disease is abortive, and in such cases there should be no necessity for sterilisation.)

If salpingectomy in females was as easy as vasectomy in males it would be more logical to sterilise the female patients. However, since salpingectomy is a much more serious operation than vasectomy, the sterilisation of the male partner is commonly practised. This is no doubt open to some criticism. Since it may sometimes necessitate the sterilisation of the male partner although not suffering from leprosy, and may sometimes result in the production of children through intercourse between female patients and non-vasectomised males.

Legal measures:—In most countries where sterilisation is practised there exists legal sanction for the operation. If sterilisation of cases of leprosy is advocated in India there is much to be said for having legal enactment for this purpose. The law should legalise the practice and should indicate the type of cases in which it is necessary. The law should not however provide for compulsion except in very special circumstances, which should be carefully defined. Primarily it should be a voluntary measure, the consent of the patient or his guardian being made essential. Persuasion and not compulsion should be relied upon to make the patients agree; compulsion will make any such measure unpopular and will lead to concealment of cases which will defeat its purpose. Moreover, the law should have adequate safeguards so that the operation could be done in only bonafide cases.

Indication for vasectomy:—From the above discussion it will be clear that vasectomy is not advocated as a routine measure for every male patient of leprosy. It should be applied to suitable cases, primarily on voluntary basis. On the ground of prevention of spread of leprosy the operation will be justifiable when either or both the partners are infectious. On medical and social grounds, however, the operation may be indicated in some non-infective cases also, and even in some non-cases for the sake of their wives suffering from leprosy. The situation calling for the operation of vasectomy may arise in patients both in leprosy institutions and in the patients' homes. The following are some situations which may call for this operation:

1. *In leprosy institution*:—(a) If both husband and wife are patients of leprosy (one or both of the infectious type), get admitted into an institution, and desire to continue married life.

(b) Suitable patients in institutions desiring to get the benefit of married life. Under the category of suitable cases may be included, firstly, chronic patients who are likely to stay in the institution for a very long time; secondly, patients in whom the disease is arrested and who after

marriage can settle in a separate section of the institution which may become partly self-supporting.

(c) Male patients who although given the choice of vasectomy and marriage refuse to take advantage of it, but later commit sexual crimes; such patients should be sterilised irrespective of the type of the disease, and in them the measure should be made compulsory, possibly the operation of castration being preferred.

2. *In the patient's home*:—(a) If either one or both husband and wife are infective cases of leprosy, cannot or will not get admission into an institution, and want to live together.

(b) A husband, although not suffering from the neural type of the disease, may have to be sterilised for the sake of his wife suffering from the neural type to prevent the strain of pregnancy and lactation producing an exacerbation of the disease. This will be specially indicated if the couple has already had a few children.

(c) Patients of leprosy living in leper camps and bustees where they usually lead married life. In such camps, all the male patients irrespective of the type of the disease should be sterilised, since in these places even the children born to non-infectious cases are exposed to infection from other opposition infective inmates.

Some objections to the use of vasectomy.—It may be said that at present the public opinion will not favour the measure of sterilisation. This is, however, no reason for keeping silent since, it is only as a result of free discussion and proper guidance that the right attitude of the public in any matter can be created. The contraceptive methods which are so popular and so extensively used now-a-days had to face a great deal of public opposition when they were first introduced.

Exception may be taken to this procedure on religious grounds. In India the Mission to Lepers is the largest single anti-leprosy body maintaining and controlling a large majority of the leprosy institutions in the country. This body, because of its religious views, will not look with favour on any such measure. However, it is interesting to note that sterilisation on eugenic grounds of feeble-minded and insane persons has been most popular in a Catholic country—the State of California.

It may be said that to promote or to encourage sterilisation would encourage promiscuous sexual intercourse. However, the experience in the countries where sterilisation has been practised now for some years does not justify this fear.

It may be argued that if vasectomy becomes popular, because of its cheapness and simplicity, it may divert the attention of the public and health authorities from the most important anti-leprosy measure, the isolation of infective cases of leprosy. However, if it is made clear from the beginning that sterilisation is not an alternative to isolation of infective cases but that it is an additional useful measure, there appears to be no danger that the isolation of infective cases may be neglected. In countries where sterilisation is done on feeble-minded and insane persons, the practice has not led to the neglect of proper institutional care of the patients. As a matter of fact, these countries have developed well-equipped institutions of a very high standard for the benefit of such patients, the sterilisation being done when the patients are about to leave the institution.

Yet another objection may be that the fear of sterilisation would lead to concealment of the disease and will thus defeat the very object for which it is intended. However, if the measure is not made a compulsory one, there does not appear to be any grounds for this fear.

Conclusion.—It can therefore be concluded that the objections against the practice of vasectomy are not very cogent and that vasectomy of male patients of leprosy has a definite place in any scheme for prevention of leprosy. On these grounds the operation can be justified when either or both the parties are infective cases of leprosy. It should, however, be clearly understood that this measure, or as a matter of fact any other such measure, cannot be considered as an alternative to isolation of infective cases, which is the only sure method of control of the disease. The sterilisation can be considered as a help in making the isolation more popular and more effective, and in solving some of the problems that arise out of isolation of cases. To advocate the use of sterilisation in the control of the disease should, therefore, not be understood to suggest any relaxation in the efforts to accelerate the measure to provide more and more accommodation for isolation of infective cases till there is provision for almost all the infective cases in the country.

Summary.—1. The question of male patients by vasectomy is considered, first from a general point of view, and then from the point of view of its value in the control of leprosy.

2. Sterilisation of male patients of leprosy by vasectomy is considered to have a definite place in any scheme for prevention of spread of leprosy. It should, however, be clearly understood that the adoption of this measure should in no way minimise the importance of isolation of infective cases which is the only sure method for the control of the disease. Sterilisation should be considered mainly as a help in solving some of the problems created by the isolation.

3. As a preventive measure it is indicated when one or both of the partners are cases of leprosy of the infective type, or living conditions of the patients are such that children born of even non-infective cases are likely to be exposed to infection from other infective cases.

4. On medical and social grounds it may be indicated in some non-infective cases of leprosy, or in non-leprosy male partners when the wife is suffering from leprosy.

5. There is a need for a suitable legal measure legalising the operation under proper safeguards. The operation should primarily be voluntary, but provision for compulsion may have to be included to meet certain situation.

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Ante-natal Screening of Iso-immunization Cases*

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SINCE the discovery of the Rh factor by LANDSTEINER and WIENER (1940) enormous advances in knowledge have been made and the clinical significance of this antigen has been widely recognised. In England and America Rh in compatibility is by far the most important genetic cause of foetal death and it far outweighs congenital syphilis as a factor in neo-natal mortality. In consequence it has now become the routine for every pregnant woman to be Rh tested well before the time of confinement and adequate steps to be taken for the treatment of the affected infant or of the mother should she need a blood transfusion.

In India the clinical importance of the Rh factor has not yet been fully recognised. Several factors appear to be responsible for the hold up of important research on the Rh factor. On the clinical side, very often the disease is not suspected partly because it occurs rather infrequently and partly because of its superficial resemblance to other clinical conditions. As PARSONS (1947) pointed out "syphilis and sepsis may present every clinical and hæmatological sign of icterus gravis and even indeed kernicterus." It is sometimes difficult to distinguish mild cases of erythroblastosis foetalis from physiological jaundice which runs a benign course and calls for no special treatment. Further the hæmatological picture of erythroblastosis occurs in other conditions than hæmolytic disease of the newborn. For instance, it is present in premature babies and in the oversized babies of diabetic mothers.

On the laboratory side, the scarcity of anti-Rh serum and lack of trained personnel has made the investigation of suspected cases almost impossible in most places. From his wide tour of the country the writer can state that such laboratory facilities exist in only one or two centres in India. Anti-rhesus serum is difficult to prepare in experimental animals. Even if successful, the serum from animals has been shown to be unreliable, specially when testing the cells of the newborn. The same objection holds good for most of the commercial anti-Rh serum. The high cost of anti-Rh serum of human origin and the present import restrictions have prevented interested workers from making much progress. It is high time that the major laboratories in India had trained personnel on their staff and were equipped with the necessary anti-sera.

It has, however, to be remembered that potent anti-sera can be obtained only from iso-immunized patients and this can be made possible only through the co-operation of clinicians. Physicians should encourage all patients suspected of iso-immunization to subject themselves to routine investigation and to periodic blood lettings if their blood is proved to contain antibodies. By this means serum sufficient for the investigation of all problem cases and eventually for routine Rh testing of all pregnant women will become available.

It is essential for the clinicians to know the type of cases in which iso-immunization may be suspected. Fortunately the obstetric history of

mothers with erythroblastic children is generally characteristic and iso-immunization may be suspected from the history alone. In most cases the history conforms to the following pattern: the first child is generally not affected and remains alive and well. The second or third child, sometimes a later child, is affected by erythroblastosis foetalis and may exhibit one or other of the manifestations, viz., hydrops foetalis (rarest and most dangerous), congenital anæmia (least dangerous) or congenital icterus gravis which is the commonest manifestation and carries a mortality of about 50 per cent in untreated cases. The infant may die in utero and be delivered as a stillbirth. This is the commonest course in hydropic infants. Or the hydropic infant may be born alive and succumb soon after birth. In other cases the child is born naturally at full term and appears to be perfectly normal. Within a few hours, and almost certainly within the first day, jaundice comes on and deepens rapidly. The child becomes drowsy, subcutaneous hæmorrhages may occur, convulsions or collapse develop. The jaundice may be associated with anæmia. When the jaundice first comes on it may be difficult to differentiate it from physiological jaundice. The points to remember are that in erythroblastosis the jaundice comes on earlier, increases more rapidly, reaches a greater degree of intensity and may be associated with anæmia.

Once a mother has been sensitized, the chances of her begetting a normal infant become remote with each pregnancy. The opposite is the case with syphilis. There is, however, one exception to this rule, and that is when the father's blood contains dissimilar Rh-genes (Rhrh) in which case the infant has an equal chance of being Rh positive or Rh negative. In such families some infants may be affected while others may escape.

In order to spot suspicious cases of iso-immunization the following questionnaire has been drawn up for routine use in the antenatal department of women's hospitals.

Antenatal questionnaire:—

- (1) Have there been any stillbirths or unaccountable neo-natal deaths?
- (2) Has any child been born with universal œdema (hydrops)?
- (3) Has any child had neo-natal jaundice? Was it fatal?
- (4) Has any child had neo-natal anæmia? Was it fatal?
- (5) Has any child had congenital malformation?
- (6) Did any child have greenish discolouration of the teeth?
- (7) Is any surviving child suffering from disorders of movement or mental retardation?
- (8) Has the mother had any blood transfusions? If so, when? Were they followed by any reaction?
- (9) Were the babies breastfed or artificially fed?

It is suggested that mothers giving a suggestive history such as, stillbirths, hydrops, unaccountable neo-natal deaths, neo-natal jaundice etc. should be taken up for special investigation.

The rationale of the first four questions will be obvious. As regards malformations, Wiener's (1946) study of 19 families with malformations has revealed that these frequently result from iso-sensitization of the mother to agglutinogens in the foetus's blood. According to him it is due

* Specially contributed to THE ANTISEPTIC

to the blocking of the terminal circulation by agglutination thrombi and the resulting arrest of growth causes the anatomical malformations. His series include abnormalities such as, cleft palate and harelip, spina bifida and hydrocephalus, diaphragmatic hernia, anencephaly, absence of the kidneys and hypospadias.

The staining of the temporary teeth, particularly the incisors, is one of the rare sequelae of congenital icterus gravis.

Disorders of movement and mental retardation are also sequelae of icterus gravis. The jaundiced infant exhibits lethargy, drowsiness or restlessness, excessive crying, difficulty in feeding, rigidity or spasticity, convulsive movements and sometimes opisthotonos. This is generally a fatal complication and is termed kernicterus. The children that may survive show evidence some months or years after of nervous sequelae consisting of retarded motor development, choreo-athetosis, ataxia, spasticity or hypotonia, mental retardation, emotional instability etc. The symptoms vary with the nerve circuit affected. The mental retardation is the commonest manifestation of extensive cranial involvement and may be either slight or extremely evident.

The history of previous blood transfusions, and particularly the reactions to them may suggest previous sensitization. It is in this type of cases that one meets with the firstborn infants affected by erythroblastosis. Indeed as LEVINE (1945) pointed out, some of the most severe cases ever met with are among this group as they represent a double process of iso-immunization, *viz.*, by means of blood transfusion and *via* the placenta by the foetal blood. In this connection it may be pointed out that even the unintentional injection of the father's blood to the newborn has been known to sensitize the child.

It has been shown that the breast milk from the sensitized mother contains Rh antibodies, the colostrum containing them in a higher concentration. It is assumed that these antibodies may be absorbed from the alimentary canal of the infant and destroy the red cells. This is the rationale of weaning erythroblastic infants. Circumstantial evidence to this effect has been adduced by several clinicians of infants who continued to be anemic despite blood transfusions while they were breastfed, but who showed permanent recovery after weaning and a single blood transfusion.

The writer is aware that the above scheme is defective in one respect as it does not take care of the primiparous woman whose child may be affected by erythroblastosis. It is estimated that in the first born only one child in eight is thus affected. In many of these cases there is usually a history of previous blood transfusion. Therefore if every primipara with such a history is included for investigation, the number of cases that will escape notice may be minimized. We shall still be left with a very small group of women in whom heterozygosity of ABO blood group is the cause of iso-sensitization. The percentage of such cases is, however, very small.

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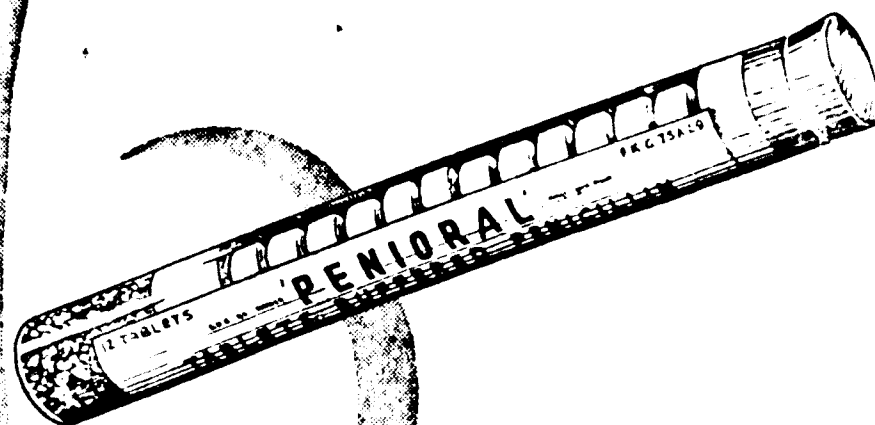
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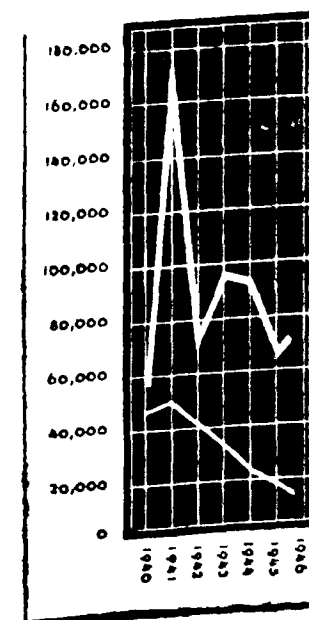
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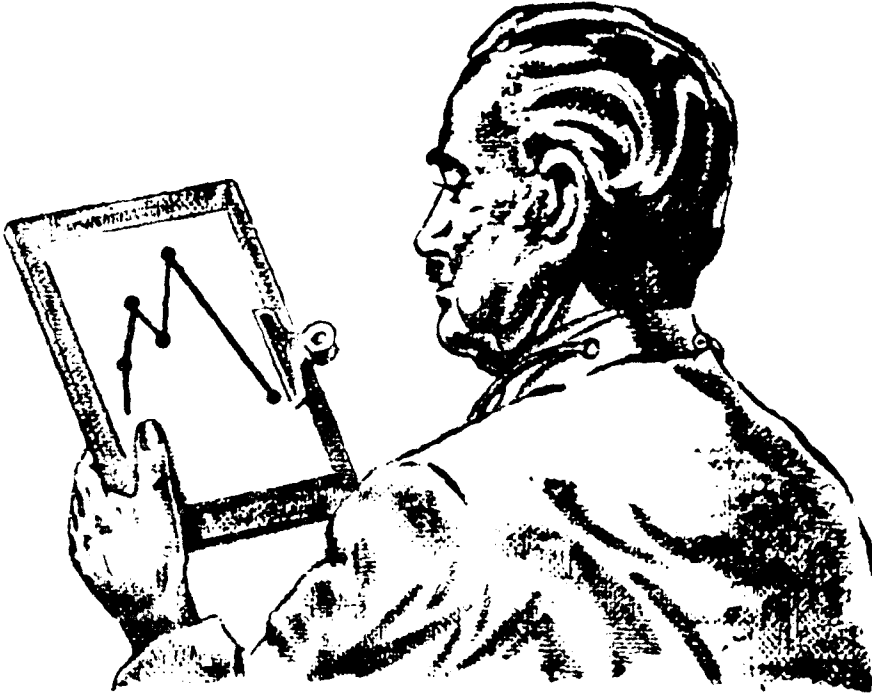
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Outlines of Medical Treatment in General Practice with Recent Advances *

TARACHAND R. LALA, L.C.P. & S. (Bom.),
Shikarpur, Sind.

Hyperpiesis (High blood pressure).—The term hyperpiesis denotes the cases of simple high tension without signs of renal or arterial diseases. But it is also loosely applied for hypertension arising from various other causes.

Causes of high blood pressure:—According to the Goldblatt experiment a substance called hypotension is in the normal kidney which acts as an antipressor substance. Due to renal ischaemia, kidney releases oppressor substance renin which when activated becomes angiotonin which has been separated and crystallised. Thus renal diseases like Bright's disease, chronic interstitial nephritis, hydronephrosis, cause high blood pressure. This is often called renal hypertension.

2. **Heridity:**—It occurs in families and a family history could be traced in about a third of the cases. Their blood vessels have narrow lumen which leads to increased peripheral resistance and the quality of the elastic tissue in the walls of the vessels is poor which degenerates early.

3. **Auto-intoxication:**—Septic focus in the teeth, tonsils, nasal sinus, gall bladder, appendix, colon and prostate etc. may be associated with high blood pressure.

4. **Chemical intoxication:**—Due to faulty protien metabolism amines like Indol and Skatol are liberated which stimulate the endocrines and irritate the vasomotor centre resulting in rise of blood pressure.

5. **Endocrines:**—Hypothyroidism tends to raise blood pressure. In later stages of hyperthyroidism when the heart hypertrophies with the secondary renal changes, a rise in blood pressure is noted. Early cases of thyrotoxicosis do not show hypertension. Lesions of the medullary and cortical portions of the suprarenal glands result in raised pressure. Ovarian and testicular hormone deficiencies are also responsible for hypertension. Similarly want of anterior pituitary hormone leads to high blood pressure.

6. **Psychical influences:**—Prolonged mental strain, worries, emotions, shocks etc. predispose and cause hyperpiesis.

7. **Overeating, overindulgence in the use of alcohol and tobacco etc.** are said to cause hypertension.

8. According to Dr. Bishop, allergy causes cardio-arteriosclerosis and nephrosclerosis and thus results in hypertension. The arteriosclerosis is generally of a diffuse nature. There is a uniform hypertrophy in the whole length of the middle coat of an artery. Such an artery still retains its power of contraction and relaxation. But when contracted it gets further thickened and its lumen gets proportionately diminished. This vicious circle leads to hypertonus of the arteries and ends in hypertension.

* Specially contributed to THE ANTISEPTIC.

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Exaggerated tonicity in the capillaries and consequent high blood pressure is also produced by undue strains on the adrenal in function called upon by the exigencies of modern life in the non-arterio sclerotics.

Normal blood pressure.—*Systolic pressure*:—At 20 years, it is 120 m.m. Hg; upto 60, $120 + \frac{1}{2}$ of the age; at 60, 135; upto 80 add one m.m. Hg; after 80 tends to fall.

According to others, systolic pressure should not exceed a value in m.m. of $100 +$ age of the individual in years.

Diastolic:—At 20, it is 80 m.m. Hg. For each five years above 20 upto 60 years add one m.m. Hg; for each five years above sixty upto 80 years of age add 2 m.m. Hg; after eighty it tends to fall.

According to others the diastolic pressure slowly rises from 70—75 m.m. at 20 to a value which should not exceed 100 m.m. Hg. in old age.

The systolic pressure is much more variable than the diastolic specially from psychological causes.

Pulse pressure:—The difference in m.m. of Hg. between the systolic and diastolic pressures is called the pulse pressure. Thus 120 (systolic) m.m. Hg. — 80 (Diastolic) m.m. Hg. = 40 pulse pressure. Pulse pressure should not be above 50, or below 25, and if it continues, it is indicative of inefficient cardiac work. The systolic, diastolic and pulse pressure always maintain the ratio of 3: 2: 1 (120: 80: 40) in health. Or, in other words, P.P. is about $\frac{1}{2}$ the diastolic and $\frac{1}{3}$ of the systolic pressure.

According to some writers the term hypertension should be restricted to diastolic hypertension since the important factor is the state of the resistance of the arterioles. During the stage of the cardiac compensation the diastolic pressure also rises to maintain the normal ratio, but during the stage of cardiac failure, the diastolic falls and the normal ratio is upset.

It should be remembered that conditions like complete heart block and arteriosclerosis often produce a rise in the systolic pressure with a normal or low diastolic pressure.

Depending upon the readings of the diastolic pressure various types of essential hypertension have been described.

1. The hypertension is mild if the diastolic pressure is under 115 m.m. Hg; there is no demonstrable impairment of functions of heart, kidney, or brain; mild degree of vasoconstriction and arterio sclerosis of the retinal arteries present. Prognosis is usually good.

2. In the *severe benign type*:—The diastolic pressure is above 115 m.m. Hg; there is impairment of functions of heart, kidney and brain; hæmorrhages and exudates occur in the retinal vessels. Prognosis is usually bad.

3. In the *malignant type*:—The diastolic pressure is usually above 130 m.m. Hg; frequently above 150 m.m. Hg; there is marked impairment of functions of heart, kidney and brain; retinal changes are also exaggerated. Prognosis—Length of life usually less than two years.

Estimation of B. P.:—Among the various methods used for estimation of B. P. the auditory is mostly in vogue and the instrument in use is either Baumanometer or Tykos Sphygmomanometer. The sounds could be analysed into five phases: (1) After air has been pumped into, obliterate all sounds and when pressure is released, the first sharp click marks the beginning of the first phase and is the auditory index of systolic pressure; (2) is a zone of murmurs due to eddies in the blood stream; (3) is like a throbbing of a drum or the beating of a gong; (4) the change from loud thuds to dull sounds which is the beginning of the fourth phase and is the auditory index of the diastolic pressure. It is very important to emphasize at this juncture that it is the appearance of the dull sounds and not the disappearance of all sound, that indicates the diastolic pressure. If this fact is not borne in mind and the diastolic pressure is read as the disappearance of all sound, we have the fallacious reading of even zero diastolic in some cases—which could never exist in life, since the diastolic pressure is a constant load on the heart; and (5) silence ensuing when the artery is relieved from compression of the armlet (ANTISEPTIC, 1941, p. 805)

Symptoms.—There may be no symptoms and hypertension recognised casually on routine examination, or the patient may complain of any of the following symptoms: change in temperament, irritability, emotional outburst, impaired memory, fullness and throbbing in the head, headache both frontal and occipital, giddiness, insomnia, palpitation, flushing flashes of light before the eyes, transient blindness, tinnitus and paresis of limbs. Epistaxis is common and hæmoptysis rare. The heart in high blood pressure: Two important points have to be considered: (1) the size of the heart; and (2) the pressure or absence of a mitral systolic murmur. A high pressure reading with a heart that is not enlarged suggests that the high blood pressure is not constant but intermittent. An apical systolic murmur means not valvular disease but dilatation of the left ventricle at the auriculoventricular ring. It is an indication of a stage in the heart's downward progress, though it may be present for many years. One of the first auscultatory signs of high blood pressure is the accentuated second sound at the aortic area. Gallop rhythm again may be detected in the course of hyperpiesis. It is caused often by reduplication sometimes of the first, sometimes of the second sound, if it occurs with a high pulse rate, it suggests a failing myocardium and a fatal issue. Pulses alterans is an important sign of muscular failure of the left ventricle.

In determining the state of arteries, the retinal arteries give a better estimate than the brachial or radial, and are more likely to indicate the condition of the cerebral arteries. The most important points are a silver wire appearance and a distortion of the vein where an artery crosses it.

Sequelæ of hypertension.—The complications of high blood pressure can be classified under three main heads: (1) Cerebral; (2) cardiac; and (3) renal.

Under the cerebral complications we should note the following: Hypertensive cerebral attack with œdema or without œdema: hypertensive cerebral attack sets in with convulsions, coma and paralysis—usually hemiplegic. Cerebral œdema is diagnosed from lumbar puncture and the œdema of the optic discs.

In the former, the cerebro-spinal fluid is under pressure. Hemiplegia tends to be permanent and the prognosis is bad.

An hypertensive attack without œdema is explained by the fact that arterial spasm or angio-spasm occurs in cases of hyperpiesia. And when the spasm passes off, the patient is relieved of the transient paralysis.

2. *Cerebral hæmorrhage*:—Majority of cases of cerebral hæmorrhage have 145–190 m.m. Hg. systolic pressure. Due to raised intracranial pressure, the intra-cerebral artery gives way. The person becomes unconscious and passes into deep coma and death. Cerebro-spinal fluid is blood-stained and is diagnostic of cerebral hæmorrhage.

3. *Cerebral thrombosis*:—All those cases that have recovered from an apoplectic attack are the cases of cerebral thrombosis. Paræsthesia, tingling, numbness, pain, blindness, disorientation, poor memory, lack of intelligence, monoplegia, facial paralysis, paralysis localised to lips, cheek, tongue may result from hypertension. The duration of these may be few days to few weeks or the conditions may become permanent.

Cardiac complications:—The commonest of the serious cardiac complications of hypertension is the cardiac failure. The first evidence of hypertension is often an attack of pulmonary œdema and cardiac asthma.

The involvement of the kidney is shown by the presence of albumin in urine. A few granular casts, a slight trace of albumin associated with a fairly high specific gravity do not mean anything very bad but on the other hand same casts and albumin associated with loss of specific gravity mean advanced kidney disease.

In a large number of cases breathlessness is a marked feature. This is due to acidosis arising from involvement of the kidney. Heart failure is also responsible for it to a certain extent. The patients though dyspnoic, can lie flat, their dyspnoea is not continuous, is somewhat of the air hunger type and often periodic. There is persistent diastolic pressure of 130 m.m. Hg. Retina shows cotton wool patches. They frequently have a low temperature which may vary between 99°F–101°F, and sometimes loose stools with mucus and blood, even melæna. Tuberculosis and dysentery are suspected on some occasions.

Hyperpiesia in women:—While the ground traversed so far is common to both sexes, yet there is a special variation in the arterial pressure at or about the menopause in some women. A benign form of high blood pressure occurs in multiparæ inclined to obesity and constipation, aggravated by worry and anxiety. In these cases, the systolic pressure abides at a moderate and harmless level of 150 to 160 m.m. Hg. with only a slight elevation in the diastolic pressure and the arteries are fairly soft tending to a favourable prognosis. Endocrine disturbance viz., a deficiency of the ovarian and pituitary hormones and hyperfunction of the adrenals is said to be the cause. A substance has been isolated from the ovary which lowers arterial pressure. It is probable that during the term of ovarian activity, this substance acts as a depressor and at menopause a deficiency of this results and the pressure rises till the body is able to re-adjust its metabolism to the altered condition viz., in about two years when this climacteric hyperpiesia generally passes off.

Treatment.—Lord Horder rightly points out: "To discover hypertension at the earliest possible moment was, of course, of great service to the patient. It might not be possible to change the temperament, but the patient's

outlook could be modified in such a way as to diminish stresses and strains, and occasionally a man might be made a philosopher before some crippling catastrophe thrusts philosophy upon him."

One should also bear in mind that lowering of blood pressure by powerful medicines is in itself likely to cause apoplexy or hemiplegia. In the *Medical Annual*, 1934, a case is recorded whose usual blood pressure was 245 m.m. Hg. His pressure came down to 170 during an apoplectic stroke and recovered when by treatment the pressure was raised to 235 m.m. Hg. Such lowering of blood pressure may occur of its own accord. Having noted these important points treat the patient on the following lines:

1. *Rest*:—It should be both mental and physical. Eight hours of rest at least at night and one to two hours after midday meals. Emotions, anxiety etc. must be asked to be avoided. This is common in speculators.

2. *Obesity*:—Those who are obese and accustomed to overeat must be asked to reduce the quantity of their food. Protein and salt intake should be restricted. This is specially needed when the kidney is involved. Meat extracts, liver, kidney, coffee, sauces and chutney may also be discarded from the menu of the daily diet.

3. *Drugs*:—In a symptomatic patient, it is unwise to prescribe any drug. They must not be told high blood pressure readings or they will think of their B.P. day and night and become neurotic. The word blood pressure is horror to some and many lose the peace of mind. It is a malpractice to strike terror in the minds of patients; and the knowledge that they have high blood pressure causes great anxiety to them.

There is no specific drug for hyperpiesia, and therefore no great reliance should be placed on any one of them. It is better to use the drugs sparingly. A selection may be made from any one of the following according to the needs of the patient.

(1) *Iodides*:—Iodine and Iodides are often used but the actual reason is not known. According to Chandra 'Iodides are the best arterial sedatives, they render the blood more fluid, act favourably on nervous system, lower blood pressure and allow nature to do its work.' Iodides should be given for long periods interrupted every few weeks, always after meals, well diluted best in combination with Bicarbonate of Soda or Potash.

Sodium or Potas. Iodide or Tr. Iodine Rect. are the drugs to be used, Lipo Iodine (Ciba) contains 41% Iodine and may be used in place of Potas. Iodide.

(2) *Purgatives* lower arterial tension. Therefore prescribe them in the following form:

R	Mag Sulph	...	3 i ss
	Sodi Sulph	...	3 i ss
	Aqua Rose	...	3 ii
	Aqua Chloroform	...	3 i
	Mft. for a dose. Sig: Early in the morning on an empty stomach.		

(3) *Sedatives*:—For insomnia, any of the following sedatives may be used:

Bromides, Chloral Hydrate, Luminal, Gardenal, Theogardenal (M & B), Theominal etc. Thus a useful prescription which contains all the three drugs is:—

℞ Ammonii Bromide	gr. xxx
Pot Iodide	gr. xii
Mag Sulph	℥ iii
Tr. Belladonna	℥ xii
Syp. Auranti	℥ ii
Aqua ad	℥ iii
℥ i. T.D.S.	

This is useful for restlessness, excitability, palpitation, flushing, tinnitus etc.

(4) *Nitrites*:—These act as vasodilators and are useful in those cases who complain of morning headache or the symptoms of hypertension prove troublesome. The effect is however temporary. Trinitrin (glycerine trinitrate) 1 gr—1½ gr; Sodi nitrite 1—2 gr; Erythral Tetra Nitrate in grain one dose may be used every six to twelve hours.

℞ Sodi Nitris	gr. xii	℞ Sodi Nitris	gr. i
Sodi Iodide	℥ ii	Sodi Hippuras	gr. ii
Aqua ad	℥ vi	Sodi Iodide	gr. v
Dose: A dessertspoonful in water 3 times a day.		Syp. Aromatic	℥ xx
		Aqua ad	℥ i
		One twice a day.	

(5) *Mistletoe*:—This vegetable product is praised by many physicians. Guipsine and Hypotensyl tablets contain this principle. Dose should be given according to the directions of the manufacturers.

(6) *Sodium Sulphocyanate*:—Dose two grains thrice daily after food for one week, subsequently twice a day for two weeks. Potassium thiocyanate: Dose two to three grains three times a day for one month. These appear to lower blood pressure but tend to cause symptoms of poisoning easily.

(7) *Rauwolfia Serpentina* (Himalayan Drug Co.):—This gives good results. (Dose one to two tablets three times a day. Relafen (B.C.P.) may be used.

(8) *Calcium Diuretin* (Dirocol Cipla), Iodo Calcium Diuretin (Rhodan Dirocol), Calcium Diuretin (Rodhan Dirocol): one tablet three times a day is worth trying when œdema or hydræmia is coupled with hypertension.

(9) *Choline group*:—Acetyl Choline and Doryl have been used with poor results. These drugs are also depressants of the heart.

(10) *Bismuth Subnitrate* gr. x T.D.S. is used for hypertension. This is useful when loose stools and dysenteric symptoms accompany hyperpiesis.

(11) *Liver extract and calcium salts* are advocated by some.

(12) *Venesection*:—This is a valuable procedure in severe cases associated with cardiac failure or extremely violent headache and hypertensive crises.

(13) *Autohaemotherapy*:—5 to 10 cc. of blood are removed from the vein of the patient's arm and immediately injected into the gluteal muscle. This is repeated once a week for six weeks and is found of use in severe headache and vomiting.

(14) Recently several articles have appeared on endocrine therapy in hyperpiesis and arteriosclerosis. Where other methods have failed a trial to testicular hormone proves highly beneficial. It is typically indicated in those patients in whom so-called male climacteric has set in, complete or partial impotency is complained of and there may be enlarged prostate. Symptoms of cardiac failure and anginal attacks show abatement under the influence of testicular hormone. Weight is reduced in obese persons. They feel what they have never felt before and improve in all respects.

According to Dr. H. Benjamin even hypertension with chronic interstitial nephritis has occasionally been reduced, but the present writer is of opinion that it does not give any result in such cases. A case of hypertension of renal origin was treated with Perandren (Ciba) 25 mg. twice a week for five weeks without any result. Therefore to achieve best results, this treatment should only be given to cases of pure hyperpiesis not depending upon renal lesion.

The writer has used Perandren (Ciba) 25 mgs. intramuscularly every week in few patients with excellent results. It was only after the tenth injection that the patients could definitely say that the drug was acting. Time is a great factor and the patient must have patience. The treatment is to be continued for several months. And once the patient has known the effect, he is likely to prolong the treatment. The only drawback is that it is a costly treatment and an average Indian who has already spent much upon his disease may find it difficult to continue the treatment. Therefore the financial position of the patient must be considered as each injection is likely to cost him at least seven to eight rupees. Several patients have come and gone and then complain of getting no relief when they have got only four or five injections.

Perandren (Ciba) is the preparation of Testosterone Propionate used by the writer. 25 mgs. are to be given intramuscularly twice a week. Perandren linguates are also available for oral use to supplement injections. Androstin (Ciba) contains total testicular extract but has now been replaced to a large extent by the pure synthetic male hormone Perandren.

Along with the above treatment, some writers use Gonadotropic hormone of the anterior pituitary viz., Preloban (Bayer not available at present) or Gonadotraphon (Paines and Byrne Ltd.), to stimulate testes. The effect is said to be more lasting.

15. *Thyroid extract* in small doses may be used for stout persons notably obese women at menopause. It is contraindicated in persons showing thyrotoxicosis in whom the drug of choice is Di-Iodo Tyrosine (Roche). Ovarian hormone viz. Stilboestrol Dipropionate or Estradiol Benzoate or Corpus luteum Extract viz. Lutoeyelin (Ciba) or Copolutin tablets (C.D.), or Placental Extract viz. Eumenin Complex (Glaxo) is to be prescribed at menopause according to the needs of the patient.

16. *Magsulph enema*:—Simple water enema at night followed by colonic injection of 4 ounces of 25% Magsulph solution next morning lowers the blood pressure by 10 to 20 m.m. of mercury. This should be repeated every five to seven days.

Treatment of hypertensive crises: (1) Rest; (2) Starvation; (3) Venesection; (4) Lumbar puncture; (5) Magsulph orally if the patient can

swallow; (6) Mistletoe preparation by mouth; (7) Intravenous injection of 40 c.c. of 30% Sodi Chloride solution; and (8) Magsulph enema: Two ounces in eight ounces of water. These methods have been suggested by various writers.

Lastly a word may be said on homœopathic and biochemic lines of treatment. Schussler's biochemic medicines are only twelve in number whereas Samuel Hahnemann's homœopathy has several remedies. Each system of medicine claims to cure chronic diseases. And those who practise them criticise the allopathic line of treatment because according to them the disease is suppressed by powerful medicines employed by allopaths. It is possible that they may be able to manage cases of hypertension more successfully as they claim to do. Their opinion should be invited and their remedies properly studied for their high claims. It is a wrong principle to laugh at other systems of medicine. On the contrary, it should be the aim of every physician to alleviate the suffering of his patients by whatever means. The only point of selection of the remedy should be some scientific trials behind it by those who have used them. And it is an attack of apoplexy where we are often helpless. Jahr, Bahr, Richard Hughes and other homœopaths promise good results if homœopathic medicines are administered in time which are easily given to even unconscious patients—because of the size of the globules which are allowed to dissolve on the tongue. The writer only intends to give the remedies used by homœopaths and reserves his opinion as he is not an expert at the use of these medicines. Those who have used them extensively may come forward as there are many eminent homœopaths at present.

1. Belladonna should be the first remedy according to Jahr.
2. Nux Vomica: If Belladonna fails and the corner of the mouth is drawn to left side.
3. Opium: If the patient is lying in a deep stupor with his mouth open and stertorous breathing.
4. Hyoscyamus: If there is involuntary evacuation from bowels and bladder.
5. Arnica: If Hyoscyamus fails.

Biochemic medicines are: Ferrum Phos. should be the first medicine. Kalimur to absorb away exudate.

The dose is to be given either in water or dry on tongue every fifteen minutes to half an hour in early stages. Later few doses will suffice. Besides these there are several remedies which require study for their proper administration.

Shikarpur, Sind.

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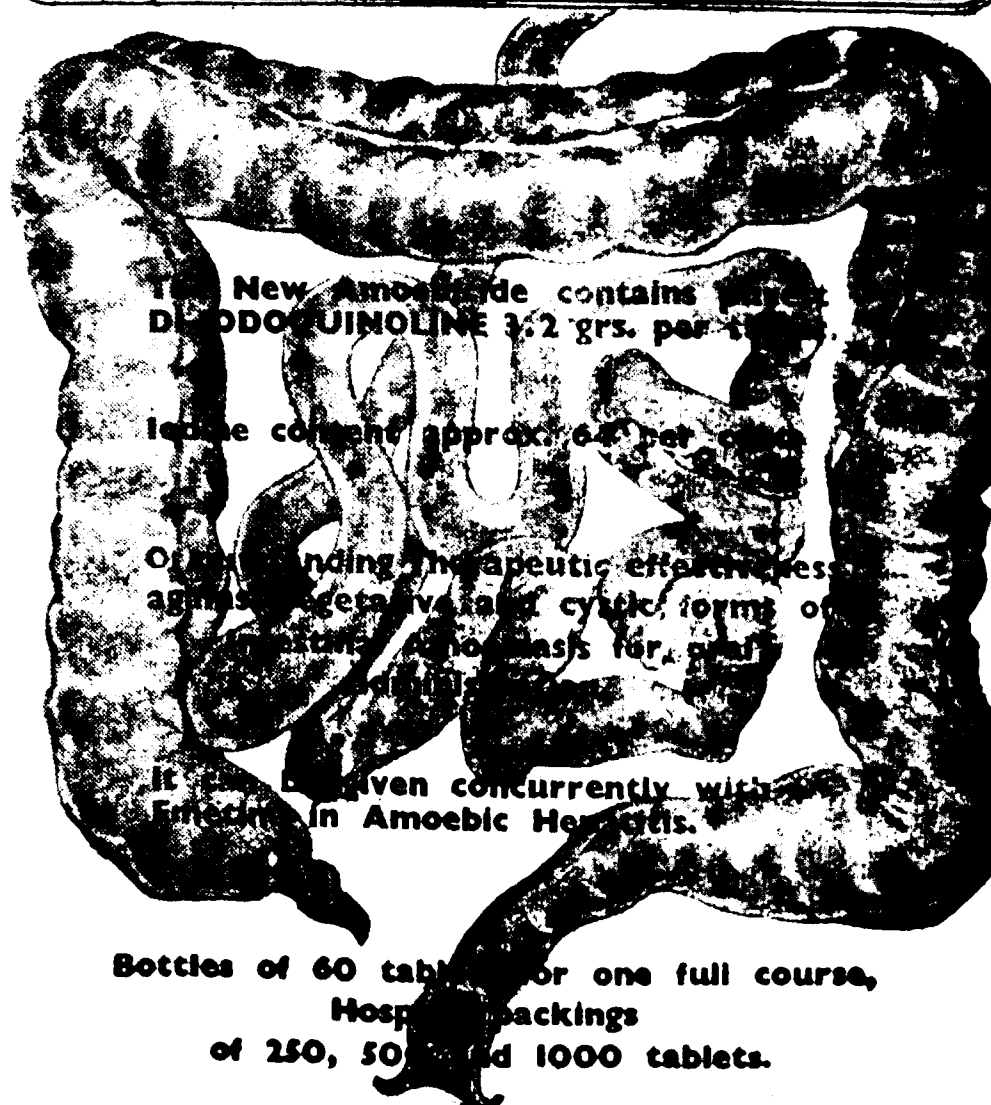
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asthmatic and other respiratory troubles subsided. Since then she never complained of the same difficulties. Night blindness was noticed in cases of ascariasis. Some children of tea labourers came to the hospital for the treatment of night blindness; they also complained of abdominal pain and anorexia. They were treated with Oil Chenopodi in Oil Recini in one dose mixture. They got rid of night blindness and abdominal pain after expulsion of the ascaris. *Ascaris lumbricoids* produce various mechanical symptoms. Respiratory catarrh is the common symptom associated with ascariasis in children; they migrate into the lung and may produce the symptoms of broncho pneumonia and lobar pneumonia. During migration the ascarial larvæ may introduce the larynx and cause respiratory obstruction, dyspnoea. The ascaris produce the symptoms of diarrhoea, irregular digestion and gradual emaciation. Large number of round worms in bunch may produce obstruction in the lumen of intestine by impaction. Ampulla of Vater is sometimes obstructed with bundle of worms and produce the symptom of obstructive jaundice. There may be a chance of intestinal wall in cases of typhoid and amœbiasis associated with ascaris. Unusual manifestations are noticed in many usual cases due to *ascaris lumbricoids*.

Worms associated with cases of malaria may often produce the symptoms of cerebral malaria, remittent type of fever and other grave symptoms.

This is sometimes seen in children. The fever is continuous and if associated with cerebral and abdominal complaints may resemble enteric group of fever. The temperature is fluctuating and the pulse is rather quick. Grinding of teeth may sometimes be present.

One girl was suffering from malarial fever for few days. Quinine in mixture form and mist alkaline were given but no improvement was noticed. Then Quinine Bihydrochlor was injected (according to the age) on two consecutive days, without any effective result. The temperature was still high and the patient complained of slight abdominal pain round umbilicus. An Anthelmintic was given followed by a Saline purgative and the temperature subsided after expulsion of two big round worms. The symptoms of salpingitis was also noticed in a case of malaria. One lady carrying for six months was suffering from malaria for few days. She complained of severe abdominal pain just above the pelvic fold, more marked in both sides and severe nausea and vomiting. After the first day of her illness, on the next day, she vomited whole day long and cried in agony of pain in abdomen. The vomiting was checked but the pain could not be relieved by various medications and the parts, specially the area of Fallopian tube was more tender to touch.

Sulphanilamide was given on suspicion without any result. A dose of Santonine with Calomel was given on the basis of worm (as it was in Tea area, where the worm incident is more prevalent) if there be any. The patient got rid of the pain after expulsion of four worms.

Cystitis-like manifestation is seen in a girl of eight years. The girl patient with her other fellow sister went to school as usual. After two hours she was suddenly seized with severe pain in the abdomen and was obliged to leave school for the same.

It might be due to any gastric trouble. A dose of fruit salt was given. The pain was relieved for a while but she was attacked with high

temperature. The temperature rose up to 105°F. but the patient was very restless and cried in agony of pain.

The pain was more prominent in the area between the umbilicus and the mon-pubis. A pussy vaginal discharge was also noticed. An injection of Quinine Bihydrochlor gr. vii brought down the temperature to 102°F. On the next day the temperature remained up to 100°F. and the pain also in the same severe nature. The affected part was very tender to touch and Antiphlogestine was applied, and Sulphathiazole tablets were given but no improvement was noticed both as regards pain and temperature. The patient had always a vomiting tendency and was anorexiated. The following powder was given at night followed by a dose of Saline purgative.

R	Santonine	...	...	gr. x
	Calomel	...	...	gr. ½
	Sodibicarb	...	...	gr. ii

A big adult worm and some young round worm came out with defaecation and gave relief to the patient from her abdominal pain and the temperature gradually subsided in a day or two.

The ascaris may sometimes cause hæmorrhage per rectum and per air passages. It may produce the symptoms of bacillary dysentery or hæmophysis. Ascaris may produce suddenly unconsciousness to the children and produce the symptoms of cerebral malaria or other grave signs.

One women labourer came once to the hospital for the treatment of her daughter. She told that her child was suffering from slow fever for two days and she was waiting for medication at the corner of the verandah. Suddenly she cried aloud as her daughter was passing away. It was noticed that the child was in a stage of convulsion and one injection of Quinine Bihydrochlor gr. v was given and other measures were taken to bring her to normal. But the child remained in the same grave condition and another injection of Quinine Bihydrochlor repeated after three hours. After twenty-four hours the condition was the same but the temperature subsided. A dose of Anthelmic was given on suspicion and two big round worms with many youngs came out with the motion and gradually the child recovered in consciousness.

Diagnosis:—1. History of vague abdominal pain. 2. Nausea vomiting of watery material. 3. Perverted appetite. 4. Nocturnal teeth grinding. 5. Nocturnal enuresis. 6. Dilatation of pupil. 7. Emaciation and loss of energy. 8. Protruded abdomen. 9. Presence of ova by microscopical examination.

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P.O. Dooms Kanrup, Assam.

An Interesting Case of Plague

K. D. BHALERAO, L.M.F.,
Medical Practitioner, Raipur, C.P.

On the 6th October 1947, I was called to see a patient aged 35, who was said to be suffering from fever and pain in the left groin.

From the history I learnt that a few dead rats were noticed in the house (where the patient was staying) a few days before the illness. In the town itself, a few cases of plague were reported by the Health Officer. On enquiry I learnt that the patient was not inoculated against plague.

On examination of the patient I found that he had a temperature of 101.4°F . and he complained of pain and tenderness in the left groin. There was a glandular swelling in the femoral region. The inguinal glands were normal. The patient complained of severe pain all over his body and persisting vomiting. The present illness started 3 days before I actually saw him with pain in the left groin on the first day and fever from the next day.

Except for the glandular swelling in the femoral region on the left side and fever there were no other symptoms suggestive of plague. Hence the patient was kept under observation. The patient was given Cibazol tablets and alkaline diaphoretic mixture on the first day. There was however no change in the range of temperature which varied between 100° and 102°F . Next day the patient became delirious and began to talk incoherently though the temperature did not exceed 102.4°F . As such his blood was sent for examination and the report was:—

M. P. not seen. Differential W.B.C. count: Polys 63%; Lymph 32%; Large minos 5%; Eosonophyl nil. No Leucocytosis.

This report was also not very suggestive of plague infection.

However the health officer was called in for consultation. On examining the patient, he too did not suspect the case to be suffering from plague, but he was insisted to take the gland puncture and get it examined for the presence of B. Pestis. The gland puncture was taken and sent for examination and to our utter surprise the smear was found to be positive for B. Pestis.

The patient was immediately transferred to the infectious hospital where, under careful treatment, the patient recovered.

The point of interest in this case is that clinically no one would even suspect the case to be suffering from plague. It was only when the smear from gland puncture was examined that the proper diagnosis was made.

The glandular involvement was not bilateral as is usually the case but was restricted to one side only. And the gland involved was femoral and not inguinal. The delirious condition of the patient however put us under the guard.

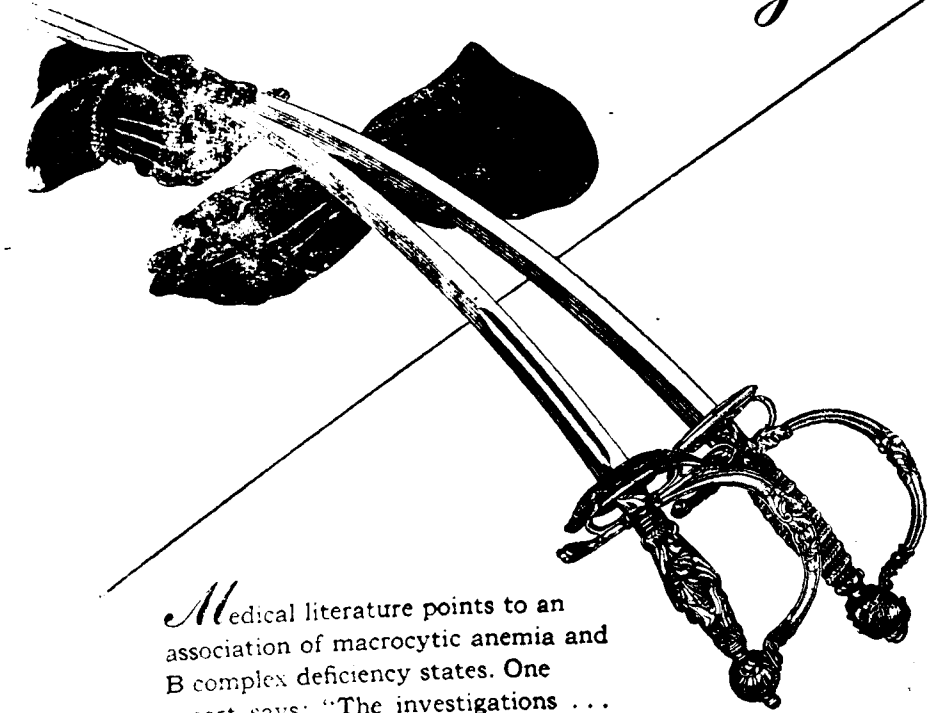
I hope this case report will be found of interest by my fellow readers.

1948]

THE ANTISEPTIC

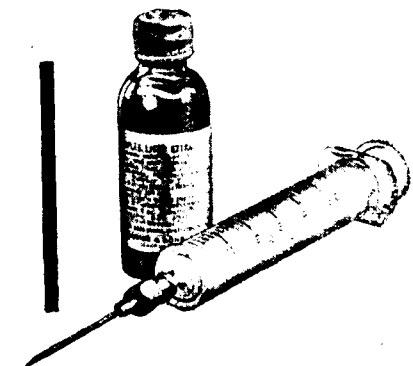
45

A Two Pronged Drug



Medical literature points to an association of macrocytic anemia and B complex deficiency states. One report says: "The investigations ... have indicated that a food factor other than the 'extrinsic factor' may also be necessary for the maturation of red blood cells".⁽¹⁾

A two-pronged drug, such as B-Complex Liver Extract Squibb, satisfies such a need as it provides not only the vitamin B complex but also the anti-anemia fractions of mammalian liver. B Complex Liver Extract Squibb is a sterile aqueous solution for intramuscular injection and comes in 10 cc. vials.



⁽¹⁾ Spies, T. D. and Butt, H. R., chapter in "Diseases of Metabolism", edited by G. G. Duncan

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MANUFACTURING CHEMISTS TO THE MEDICAL PROFESSION SINCE 1858
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honorary: (2) Medical education: (a) undergraduate training, (b) post-graduate training and refresher courses, (c) specialist training and the development of specialities, (d) dental education, (e) pharmaceutical education, (f) nursing, (g) midwifery and health visitors, and (h) dietetics; (3) Medical libraries; (4) Hospital technicians; (5) House officers; (6) Medical research; and (7) Other miscellaneous subjects. Nothing of importance has escaped the attention of the Committee.

It is but natural that to the question of personnel a great deal of attention should have been devoted, for on it depends the efficiency of the services rendered by the Department. It would be within the recollection of our readers that the question whether paid medical officers should be allowed private practice has assumed considerable importance of late. It is fitting therefore that the Committee's opinion on the matter was asked for. The Committee has, after full consideration of the subject, in all its bearings, come to the conclusion that "all entrants to the medical service shall be completely debarred from private practice and the scales of pay revised making allowance for this bar." And they have also made their recommendations with regard to the grades and scales of pay for both the general and teaching lines. They are:

Professors in teaching line and general line—Rs. 1,000-50-1,200-100-1,500. Readers in the teaching line and Civil Surgeons in the general line—Rs. 500-50-1,000-100-1,200. Lecturers, Tutors and Clinical Assistants in the teaching line and Assistant Surgeons (Senior) and (Junior) in the teaching line—Rs. 200-20-500-25-600. Demonstrators Medical (non-clinical)—Junior and Senior—Rs. 200-20-300.

As regards the general line the Committee considers that the existing class of Sub-Assistant Surgeons and the poor scale of pay allowed to them, namely Rs. 100-5-160-10-230 should be abolished, because no medical man, who, in future, will be a graduate will be attracted by the present scales of pay.

There will be general agreement with the basic recommendation that entrants to service should be debarred from private practice, but we think it should be subject to the proviso that the public should not be denied their right to get the best medical advice available. The scales of pay recommended will, we are sure, be conceded generally as fair.

The Committee is perfectly right in insisting on an apprenticeship on all medical graduates for a period of fifteen months in a hospital after securing the degree with a view to enable them to acquire a basic knowledge of the subject which they propose to practise. This will enable them to apply the theoretical knowledge they have acquired during their college course in actual practice and help them to gain practical experience which is absolutely necessary to become a successful medico. And service in a primary medical and public health centre from three to five years will serve as the best foundation to take up responsible positions later.

We are glad that the Committee has not only blessed the system of appointing honorary medical officers, but has also recommended its adoption on a wide scale. This system is working wonderfully well in many advanced countries in the West. We have been urging ever since the

inception of the scheme in the twenties of this century that if the overhead charges in the Medical Department are to be brought down and medical relief extended on a wide scale, more and more honorary medical officers should be appointed. But unfortunately vested interests stood in the way and the system was not given that fair trial which it richly deserved to make it productive of results. Now that the obstacles have disappeared and the path made easy, we trust the Government in their own interests as well as in the interests of the people they seek to serve, will extend the scheme and give effect to it in provincial, district and taluk hospitals.

We are unable to agree with the recommendation of the Committee that the number of admissions to the Medical Colleges should be restricted, for the Madras Medical College to 125, and for the Stanley and Andhra Colleges to 100 each. True, the Colleges should not be overcrowded. But at the same time we should not forget the fact that more and more medicos are needed to meet the present needs. And the country cannot afford to wait till more colleges are established in a leisurely way. We would therefore point out that overcrowding is the lesser of the two evils, and urge upon the Government the necessity of introducing the shift system with a view to enable more people to qualify themselves. We are glad that the Committee has, in another part of the Report, recommended that provision should be made in the existing medical colleges for increased admissions.

The establishment of a Department of Dentistry in the Madras Medical College recommended by the Committee will be welcomed by the public. Also the suggestions that the syllabus for the existing Pharmacy Diploma Course in the Madras Medical College and the Chemists' and Druggists' Diploma Course in the Andhra Medical College should be suitably revised to bring them into accord with the recommendations of the Bhole Committee and that the Department of Pharmacology in the Medical College should be enlarged to provide for the type of instruction which the revised syllabus will demand, as well as the investigation of Indian drugs and plants and for research, are welcome. The setting up of a Degree Course in Nursing in the Madras Medical College and General Hospital will go a great way to make available to the public highly qualified nurses. The recommendation that all House Surgeons and Physicians should be paid and that quarters should be provided for them within the hospital premises at an early date should be given effect to as early as possible if efficiency and service are to be made the watch-words.

There are many other recommendations relating to the number of beds to be allotted to each hospital unit, the strength of each unit, the institution of diplomas in specialities, post-graduate training and refresher courses, the provision of facilities to service men and private practitioners for foreign studies, the position of male nurses in hospital service, the deputation of a suitable person abroad, preferably to the U.S.A., for advance training in dietetics and so on and so forth. The Committee deserves to be congratulated on the splendid report it has presented. It is now for the Government to take steps to give effect to these recommendations, and we trust they will lose no time in implementing them.

The Drive Against Leprosy

MADRAS has taken the lead and shown the way to other provinces in many things. It was in Madras during the earlier Congress regime that a Public Health Act, the first of its kind in India, was placed on the statute book; it was again in Madras that a comprehensive scheme of anti-leprosy work was ordered to be drawn up first. It is therefore fitting that H. E. Governor of Madras, Sir ARCHIBALD NYE, in inaugurating the Anti-Leprosy Workers' Association the other day should have expressed the hope that "the Madras Presidency would be able to attain the leadership not only of India and Asia but of the world in finding the means for the eradication of leprosy."

It is an undoubted fact that since the establishment of the first leprosy clinic in Saidapet in the thirties, considerable improvement has taken place. More clinics have been established; many workers have been trained. But as Dr. COCHRANE observed at the meeting they cannot rest satisfied with a few trained workers working under impossible conditions. There must arise a large number of training centres, adult and children sanatoria and publicity centres, resulting in a band of enthusiastic doctors and lay workers under the stimulus and the direction of the government, determined to see that this Presidency maintained her lead in the campaign against the age-long disease.

The Minister for Public Health, the Hon. Shri A. B. SHETTY who presided over the meeting referred to the view given expression to by some experts that "leprosy is still a most mysterious disease that there is a great deal of uncertainty about the mode of infection." The fact that it had died out in Western Europe gives one reason to hope that if properly handled it is not after all impossible to eradicate it. Close contact with diseased people, without providing the necessary safeguards and heredity wide. Attempts are made in places to segregate the patent cases. But the difficulty is in regard to latent cases. The social stigma that has attached to the leper in all ages makes the sufferers try to conceal its onset for as long as possible with the result that they are doing the greatest disservice to themselves but also to their kith and kin. Only by widely publishing the evil effects of allowing the disease to remain untreated on a wide scale in a manner most appealing to the people, can the conscience of the people be roused. In addition further and extensive research is called for if all the causes that contribute to the spread of the disease are to be detected and steps taken to remove them.

We are glad to learn that the Government of Madras are deputing Dr. COCHRANE to represent them at the International Leprosy Conference. The contacts he establishes there and the exchange of views he has with leprologists of repute from all parts of the world will certainly help him to know more about the lines on which anti-leprosy campaign is carried on in other countries and the methods adopted there to eradicate the disease. Such a knowledge can be made productive of results only if the Government of Madras are prepared to make a generous provision in the budget to carry on the work. Now that both the Governor and the Minister have interested themselves in the inauguration of this Association, we trust that the Government of Madras will be persuaded to provide the required funds to carry on the great campaign against this fell disease.

Cleanings From Medical Press

MEDICINE and THERAPEUTICS

The treatment of penicillin urticaria with nicotinic acid (W. C. Service, in *Annals of Allergy*, Sept., 1947).—The medical literature within the past two years has contained numerous articles relating to allergic reactions from the administration of penicillin. Urticaria was the most common allergic response encountered. In an attempt to secure prompt and lasting relief, intravenous nicotinic acid was used. In 41 cases, nicotinic acid in the amount of 35 mg. in 8 to 10 cc. of distilled water was administered intravenously. The injection is given into the cubital vein very slowly. When approximately 3 to 4 cc. of the solution have been injected, the patient will experience a flush. This will usually begin with a sensation of heat passing up the spine into the neck, face and scalp. Usually, a prickling sensation is present in the scalp and a general feeling of warmth over the entire body. A few will experience a feeling of swelling in the lips. The skin capillaries of the face, neck and arms dilate, giving these areas a flushed appearance. This sensation will last only a few minutes. The injection is stopped during this period of the flush and the needle and syringe maintained in place of the cubital vein. When the flush begins to subside the injection may be continued. In most patients, the remainder of the solution may be injected without a recurrence of the flush sensations.

Within a few hours the itching begins to subside; this is followed by a decrease in the urticaria and oedema, and within 24 hrs. the patients are free of the greater part of their allergic manifestations to penicillin. In only four cases has it been necessary to give a second injection the following day.

—General Practitioner.

Potassium thiocyanate in the treatment of hypertension—G. Watkinson and G. Evans. *British Medical Journal* [Brit. Med. J.] 1, 595-598, May 3, 1947.

Briefly reviewing previous reports on the treatment of hypertension with thiocyanate, the authors consider that the results have been conflicting because of failure to recognize and differentiate the various arteriosclerotic processes underlying the hypertension, and because of the small difference between therapeutic and toxic levels of thiocyanate.

The methods used and the results obtained in 60 patients with hypertension are described. The authors recognized four clinical groups: (1) *Benign hypertension, quiescent phase* (23 cases). Blood pressure is consistently raised, but is not rising; diastolic pressure is below 130 mm. Hg. Retinal haemorrhages and haematuria are absent. (2) *Benign hypertension, active phase* (21 cases). Blood pressure fluctuates widely, and retinal

haemorrhages and haematuria occur. (3) *Malignant hypertension* (10 cases). Greatly raised blood pressure, papilloedema, and retinal and renal haemorrhages are found. Evidence of renal failure exists. (4) *Renal hypertension* (6 cases).

All the patients received potassium thiocyanate in the doses necessary to maintain the blood level of thiocyanate at 5 to 12 mg. per 100 ml. Since the amounts necessary varied greatly in different patients, all received, after a control period in bed so that the effect of rest on the hypertension could be ascertained, 0.1 g. potassium thiocyanate three times a day for 1 week (a total dose of 2.1 g.). This was taken with food if symptoms of gastro-intestinal irritation ensued. The serum thiocyanate concentration was then estimated and the dose increased or decreased according to the value found—increased if the level was below 5 mg. per 100 ml. and decreased if it was above 7 mg. per 100 ml. Repeated estimations of serum thiocyanate were carried out weekly until the dose necessary to maintain the level between 5 and 7 mg. per 100 ml. for 3 successive weeks was found. Subsequent estimations were made at fortnightly or monthly intervals. Dosage should be based on repeated serum estimations and not upon the blood pressure, and the dose of potassium thiocyanate should not be increased by more than 0.4 g. in any 1 week.

The results of this treatment were assessed by the effects on symptoms and on blood pressure, the symptoms being recorded as cured, improved, or unaffected. The lowest blood pressure recorded during a preliminary control week in bed was taken as the base-line reading. The effect on blood pressure was considered significant if the average reading in the third week of treatment showed a fall from this base-line of 40 mm. Hg. systolic and 20 mm. Hg. diastolic. Late effects in 42 patients who received adequate doses of thiocyanate for 1 year or more are given. Of the 60 patients on whom the immediate effects are reported, 37 obtained symptomatic relief, and in 34 a "significant" fall in blood pressure occurred. Of the 42 patients who were followed up for a year or more 17 reported symptomatic relief and 18 a "significant" lowering in blood pressure. In all, 12 deaths occurred, 8 due to uraemia and 4 to coronary thrombosis. The most pronounced effect of the drug was in the relief of headache, dizziness, and vertigo; cardiac symptoms such as anginal pain and palpitations were not significantly affected.

The toxic effects are skin rashes, which may occur with low levels of thiocyanate, excessive tiredness, indigestion and nausea, thrombophlebitis, and goitre. In the present series 6 patients developed skin rashes

and 2 thrombophlebitis. No other complications except gastro-intestinal symptoms were encountered, and this is attributed to the close control of the serum thiocyanate levels.

[No control series of cases given placebos is recorded. The results are considered to justify the differentiation of patients with hypertension into the four groups described. However, there is no statistical significance between the immediate results in any of the groups.] *G. A. Smart.—Abstract of World Medicine.*

The present status of penicillin in the therapy of syphilis.—An investigation of the use of penicillin in the treatment of syphilis is under way in 37 clinics or research centres. Moore summarizes the preliminary results as follows: (a) Penicillin has a profound immediate effect on early syphilis in terms of disappearance of surface organisms in open lesions, healing of lesions, and a tendency toward reversal of serologic reactions of the blood. Spirochetes disappear from open lesions within the time range of six to 60 hours. (b) A single injection of penicillin is practically ineffective in man or animal; multiple injections are necessary. (c) The intramuscular route of administration of an aqueous or saline solution is superior to the intravenous. The optimal interval between injections is from three to six hours. Penicillin has the advantage of being free from serious risks of chemotherapy. A mild Herxheimer reaction, however, occurs in some of the patients. Other reactions consist of menstrual disturbances and allergic skin reactions. The optimum method of use of penicillin in early syphilis has not been determined. Several unexplored variables include the effect of much larger doses, such as have been employed in the army and navy, where a total of 2,400,000 units is administered in a course of injections, one every three hours, day and night over a period of 7½ days. It has not been established whether this arbitrarily selected large dose is more or less effective than smaller doses. The effect of prolonging the duration of treatment beyond 7½ days, the combination of penicillin and other agents, such as mapharsen, bismuth, fever, and methods to prolong the absorption and excretion of penicillin to reduce the frequency of injections toward an ambulatory treatment basis have not been determined. There are numerous reports describing the "masking effect" which occurs when a patient with undiagnosed primary syphilis receives 50,000 to 150,000 units of penicillin in treatment of a gonococcal infection. It is therefore important to make certain that a patient with gonorrhea is not also developing primary or secondary syphilis, before administering small doses of penicillin for gonorrhea. Nelson and Duncan reported favourable immediate results in six cases of early syphilis with psoriasisiform lesions, resistant to treatment with arsenic and bismuth. Noggin reported a case of syphiloderma which promptly responded to penicillin therapy

after having failed to respond not only to 2½ years of irregular bismuth and arsenic therapy but also to ten consecutive weekly concomitant injections of bismuth subsalicylate and mapharsen. Women in various trimesters of pregnancy and exhibiting dark-field-positive lesions of primary and secondary syphilis have received penicillin, without interference with the pregnancy. Much time is required to determine the incidence of congenital syphilis, although there is no immediate indication that the rate will be unfavourable. The problem of re-infection, super-infection and relapse is of more practical importance than it was before the advent of intensive arsenotherapy and penicillin therapy in early syphilis.—George X. Schwemlein (P. A. Surg. [R.], U.S.P.H.S.), *Cincinnati J. Med.*, 27: 223-31, April, 1946.

—*General Practitioner.*

The use of the ovarian hormones in the control of functional uterine bleeding.—Joseph Seitchuk, *Hahnemann. Month.* 81: 515-22, December 1946.

It has been shown experimentally that functional uterine bleeding is the result of sudden withdrawal or stoppage of hormonal activity. It is called withdrawal bleeding. This has been confirmed by observations on castrated women. Experiments indicate that the first factor involved in functional uterine bleeding is cessation of the corpus luteum function. Uterine bleeding is then precipitated by the withdrawal of estrogen. This is never complete and estrogen fluctuations cause some areas of necrosis and hemorrhage resulting in continuous bleeding. While these observations require further proof, they have been accepted as a basis for ovarian steroid therapy. There are two methods of estrogenic therapy used, giving progesterone in attempt to change the endometrium to a secretory type and giving estrogens to raise the estrogen levels. Progesterone has not usually been a successful hemostatic agent, probably because the endometrium cannot respond to progesterone after withdrawal bleeding has commenced. Estrogenic therapy is often successful but details are unsettled. Diethylstilbestrol is usually used, though any potent estrogen is equally effective in large doses, about 50 per cent of cases responding. Estrogenic therapy of menstruation consists of hemostasis, cycle and pituitary regulation and should only be used in cases of moderate bleeding when it is known that no pathology is present. Diethylstilbestrol, 6 mg., or 7.5 mg. of estrone sulfate are given daily for twenty days and repeated after seven days. The dose is increased 25 to 100 per cent if bleeding does not stop in five days. Bleeding normally occurs one to five days after stoppage of the drug. During the last ten days, 10 mg. of progesterone are given intramuscularly or 30 to 40 mg. of androxyprogesterone orally every other day. This cycle is repeated three times. This treatment is somewhat expensive and

requires about six months but is better than radium or pelvic surgery.—*Quarterly Review of Obst. and Gynec.*

Curare in treatment of poliomyelitis.—The tightness of muscles that occurs in poliomyelitis must not be confused with the spasticity resulting from pyramidal tract disease. In poliomyelitis the tightness is due to a shortening of the muscle, and there may be tenderness and pain on stretching, especially in the acute stage. It is this tightness which has received so much attention in the Kenny school of thought, whilst it used to be before considered as little more than a transitory phenomenon. There is as yet no convincing evidence for or against the presence of a lesion in the muscles themselves. It may be said, however, that at least part of the muscle spasm has its origin in lesions in the brain stem. In any case the tightness demands attention, since, if prolonged, it may become such a crippling element. The value of warmth requires due recognition, but it cannot be regarded as an infallible method of treatment. In search for other methods Ransohoff tried curare, depending of course on its relaxation effect. He reported striking effects, particularly in his first cases. He found that by passively and actively stretching the muscles after administration of curare the degree of disability was materially reduced. In bulbar cases respiratory difficulty was relieved and swallowing made easier. Fox, however, in a series of 34 patients, did not obtain similar results, and concluded that curare might help in some cases but was dangerous and should not be encouraged in the treatment of the acute stage of poliomyelitis. Richards, Elkin and Corbin, of the Mayo Clinic, now report their experience with curare in a series of 18 patients. The curare in the form of intocostin (Squibb) was given both intravenously and intramuscularly, and in each case, after estimation of the degree of tightness by a method evolved for the purpose, stretching was carried out through the full range of motion as advocated by Ransohoff. The pain and resistance in most cases was too great to permit of this and no marked improvement could be seen. Curare in oil was tried in an attempt to obtain a prolonged effect and to avoid repeated injections, but no particular benefit was noted. In seven patients pentothal was given with the curare to permit of the maximum stretching of the muscles which could not be attained with curare alone. Whilst the muscles thus stretched were not painful afterwards, it could not be decided that they had been benefited by it. The least to be said was that no harm resulted. The conclusion was that curare did not seem to materially affect any aspect of the clinical course of poliomyelitis. It did not prove to be a dangerous drug, but it should not be used unless the proper methods of combating possible untoward effects are at hand.—*Can. Med. Assoc. Journal.*—G.P.

A review of the dietetic factors in liver disease. I. Dietary cirrhosis and necrosis of the liver. II. The application of nutritional principles in treatment.—L. J. Witts, *British Medical Journal* [Brit. Med. J.], 1, 1-4, and 45-49, Jan. 4, and Jan. 11, 1947.

The first part of this paper is an account of the experimental work on dietetic factors, and the second of the application of these nutritional principles to the treatment of hepatic disease.

The author believes that two types of liver disorders can be produced by defective diets. The first is a fatty infiltration of the liver which proceeds slowly to cirrhosis of the portal type. The second is an acute necrosis, which, if not fatal, is followed by post-necrotic scarring or post-nodular hyperplasia. Previous investigations have shown that choline and lecithin are capable of preventing fatty infiltration and cirrhosis of liver in the pancreatized dog kept alive by diet and insulin and in the small animal fed on a high-fat diet, although in the former case the effect of using pancreas instead of lecithin was more marked because of the substance lipocain. Later it was found that casein, or rather methionine, one of its components, was also capable of preventing fatty infiltration of the liver, and it was soon proved that reduction of protein in the diet in animals resulted in a fatty infiltration. The subsequent development of portal cirrhosis from fatty infiltration was slow, and was thought to be due to the excess of fat, which interferes with the nutrition of the cells. From examination of the composition of compounds, known as lipotropic substances, which encourage the normal transfer of fat from the liver, it seems that the common factor, a labile methyl (CH₃) group is of primary importance.

Difficulty in assessing the part played by proteins, which also possess a labile methyl group, was found in experiments with protein-deficient diets in small animals. It seems that an acute necrosis, in contrast to gradual fatty engorgement of the infiltration type, could be produced, and depended largely on the degree of the deficiency and type of protein used. The ability to prevent such necrosis was traced to an amino-acid containing sulphur. Two such thioamino-acids are methionine and cystine, the latter being the key substance in preventing this type of liver disorder. Cystine is without the labile methyl (CH₃) group but contains the sulphhydryl (SH) group. This suggested that methionine, which contains both sulphhydryl and methyl groups is the most indispensable amino-acid concerned in liver metabolism. Yeast is only poorly protective against necrosis of the liver; it may contain some unknown lipotropic principle; in fact the relation of the vitamin-B complex to cirrhosis and necrosis of the liver is not yet fully known.

For many years it has been known that animals in which fatty infiltration has been produced have a diminished resistance to

liver poisons, and that such livers contain little glycogen. It has also been found that in combating the effect of drugs producing fatty change a high-carbohydrate diet is effective and that the displacement of fat by glycogen is necessary. But carbohydrate not only acts as fuel for the hepatic cell but also spares the utilization of protein, and it is even possible that the carbohydrates may themselves conjugate with the hepatic poisons. Carbohydrates must be given in the proportion necessary for total caloric and protein metabolism, otherwise liver necrosis may result. Carbohydrates are not the only agents necessary for the protection of the liver against poison; protein may play an equally if not more important part. In this case the specific protective factor is methionine, of which the component sulphhydryl (SH) group is the operative agent. The time of administration of the protective agent and of the exposure of the animal to the poison have considerable bearing upon the extent of the subsequent liver necrosis. This is important when this knowledge is applied to man, for methionine will afford complete protection if administered before chloroform anaesthesia, partial protection if given 3 to 4 hours after anaesthesia, and no protection if given 4 hours or more after anaesthesia. A similar condition is found with "mapharside" poisoning.

The clearcut lipotropic and antinecrotic action of protein suggests that it would be of value in the treatment of hepatic disorder but this is apparently not the case. Thus, dogs exposed to carbon tetrachloride more commonly died from acute necrosis when they were on a lean-meat diet than on a mixed diet containing bone-meal. It was therefore felt that calcium might be a responsible factor, but experimental work has shown that it merely diminishes the symptoms without preventing the liver damage. Other workers have attributed the symptoms to a rise in blood guanidine occurring as the result of incomplete liver metabolism, but lack of knowledge of the pharmacology of guanidine is holding up progress in this sphere of investigation. Most workers agree that a mixed diet rich in protein (particularly milk) and carbohydrate is of greater value than lean meat in the treatment of necrosis due to poisons. In applying these results to man the accumulated evidence suggests that cirrhosis of the liver may be due to a dietary deficiency of protein rather than to the specific action of such agents as alcohol, and that in infective hepatitis previous malnutrition may cause a relatively high mortality rate.

The value of the application of nutritional principles to treatment in man depends first of all upon the accuracy of diagnosis and the extent of the liver disorder. The latter is often difficult to determine without biopsy or necropsy, but it appears that cases of acute necrosis or toxic jaundice are extremely rare, and that the greater number are due to viruses such as that of infective hepatitis. The difficulties of carrying out therapeutic

trials on an uncommon disease are considerable. Unfortunately no help can be gained from the literature, which is devoted to isolated cases. Probably the most popular form of treatment is glucose administration, which, as might be expected from the experimental data, has yielded good results. It is important to remember, however, that hyperglycemia should be obtained without the inhibition of the formation of hepatic sugars. Insulin is contraindicated and the necessary hyperglycemia should be achieved by means of intravenous glucose.

The success of certain proteins and protein derivatives in the prevention of acute necrosis in animals has given rise to a hope that this form of therapy may be of value in acute liver insufficiency. Unfortunately such patients are liable to develop renal failure, and it is not clear whether the products of proteins may not have a toxic effect on the kidneys. Because therapeutic trials of protein derivatives have not been completed it seems safer to restrict treatment to administration of milk, the protein of which is known to be harmless.

The commonest hepatic diseases in Britain are acute infective hepatitis and post-arsenical and serum jaundice. These diseases are probably caused by different viruses, but the course and pathology are similar, and it is usual, therefore, to treat them all in the same way. They present a different problem, for it is not the mortality rate but the period of disability which is important. Therapeutic trials with diets containing high and low protein, high and low fat, methionine, and choline have all proved disappointing. Some success has been obtained with superadded cystine and intravenous casein hydrolysate but the results are not very striking. Treatment with glucose and insulin and with intravenous liver extract has also been unsuccessful, and as a result many observers believe that rest is of more consequence than diet. The author himself recommends that the diet should contain sufficient fluid and food to prevent dehydration, acidosis, and tissue breakdown from malnutrition; he often finds that a self-selected diet works well. A low-fat and low-protein diet is unappetizing and insufficient to "regenerate the shattered columns of liver cells." True cirrhosis of the liver is rare in Britain, and therefore the small number of cases precludes therapeutic trials. A high-calorie, high-protein diet to which have been added methionine and choline has greatly reduced the severity of symptoms and the mortality rate in other parts of the world.

[It is not possible to do justice in this abstract to this excellent review. It gives a full account of protein and its derivatives in the treatment of liver disorders. It is strongly recommended that all who are likely to be faced with the treatment of these cases should learn the steps which have been taken to arrive at our present knowledge.]

Abstracts of World Medicine.

Progesterone in treatment of migraine: According to the Singhs (*Lancet*, May 24, 1947), the aetiology of migraine is varied. Among 30 women with migraine who had responded poorly to the usual therapeutic methods, they found 23 with clinical evidence of oestrogen hyperactivity. In all of these it was shown that oestrogen would precipitate an attack. In all 23 cases progesterone was effective in relieving or preventing attacks of migraine. Various associated symptoms also disappeared with its use. The name "oestrogenic migraine" might be appropriate for this condition. —G.P.

The treatment of tuberculous cavities — R. Grenville Mathers, M.A., M.D., F.R.C.P.S.G. Tuberculous cavities are formed by liquefaction in an area of caseation and discharge of this liquefied material through the bronchus. The defect in the pulmonary parenchyma is then blown out into a cavity by the pressure of the inspired air. All tuberculous cavities at their inception are tension cavities, i.e. the pressure of air inside them is above that of the atmosphere. This is so because the bronchus leading from the cavity is also affected by tuberculosis and the resultant caseous material forms a one way valve to the cavity.

Cavity closure is essential for the future well-being of the patient with pulmonary tuberculosis. The cavity forms a breeding ground for the tubercle bacillus and there is an ever present danger of the cavity secretions being aspirated during coughing into any part of the lungs via the bronchial tree with consequent spread of the disease. This spread can occur whether the patient is lying in bed or up and working. In addition it is in cavities that aneurysmal dilation of arteries occurs and rupture of one of these aneurysms may lead to death from massive haemoptysis. Seventy-five per cent. of cases left with a persistent cavity are usually dead five years after the diagnosis of pulmonary tuberculosis is made.

Cavity closure is dependent upon converting the partial bronchial block into a complete block. If the patient is treated by bed rest lung movement is reduced to a minimum and little dilatation of the bronchi occurs during the shallow inspirations. Thus bed rest may be sufficient to convert a partial bronchial block into a complete block. If this is so no air will enter the cavity on inspiration, the vascular circulation in the cavity will absorb such air as is in the cavity and the cavity will collapse. Approximately fifty per cent. of cavities up to one inch in diameter will close in this way.

Bed rest tends to be a slow method of bringing about cavity closure and most sanatoria to day rely on collapse therapy for cavity closure. The commonest method is the induction of an artificial pneumothorax by inserting a blunt induction

needle, fitted with a trochar, between the two pleural layers and allowing the negative intrapleural pressure to suck air into the pleural cavity. The induction of a pneumothorax may be impossible because of obliteration of the intrapleural space by previous pleurisy, or only the healthy part of the lung may be relaxed with the formation of a *contra-selective* collapse. Such a pneumothorax must be abandoned immediately because of the danger of a tuberculous empyema developing. In other cases cavity closure may be prevented by adhesions between the visceral and parietal layers of the pleura. An attempt must always be made to divide such adhesions. This is done with the electric cautery under indirect vision through a thoracoscope. Such division may be impossible either because the adhesion is too short or because of blood vessels or lung tissue in it. Where adhesiolysis is not possible paralysis of the diaphragm may relax the adhesions sufficiently for cavity closure to occur.

If an artificial pneumothorax does not bring about cavity closure even if supplemented by adhesiolysis or phrenic crush then it must be abandoned. The incidence of effusions in infective pneumothoraces is high and many progress to a tuberculous empyema. For such a condition thoracoplasty is the only treatment with any great chance of success and such a procedure may be impossible because of extensive disease in the other lung.

Occasionally even with a complete pneumothorax with no adhesions the cavity, instead of collapsing, becomes larger. This is due to poor pulmonary elasticity so that instead of a complete bronchial block being brought about the valve action in the bronchus is accentuated. Such pneumothoraces also have to be abandoned, if possible before rupture of the cavity into the pleural space.

Diaphragmatic paralysis as an isolated method of cavity closure is not used very much these days. Its main indication is for a cavity in the lower zone and especially for a cavity just above the diaphragm. The rise in the diaphragm can be accentuated by a pneumoperitoneum when air is placed in the peritoneal cavity and refills given each week. In this way cavities both in the lower and middle zones of the lung may be collapsed.

If none of the preceding measures are successful then resource is made to a thoracoplasty, provided the condition of the other lung is satisfactory. Such an operation may be a partial or complete one, the number of ribs resected being dependent upon the extent of the lesion to be relaxed. The original operation of rib resection alone only gave lateral relaxation to the lung and many cavities remained uncollapsed because of the persistence of stresses across the draining bronchus. Nowadays rib resection is combined with mobilisation of the apex of the lung in the extrapleural space so that longitudinal relaxation is also obtained.

The results of thoracoplasty have been much improved by this procedure.

In a few cases whose general condition is not suitable for a thoracoplasty or where doubt exists as to the state of the other lung an extrapleural pneumothorax is established. In this operation part of the third rib is resected anteriorly or posteriorly. The parietal pleura is then stripped away from the endothoracic fascia over the apex of the lung, along the medial aspect of the lung as far as the hilum and down to the sixth rib laterally. An artificial space is thus formed between the parietal pleura and chest wall. This extrapleural space is then filled with air at intervals in the same way as is an artificial pneumothorax. Theoretically this procedure is an excellent one when extensive adhesions prevent the establishment of an intrapleural artificial pneumothorax but in practice the results are often disappointing. Despite frequent refills many lungs re-expand, hemorrhage is frequent; effusions are common and many of these either become secondarily infected or discharge through the operation incision with the formation of a persistent sinus. The operation is useful, however, as a procedure preparatory to thoracoplasty.—*The Broad Way Westminster Hospital.*

Stevens-Johnson syndrome—Dr. Nellen (*The Lancet*, March 15, 1947) calls attention to an interesting disease of which the characteristics are, as originally described by the two observers from which its name is derived, rising temperature, a bulbous skin rash, stomatitis and conjunctivitis. This condition appears to be a rare one. Very few cases have been met with in the female. The age incidence appears to be between twenty-two months and nineteen years. Eye complications include keratitis, and even total blindness may result. There may be merely a simple stomatitis present, but there is sometimes pseudo-membranous inflammatory process with great swelling

of tongue, lips and palate which causes considerable pain on deglutition. The etiology is obscure, but allergic sensitization has been suggested as a possible cause. The rash may readily be mistaken for that of erythema multiforme. Then, again, the bullae in the mouth may suggest that the case is one of pemphigus. Sometimes the condition is preceded by some other such as herpes or mumps. High temperatures, up to 106° F. may be recorded and there may be profound toxæmia present.—*Medical World.*

Ascorbic acid in the treatment of methemoglobinæmia—Carnrick and others (*Arch. Int. Med.*, 78, 1946) recommended ascorbic acid for the treatment of methemoglobinæmia as a result of experience with two patients. In one patient the condition was due to the ingestion of sodium nitrite, whilst in the other a diagnosis of idiopathic methemoglobinæmia, or enterogenous cyanosis, was made. The first was considered to be ill that she was given 500 mgm. of ascorbic acid intravenously. Within four hours, when a further 200 mgm. were given intravenously, the cyanosis had almost disappeared. During the remainder of the day a further 300 mgm. were given intravenously in two doses. The other patient was given 500 mgm. daily by mouth in divided doses for three days. There was a noticeable improvement in her condition within twenty-four hours. Subsequently she was given 1,000 mgm. daily for several days. This action of ascorbic acid is due to its reducing properties, and there is evidence to show that it reduces methemoglobin *in vitro*. Ascorbic acid is considered preferable to methylene blue, the current form of treatment, because of the risk that methylene blue may further increase the concentration of methemoglobin in the blood. Ascorbic acid need only be given by the intravenous route in conditions of emergency; oral administration should usually be satisfactory. *G.P.*

SURGERY

Femoral hernia—Dr. J. P. Jacob (*Proceedings of the Staff Meetings of the Mayo Clinic*, June 11, 1947), says that certain factors predispose to femoral hernia and subsequent strangulation. These are: (1) Recent loss of weight; (2) An asthenic or emaciated condition; (3) Standing erect for long periods; (4) Quick change from a stooping position while straining. Obesity tends to prevent the occurrence of femoral hernia. There is the ever-present danger of strangulation in such a hernia. Usually acute strangulation is associated with some activity which causes increased intra-abdominal tension, such as lifting, falling, coughing or straining at stool. When a portion of the small intestine is involved the clinical manifestations simulate those

of an acute surgical abdomen, with a sticky pain round about the umbilicus which frequently extends to the inguinal region. Usually a tense and painful mass appears in the groin. A constant abdominal pain and sharp, gripping pains in the groin, nausea, vomiting, prostration and shock follow within a few hours. The most constant and most frequently encountered objective sign is the appearance of a painful and tense mass in the groin. The appearance of a painful, tense and irreducible mass in the groin, especially in elderly persons, should be regarded as being indicative of a femoral hernia until proved otherwise. The lowest fatality rate is where spinal or regional anaesthesia is employed. Pulmonary complications after

operation may result in death of the patient and must always be kept in mind.

—*Medical World.*

Powdered penicillin: Its surgical uses and advantages—A mixture of penicillin and sulphur powder has been used in all sorts of abrasions, fissures, lacerations, burns, ulcerations, Vincent's infections, conjunctival infections, strep-throat infections, and in traumatic and surgical wounds.

However, although the sulphur has a wide applicability, it is often inadvisable to use them in or on some wounds, on large burned or denuded areas, and on patients that have become sensitized to the sulphur cycle. The local use of penicillin in these cases, however, is usually of great value. The most innocuous substance yet tried as a vehicle for penicillin powder is dried blood plasma. From our experience we believe it is safe to insufflate a sterile powder mixture of penicillin and dried plasma into the peritoneal cavity or any other body cavity at any time that the surgeon feels that the topical application of penicillin is indicated. Such a powder mixture tends to dissolve immediately upon contact with the exposed tissues, and it does not entail the addition of more fluid to the area. We treat all open wounds, chronic leg ulcers, decubitus ulcers, abrasions, burns and the like by dusting daily with a powder containing calcium penicillin, dried plasma, and dried red blood cells. Sometimes sulphathiazole is added to the powder mixture or sulphathiazole ointment is applied after the powder is dusted on the affected area. It is the impression of all attendants, nurses, and doctors caring for these patients that a marked improvement in the care of all infected wounds has resulted from such treatment.—*Gilbert O. Dean, Journal of the Arkansas Med. Soc., Nov., 1946.—U.P.*

Discussion on the treatment of acute peritonitis—J. Morley, C. G. Rob, and R. V. Hudson. *Proceedings of the Royal Society of Medicine [Proc. R. Soc. Med.]* 40, 123-128, Jan., 1947. 1 fig., 7 refs.

Morley, the first of the three contributors to this discussion, dealt in general terms with acute peritonitis secondary to infection from hollow viscera. He mentioned the old irrational treatments, such as peritoneal irrigation, drastic purgation, and multiple tubular drainage. He considered that the greatest recent advances were the replacement of fluid and chloride loss, the use of a Ryle's tube, and chemotherapy. As most cases were secondary to some perforation of the alimentary tract, he advised closure of the perforation as a primary consideration. Hermon Taylor's plea for expectant treatment of a perforated ulcer did not impress him, but he was prepared to allow it in bad-risk cases. He was against intraperitoneal drainage, but would drain the abdominal wall where necessary. A dehydrated patient was given intravenous saline, and a Ryle's

tube was used for inhibitory ileus and mechanical ileus caused by acute inflammatory adhesions. Chemotherapy was of great value, but there was still no unanimity on the best drug to use or on the best way of applying it. In patients with subacute obstruction due to carcinoma of the colon, he advocated preliminary administration of sulphauxidine by mouth for 3 or 4 days. This allowed a successful primary resection and anastomosis. Spalding's attack on the Fowler position impressed him, but he did not agree with all the arguments against it.

Rob discussed protein balance in the treatment of acute and generalized peritonitis. As a result of investigations in the war it was found that in a patient suffering from chronic suppuration, whose total protein loss was considerable, the plasma protein was kept up at the expense of tissue proteins. In acute generalized peritonitis there was a reduction of the body protein, which progressed until the plasma protein dropped. The loss of body proteins occurred in four ways: (1) as an exudate from an inflamed peritoneum; (2) into the lumen of the distended and paralysed gut; (3) into the inflamed peritoneal wall; and (4) due to an associated reduction of protein digestion. In addition, the albumin/globulin ratio of the plasma proteins changed, the albumin level falling and the globulin level rising. The importance of this was that plasma globulins exert an osmotic pressure only about one-third of that exerted by an equivalent quantity of plasma albumin.

The speaker advocated the use of plasma transfusion in severe peritonitis as a means of restoring both fluid and protein loss, thereby preventing peripheral circulatory failure or sometimes correcting this condition when established. Another advantage of plasma was that it diminished the risk of pulmonary edema. He had treated 25 patients in this manner successfully before the onset of circulatory failure by giving 2 pints (1,130 ml.) of plasma and 4 pints (2,260 ml.) of glucose daily until intestinal activity was re-established. Three of his 6 patients with failure of circulation recovered after an initial dose of 4 to 8 pints (2,260 to 4,520 ml.) of plasma followed by an average daily fluid intake of 6 pints (3,390 ml.), including a maintenance dose of plasma. He stated that for patients up to middle age [but only up to middle age] the results might be dramatic.

Hudson stated that after intraperitoneal sulphonamide the concentration in the portal vein was three to four times that in the blood stream, which he accepted as evidence that toxins from the abdominal cavity were carried by this means. He thought that penicillin was of value in coping with infection in the abdominal wall, drainage-tube tracks, and lung complications. He had seen 5 patients with perforated peptic ulcer treated successfully by conservative means, all of whom had developed basal lung collapse and pneumonia [a very significant observation]. He finally emphasized the

palate to prevent fluids running into the larynx also prevents the gargle from contacting the tonsillar areas and posterior pharyngeal wall. Warm saline or dextrose irrigations from a container slightly above the patient's head can run over the areas. Pastilles and lozenges dissolved in the throat depend upon the flow of saliva to carry the drug to the inflamed area. Investigations using pastilles containing methylene blue showed no staining of the pharynx. This treatment is therefore practically useless. Similar experiments using medicated chewing gum showed that the drug only reached the tonsillar area and pharynx when the patient was lying down.

Other experiments have shown that dissolving lozenges containing sulphonamides

in the mouth is not effective in preventing or treating streptococcal throat infections, but good results were obtained by insufflation of about 5 grains of sulphadiazide powder once or twice a day to the throat. The time required for cure, however, was only 12 days less than for patients not so treated. Topical applications of 5 to 25 per cent. solutions of iodine in glycerin or silver nitrate are useful in beginning sore throat. Throat sprays were shown to be of definite value. The greatest advance in treatment of throat infections with local medication has been the application of a solution of penicillin containing 250 to 500 units per cc. four times a day to Vincent's angina. Negative smears were obtained much more quickly with this treatment. — *General Practitioner.*

Correspondence

A Peculiar Case

To The Editors, THE ANTISEPTIC, Madras.
Sirs,

I patient, 30 years, health apparently good, complains of tired feeling of the eyes after little work. Further work causes burning sensation and pain and the vision gets blurred. After testing it is found +1.5 Dst. and also 2.5 Dst. give equally good vision. After prescribing 2.5 Dst. he comes 2 days after complaining of a peculiar distress and pulling sensation in the eyes after using the glasses for sometime. +1.5 Dst. was ordered with the same result. Dark room examination shows nothing abnormal. Will any brother explain the causes?

Yours faithfully,
Akshaya Hospital, } PRATAP SINGH,
Banera, Mewar } Ophthalmic surgeon.

Paludrine—A New Anti-malarial Drug

To The Editors, THE ANTISEPTIC, MADRAS, Sirs,

With reference to the article "Paludrine—A New Anti-malarial Drug" by Mahadev Chowdhry, M.B. in your September issue '47, I like to throw some light on the subject regarding the dose and the results obtained in my series of cases.

I have treated the cases on the lines mentioned below:—

The first case I gave a trial with Paludrine was an old man aged 60 years. He was suffering from malaria for three days, first a saline purge was given and three tablets of Paludrine (0.1 gm.) total 0.3 gm. was advised after opening of the bowel. He did not get any rise of temperature next day and did not take any medicine from the next day. He was treated on 19.7.47. He is now O.K. i.e., for over 8 weeks. In this line I have treated 18 cases upto Aug. '47. Temp. dropped within 24 hours in each case, no relapse took place. They are O.K. from 7 weeks to 4 weeks. In 7 cases 6 Paludrine 0.1 gm. tab. were required to stop the

symptoms and in 4 cases I had to push 9 tablets of Paludrine 1 tab. T.D.S. for three days.

In my last series of cases they were too much constipated and moving of the bowel was unsatisfactory. It retarded the absorption of the drug. In every case I gave first three tablets of Paludrine statim in my series of 25 cases. Keeping those patients under control I gave them no other medicine, but all of them are in good health. Brothers of the profession are requested to throw more light on the subject.

Kshirgram, P.O. } Yours faithfully,
Burdwan. } AJIT KUMAR JAS. I.M.P.

Prevention of Yellow Fever in India

To The Editors, THE ANTISEPTIC, Madras, Sirs,

Considering that hundreds of thousands of people might die as a result of importing a person infected with yellow fever, stringent regulations have been passed and insisted on regarding inoculation of all persons likely to pass through the endemic areas of the disease or travelling in planes which have passed through the endemic areas.

Unfortunately the seriousness of the possibilities is not realised by some members of the travelling public. Some of these may bring severe pressure to bear on medical practitioners to issue a certificate that an inoculation against yellow fever has been carried out when in fact it has not been done. Some of the medical practitioners may yield under the pressure and issue a false certificate. As all such certificates are checked at the port of entry, the falsification is easily detected. If so detected and the case proved against the practitioner, his name will be struck off the medical register.

Yellow Fever Vaccine

The vaccine used in India is manufactured by Rockefeller Foundation. The vaccine is also prepared by Messrs Burroughs Wellcome

and Co. in England. It is also produced in South Africa.

The vaccine cannot be imported into India without the permission of the Director General, Medical Services, India. If any is imported by accident, the D.G. must be immediately notified and permission for retaining it obtained. It is an offence to possess the vaccine without the permission or knowledge of the D.G.

At present the vaccine is donated to the Government of India by the Rockefeller Foundation. The Government then distributed it to the various provincial laboratories, which alone are authorised to vaccinate against yellow fever. The certificate of inoculation can be signed only by the director of the laboratory or by his nominee. For the Bombay province the Haffkine Institute, Parel, Bombay, stores and injects the vaccine.

The vaccine is not issued to medical practitioners. Under direction of the D.G. the vaccine is sometimes sent out to places where the need may arise, with all the precautions regarding its preservation. A record of all such vaccine sent and of all injections of the vaccine is kept by the Haffkine Institute. All yellow fever inoculations are given free. About a thousand inoculations are made every month.

The vaccine consists of the virus of the disease modified by numerous passages through the mouse, mixed with yellow fever immune human serum and then frozen, dried and sealed in glass ampoules. Each batch is numbered. The vaccine must be stored at or below the freezing temperature. If exposed to a higher temperature it deteriorates rapidly so that it becomes useless in about three hours at room temperature. The vaccine loses efficacy even when kept at freezing temperature in about three months. Periodic checks are made of a batch by inoculating white mice, who develop a paralysis of the hind legs within 10 or 12 days if the vaccine is potent.

The vaccine comes in ampoules of 20 or 100 doses. It is a yellowish white powder. Before use the requisite quantity of sterile normal saline is added so that each dose is contained in half a c.c. The solution must be used within three hours.

There is no fever or other reaction after the injections. Immunity is developed after 10-14 days and lasts for four years.

Bombay Medical } Yours faithfully,
Council, Bombay, } S. R. MOOLGAVKAR,
24.2.47. } President.

Book-Reviews

The British Encyclopædia of Surgical Practice—Gen. Editors: SIR EARNEST ROCK CARLING, F.R.C.S., F.R.C.P., and J. PATERSON ROSS, M.S., F.R.C.S. (in 8 volumes) Vol. 1, 1947, pp. 486, Messrs Butterworth & Co. (Publishers), London. Rs. 52-8-0.

The very favourable reception accorded to the *British Encyclopædia of Medical Practice*, has prompted its publishers to come out with this major surgical work—*British Encyclopædia of Surgical Practice*. The first volume starts with abdominal emergencies and ends with Autonomic Nervous System. The treatment of the various subjects is made in an alphabetical order and the various subjects are dealt with by eminent contributors, not only from the British Isles, but also from other parts of the British Commonwealth of Nations. All the chapters in this volume are good; and the chapters dealing with Adrenal Glands, Amputations, Appendicitis and Artificial limbs appear to be exceptionally useful. Though the work is designed primarily to meet the everyday needs of the practising surgeon who is outside a city and therefore has no easy access to libraries, works of reference or centres of teaching and research, there are several articles which cannot be ignored either by the expert or by the under graduate. The volume is well illustrated.

So that the work may not fall out of date,

the publishers propose to issue an annual cumulative supplementary volume, which will bring every volume of the original work up-to-date.

We are so confident of the usefulness of this work and its reliability as a guide to sound practice, that we await the subsequent volumes.—U.M.R.

Tharuneeyara Arogya—By SHRI AYURVEDA VIDWAN VINAYAKA RAO BAPAT, L.A.M.S., Publishers Sadhana Prakatnalaya, Sagar Shimoga. Price Rs. 2.

The book is highly useful for the newly wedded couple. It can be read by men and women with benefit. Every household should possess a copy. But it should not fall into the hands of unmarried people.

It is a combination of western and oriental sexual hygiene, both physical and mental. Especially the latter, we do not find in western books. The importance of rest and certain mental conditions during menstrual period, may look rather superstitious; but our ladies will stand to gain a good deal if they know them.

Married life is not looked upon as a purely sexual affair. It is regarded as very sacred, and sexual union, even within the wedlock, has to be under great restraint and intended only for procreating healthy and virtuous

issues. The author regrets, and rightly too, that in this respect the average man is a greater sinner than even lower animals.

The baneful effect of coffee and tea is stressed, and certain household recipe during puerperium. There are several useful minor hints more suitable for Indian climate,

habits, and environment, brought out by centuries old experience which we do not find in western text books.

There is also an elementary knowledge of conception, gestation, midwifery, gynaecology and even a chapter on contraception is added.

News and Notes

Indian Medical Association RESEARCH FELLOWSHIP

Dr. P. K. Guha, M.B., M.R.C.S., D.O.M.S., Hon. General Secretary, Indian Medical Association, invites applications for four Research Fellowships under the Indian Medical Association Research Fund of the value of Rs. 250/- each per month. The fellowship is open to men and women and will be tenable for a period of not more than two years. The applicants must be medical practitioners whose names occur on the Provincial Medical Registers.

The applicants must furnish the following information in their applications along with certificates of physical fitness and character.

- (a) Full name
- (b) Age and Sex
- (c) Permanent address
- (d) Details of academic career, including particulars of previous research work done by the candidate
- (e) Particulars of the proposed research scheme
- (f) Details of financial supports from other sources which the applicant will be in receipt of during the period of fellowship.

The note on the proposed research under item (e) should give (i) a resume of research work done on the subject, indicating the present state of the knowledge on the subject (ii) details of the proposed research, indicating (a) the methods to be employed, (ii) previous experience in the use of these methods and (iii) the experiments to be carried out.

Five typed copies of the note on the proposed research should be sent.

Applications must be forwarded through the principal or the Dean of a Medical College or the Director or the Officer-in-charge of a Laboratory or Institute where the applicant proposes to work and must be accompanied by a letter from the forwarding authority that he has critically examined the details of the proposed research and that he is willing to guide and direct as far as possible the investigation and provide laboratory facilities and the contingent expenses for the particular line of work will be provided by the College or the Institute concerned.

The progress of the work must be communicated every six months to the Hon. General Secretary of the Indian Medical Association, 23, Samavaya Mansion, Corporation Place, Calcutta-13.

Typed applications should be addressed to the Hon. General Secretary, Indian Medical Association, 23, Samavaya Mansion, Corporation Place, Calcutta-13, so as to reach the Association Office before the 30th April, 1948.

The Gujarat & Kathiawar Provincial Branch of Indian Medical Association

Under the auspices of the above association, Second Provincial Conference of the medical men of Gujarat-Cutch-Kathiawar will be held at Rajkot (Kathiawar), on 27th and 28th March 1948, under the Presidency of Rai Bahadur Dr. J. P. Modi of Ahmedabad. An influential reception committee has been formed under the chairmanship of Col. Kalyant Rai, Civil Surgeon, Rajkot. Dr. Jivraj N. Mehta, Director General of Medical and Health Services of India has kindly consented to inaugurate the Conference.



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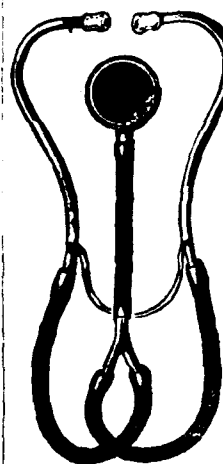
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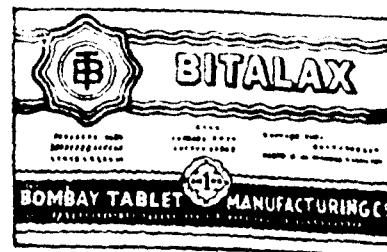
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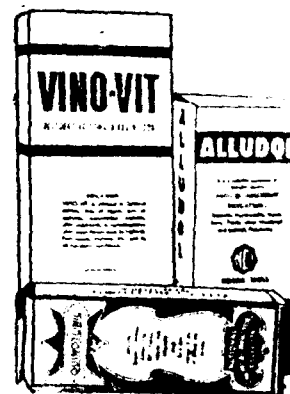
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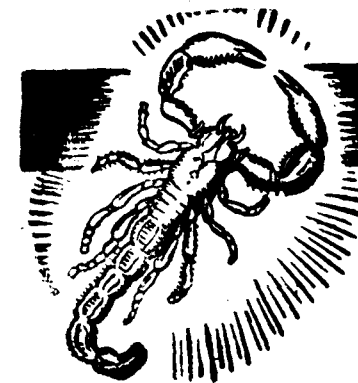
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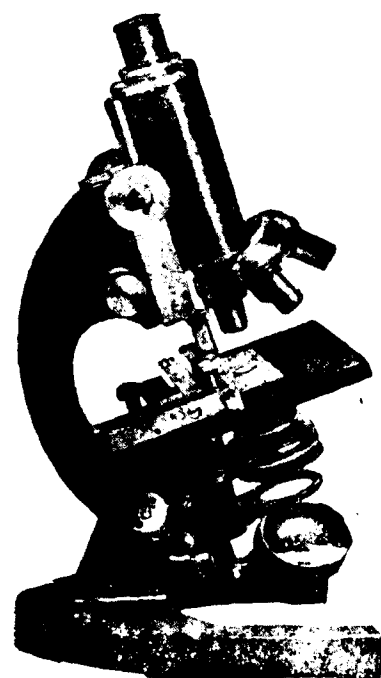
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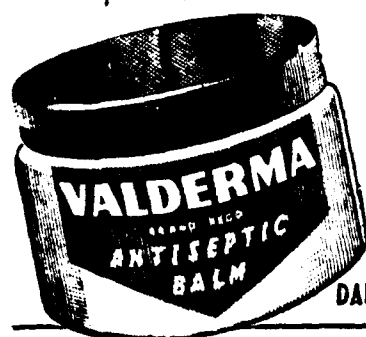
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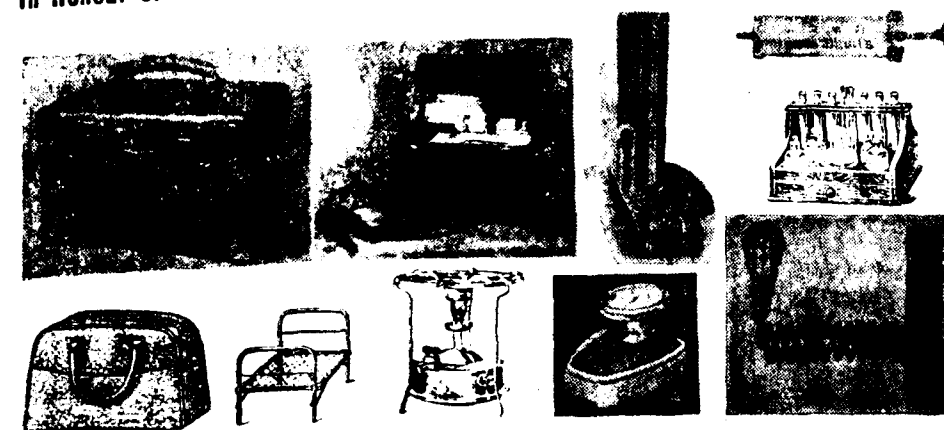


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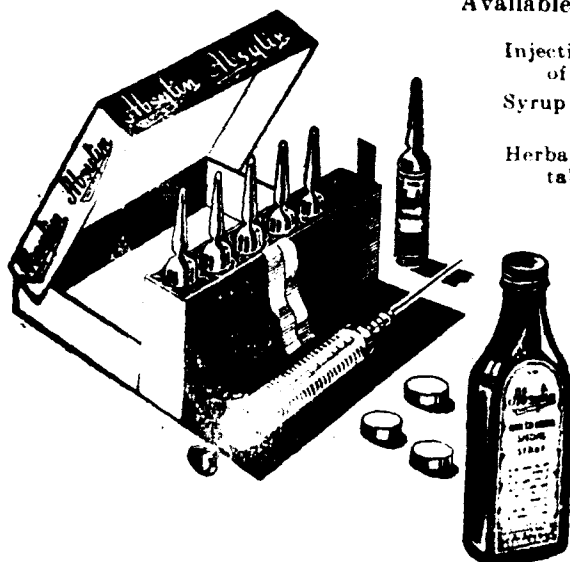
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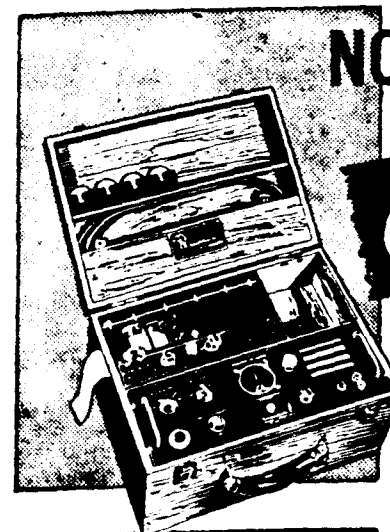
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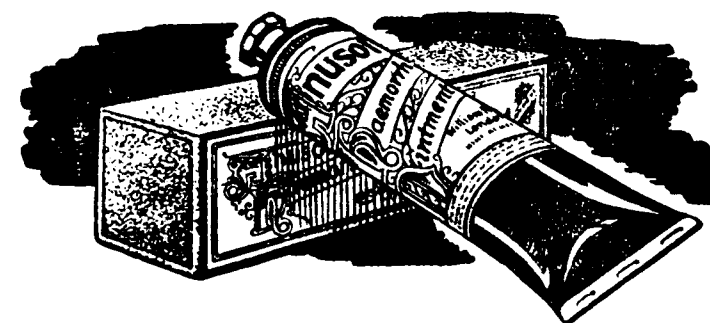
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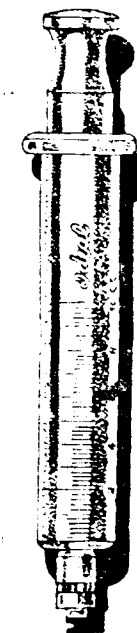
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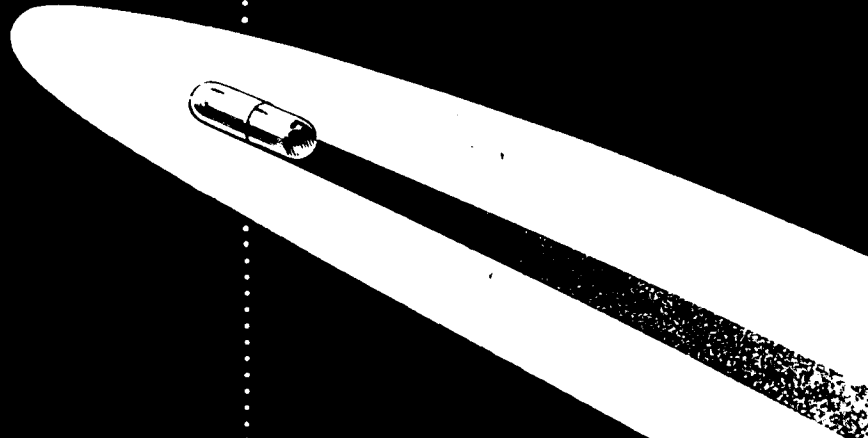
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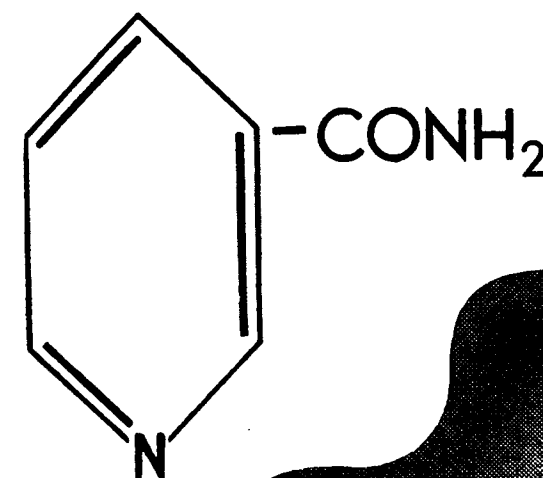
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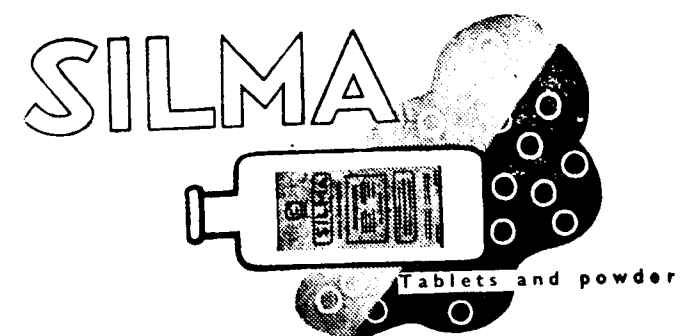
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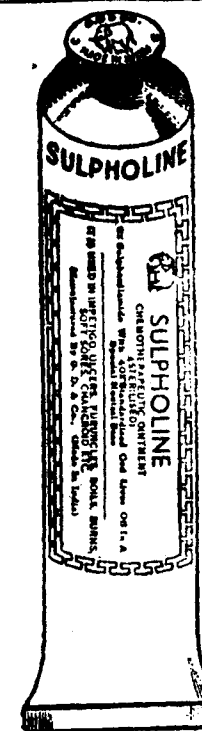
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Aneurine HCl	1.0 mg
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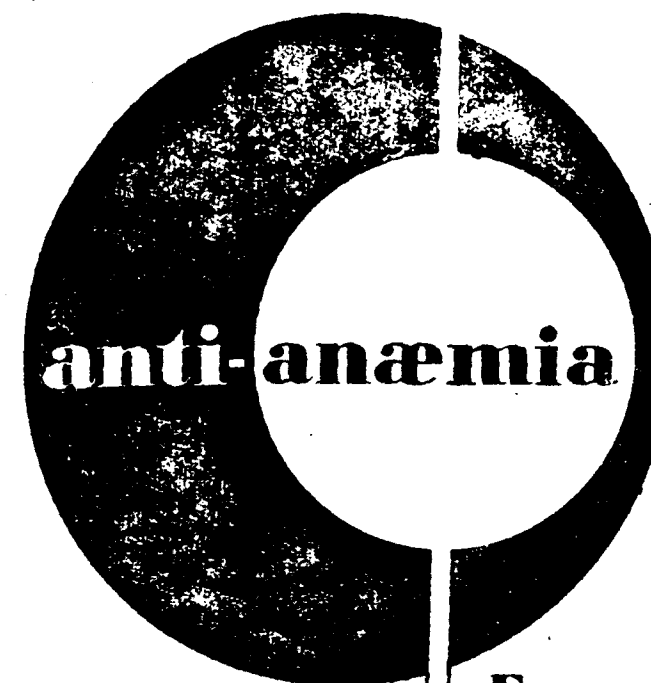
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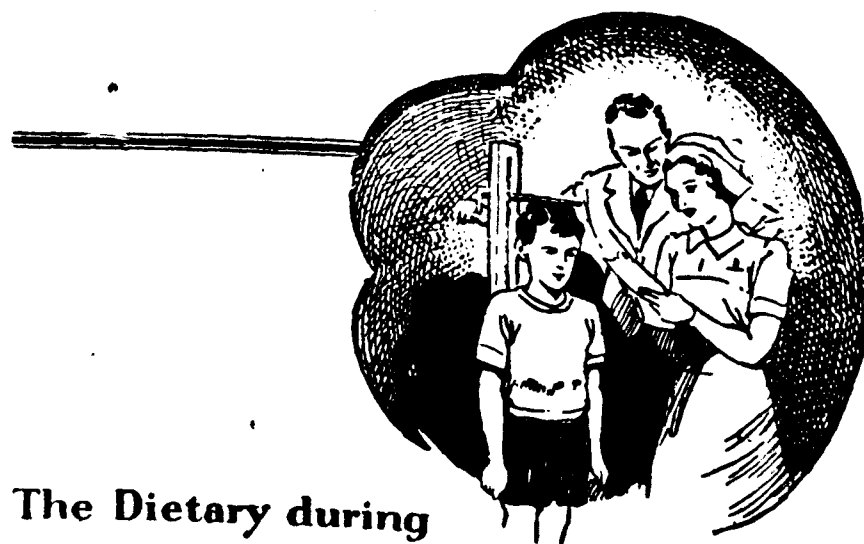
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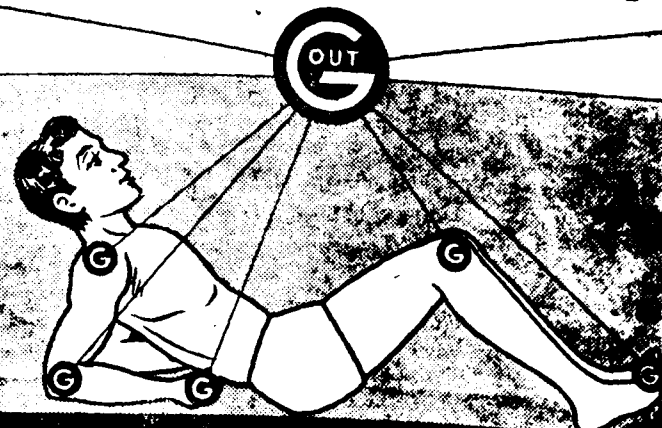
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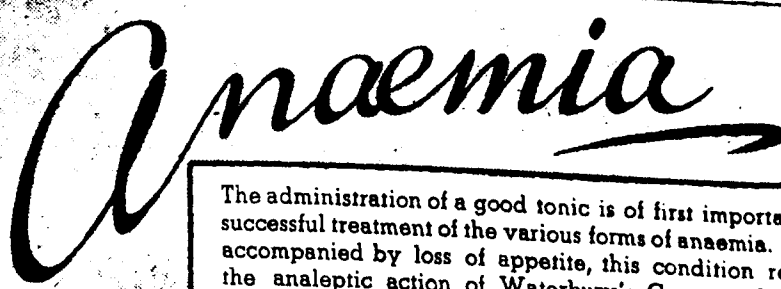
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Original Articles

Cirrhosis Liver*

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CIRRHOSIS liver is one of the common diseases of the liver met with in practice. In the last few years much work has been done on this, and the outlook of the disease is brighter with some of the recent advances in the treatment.

The disease seems to be much more common in men than in women. The age incidence seems to be the late middle life. The atrophic cirrhosis liver is rare in the younger age. It is more common in those who have access to alcohol. Alcohol by itself is not the sole cause as the disease occurs even in teetotallers. The consensus of opinion seems to be that nutritional deficiency lowers the liver resistance and a toxic factor like alcohol damages the liver still further, resulting in the breakdown of the liver function. In other words, alcohol seems to be a contributory factor rather than the sole factor. In non-alcoholics, the place of alcohol is taken by such toxic agents as the virus of infective hepatitis, the causative organisms of bacillary dysentery and chemical toxins like arsenic, lead and tetrachlorethane. Of these, barring alcohol, dysentery seems to be the next commonest causative agent in South Indian patients. Probably dysenteric organisms may not directly act on the liver, but cause cirrhosis of the liver by reducing the absorption of the nutritive material from the alimentary canal and also by raw areas in the gut allowing toxic material to get into the liver through the portal circulation.

Symptoms of cirrhosis liver.—Swelling of the abdomen occurring insidiously though it is painless in the large majority of the cases. For some reason or other few patients complain of pain of a generalised nature even apart from ascites. After the swelling of the abdomen, swelling of the legs occur. In a large percentage of cases, anorexia is a prominent early

* Specially contributed to THE ANTISEPTIC.

symptom. Nausea and vomiting may also occur. In some others hematemesis may be the presenting symptom. In men impotency occurs early

Physical signs in cirrhosis liver.—Ascites is the single constant physical finding in a fairly large percentage of cases. By the time the patient seeks admission with ascites, liver is not palpable. Spleen is also not palpable in most of the cases. In the ascitic stage, particularly in cases of sub-acute yellow atrophy of the liver going on to cirrhosis or infective hepatitis going on to cirrhosis, liver may be palpable even 3 or 4 fingers' breadth below costal margin. If in a case, liver and spleen are both enlarged and ascites is also present, the possibility of Hanot's hypertrophic biliary cirrhosis is a possibility though this condition is rare. The possibility of its occurrence should not be overlooked. After the ascites, swelling of the legs is bound to occur sooner or later. Jaundice is a late manifestation of the cirrhosis liver. Due to ascites, physical findings in the lungs may suggest bilateral pleural effusion. Very rarely pleural effusion may occur along with ascites. Where pleural effusion is suspected the skiagram of the chest is of great value.

DIFFERENTIAL DIAGNOSIS.—Other conditions in which ascites occurs should be eliminated. Ascites may be part of a general condition such as congestive failure, kidney disease, anæmia and rarely myxoedema. Particularly adhesive pericarditis, (in which repeated paracentesis abdomen is to be done for ascites) may be mistaken for a cirrhosis liver. The primary cause of ascites in these cases can be made out by the examination of the heart, the urine and the blood. Ascites due to causes in the abdomen are tuberculosis peritonitis, Banti's disease, secondary malignant deposits in the peritoneum and obstruction to the thoracic duct by filariasis which results in chylous ascites. The diagnosis is made in the case of tuberculous peritonitis by the presence of fever—as a rule not very high—varying from 100° to 101° F. I have seen cases with a temperature variation from normal to even as high as 104° F. In these cases constipation alternates with diarrhoea. As the abdomen swells wasting of the limbs occurs. In the abdomen irregular masses are felt. These are probably due to matting of the glands of the mesentery, giving rise to the irregular lumps. These are more commonly seen in children. In adults it is infrequent but may be made out if carefully looked for. Examination of the lungs might help in arriving at a diagnosis since tuberculosis peritonitis is often secondary to pulmonary tuberculosis. The ascitic fluid is rich in protein content varying from 10 to 14% with lymphocytic predominance. The next condition is Banti's disease, where the spleen is enlarged with ascites. History of hematemesis is common. In these cases even exhaustive investigation does not reveal any defect in the thrombocyte count, bleeding time, or coagulation time. The diagnosis is made more by a process of elimination. Hematemesis might occur several times, and one of them might prove fatal. Hematemesis should be done as early as possible. In a case seen by me in a young man with hematemesis I advised splenectomy even on the first occasion. For some reason or other it was deferred. A few months later the young man had a recurrence of the hematemesis and it proved fatal. I feel had splenectomy been done as per the advice given, this may not have occurred. Chylous ascites is often diagnosed by tapping milky white fluid. Microscopic examination reveals microfilaria and fat globules. The malignant abdomen is often due to secondary deposits in the peritoneum, the primary foci being stomach, breast, cervix or prostate. The fluid is blood-stained and section

cutting may show malignant cells. A Hindu male, aged 40 years, was admitted for ascites. History of ascites was of two years' standing. It was of insidious onset with loss of appetite. Digestion was impaired and there was frequent vomiting of undigested food but no hematemesis. Tapped one year back and the fluid was bloody. Six months ago the patient was tapped again and soon refilled. General condition on admission was that of ill-nourished individual of about 45 years, slightly anæmic, face pinched and drawn, teeth dirty, glands palpable with œdema of the lower extremities. Abdomen was uniformly swollen and umbilicus everted. The superficial veins of the abdomen were also distended. The other systems nil—abnormal. Paracentesis abdominis was done and 140 ozs. of blood-stained fluid drawn. Suspended in the fluid were yellow, jelly-like nodules of the size of sago grains. Fluid culture was sterile. Pathological report on the specimen: myxomatous material with glandular spaces lined by columnar epithelium. Adeno-carcinomatous secondary deposits. This patient was subjected to laparotomy and peritoneum contained plenty of jelly like nodules all over the abdomen, some free, and others implanted on the various viscera. Fluid was sucked out, the stomach was shrunken, hard and nodular, liver spleen and entire visceral peritoneum covered with malignant secondary deposits. Final diagnosis in the case was adeno-carcinoma of the stomach with extensive secondary deposits. In most cases of malignant abdomen, induration occurs around the umbilicus. The other cause of ascites is due to obstruction in the hilum of the liver by enlarged glands due to tuberculosis, syphilis or malignant deposits. In these cases ascites occurs with jaundice.

Treatment.—*Prophylaxis*:—Since the disease is caused by the nutritional deficiency and toxic factors, a balanced diet rich in vitamin B should be ensured. Also all factors likely to cause chronic gastritis must be avoided. Since alcohol is one of the most potent factors both in the production of gastritis and in damaging the liver cells it should completely be eschewed. Treatment of dysenteric disorders should be thorough. Other toxic agents like arsenic, lead and tetrachlorethylene, should either be avoided completely or if administered should be administered with great caution.

TREATMENT:—Once ascites sets in, it should be taken as an established case. Paracentesis abdominis should be done to give relief from distress. Mercurial diuretics may be given once a week as a routine. These are best given suspended in Glucose, intravenously. The mercurial diuretics act best in an acid medium. Hence Ammonium Chloride $1\frac{1}{2}$ drams per day administered on the day previous to the mercurial diuretic injection, on the day of the injection and on the day following the injection gives a very satisfactory diuresis. Sometimes I have even had as much as 160 ozs. of urine recorded in 24 hours' time. Where the fluid has got a tendency to re-accumulate rapidly, the mercurial diuretics may be administered even twice a week. I personally prefer the mercurial diuretics to be given intravenously. When given intramuscularly they cause pain and cannot be repeated as frequently as when given intravenously. But the advantage of the intramuscular route is, the effect is more sustained though less pronounced.

The recent advance consists in the administration of Methionine 2 grams daily and Choline Chloride 2 grams daily. Special liver extracts enriched with vitamin B complex may also be given. One such preparation

of liver extract is Intraheptol manufactured by Lederle. It is suggested by them to give 0.1 or 0.2 c.c. of the Liver Extract intramuscularly and if within 30 minutes no untoward reaction be noticed, as flushing of the skin, dyspnoea, or other allergic manifestation, the Liver Extract may be given intravenously well diluted. It is suggested by them to give on the first day 1 c.c. of the Liver Extract diluted in 25 c.c. of Normal Saline. On the 2nd day 3 c.c. diluted in 30 c.c., on the 3rd day 5 c.c. diluted to 40 c.c., on the 4th day 5 c.c. diluted to 40 c.c., on the 5th day 10 c.c. diluted to 50 c.c. and subsequently 10 c.c. diluted to 50 c.c. three times a week. The treatment is to be continued till ascites clears itself. If at any time any allergic manifestation is noted during the course of injection the dose of the Liver Extract should be reduced and only such dose which does not produce any reaction should be administered. The treatment with this particular branch of Liver Extract has been tried only in two cases so far by me. In one, the ascites cleared up promptly; but in the other ascites persisted, but clinical improvement was noted, in that the patient's appetite got better and the general condition showed considerable improvement. This treatment, I admit, is rather expensive for the average patient. Some workers in the field have advocated Cystine to be administered along with Methionine and Choline; but the opinion seems to be Cystine may act adversely also and it is not free lipotropic agents and that they prevent the fatty degeneration of the liver. Diuresis begins about two weeks after starting the patient on Methionine and the ascites rapidly clears itself. The liver if palpable at the start of treatment becomes not palpable as the patient shows clinical improvement. Along with this, high protein diet is to be included in the food. The proteins are best derived from skimmed milk feeding and meat. A minimum of 200 to 300 grams of protein is the ideal to be aimed at.

If in spite of these things the patient fails to improve, operative interference should be resorted to. Operation consists of implanting the omentum into the rectus sheath, scarifying the surface of the liver so that adhesions occur between the liver and the peritoneum. Also splenectomy have eliminated repeated paracentesis by an abdominal glass button connecting the peritoneum with the subcutaneous tissue. By these means the patient's ascitic fluid with its protein content drains through the pore of the button into the subcutaneous tissues and is absorbed as oedema treated with Liver Extract. Prior to the operation he had to be tapped at least once a week. After this he had to be tapped twice after the operation, and thereafter now for a period of three months, he has not been tapped any further and is leading a normal life. In another case where this was attempted, the relief was not quite so remarkable, the fluid tending to accumulate in several pockets probably due to intra-abdominal distension of diuretics. In another case submitted for operation, though the patient withstood the operation very well, in the post-operative period he developed cholemia and died.

Though with these lines of treatment, improvement occurs, if the patient neglects to take a balanced diet rich in vitamin B and does not

abstain totally and completely from alcohol, the whole train of symptoms will recur. It is the duty of the physician to impress strongly on the patient the need for abstaining from further alcohol intake. In one of my cases of cirrhosis of the liver associated with severe degree of anaemia remarkable improvement occurred with repeated blood transfusion. After this case I tried transfusion in a few cases. Clinical improvement undoubtedly occurs; but the treatment, for obvious reasons, cannot be tried in all cases.

PROGNOSIS:—Till about 3 years ago prognosis of an established case of cirrhosis liver was very bad. They generally lived for 6 to 8 months after the onset of the ascites and death occurred either due to cholemia or complications occurring, as intercurrent infections like pulmonary tuberculosis used to be common. With the advent of Methionine and Choline and concentrated liver preparations supplemented with operative interference, prognosis seems to be very much better. It is too soon to say how long the patient will live when they are brought back to normal conditions with these drugs.

My thanks are due to the Surgeon-General with the Government of Madras for permitting me to write this article.

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8C, Balfour Road,
Kilpauk, Madras.

Angina Pectoris and Coronary Thrombosis*

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Angina pectoris.—Angina pectoris is a syndrome characterised by paroxysmal attacks of pain occurring in the precordial region with a tendency to radiate to the left side. The pain comes off as a result of a sudden exertion or emotional strain and goes off when this has passed off. Dr. John Hunter described one of the attacks in the following vivid words: "As I was walking about the room I cast my eyes on a looking glass and observed my countenance pale, my lips white and I had the appearance of a dead man looking at himself."

Theories of causation:—1. Sir Clifford Albert is of opinion that angina is the cry of pain of a diseased aorta. According to his view the pain is due to a sudden stretching of an inflamed aorta. He was of the opinion that the relief of pain by Nitro Glycerine is due to the dilatation of the peripheral arteries and fall of blood pressure in the aorta.

* Specially contributed to THE ANTISEPTIC.

2. Sir James Mackenzie's view is that angina is an expression of exhaustion of the heart muscle, together with a susceptible nervous system. The pain is a visero sensory reflex. The sense of constriction is a visero motor reflex.

3. *Coronary view*:—According to this view the pain is due to a spasm of the heart musculature when it is subjected to the stress and strain without adequate supply of blood, owing to the coronary artery disease.

ETIOLOGICAL FACTORS:—1. *Heredity is a factor*.—The chief reason for this being a peculiarity in structure of the cardio-vascular system occurring in certain families.

2. *Age*:—The commonest age incidence is among those who are passing from middle life into elderly life. The males are much more affected than the females.

3. *Prevalence*:—The greater prevalence of angina pectoris in recent years has been explained on the basis of stress and strain of modern life. Is it probable that the incidence of noxious fumes caused by the methods of warfare coupled with the economic stress and strain are causing a cardio neurosis sequela of which is the greater incidence of angina pectoris?

SYMPTOMS:—The patient may experience a disagreeable feeling like indigestion, associated with belching. The chief cardinal feature is pain. This pain may characteristically radiate down the left arm, the neck, the jaw, the side of the face or shoulder. The effort causing this pain may be either a heated argument or during the act of sexual intercourse. During an attack the patient is pale; there is slight perspiration. The B.P. rises during the pain. Occasionally there is increased micturition or salivation. If the patient is in motion, he becomes immobile and remains so. The breathing rate is usually increased. The heart sounds may be weak.

PROGNOSIS:—The patient may die in the first attack as in the case of Dr. Arnold of Rugby or he may have many attacks.

TREATMENT:—This can be considered under two headings. 1. Treatment during the attack. 2. Treatment between the attacks. The commonest drug used is Nitro Glycerine 1/100—1/200. of a grain. These pills should be carried by the patient and should be chewed or placed beneath the tongue and allowed to dissolve instead of being swallowed.

The inhalation of Amyl Nitrite (2 to 5 min.) capsules which are broken in handkerchief and inhaled, act quickly and somewhat violently but is not simple for daily routine use. Rest, of course, is *sine qua non* for a case of angina pectoris.

Treatment between the attacks and to prevent recurrence:—Two views are held regarding the question of rest. I have emphasised on my patients and I have advised them on the importance of rest for four weeks following the attack of angina pectoris. I have known two of my cases who have slighted this important factor. Fortunately my attention was drawn to this during a second attack. I insisted on the necessity of taking rest, which has prevented a third attack so far.

All annoying experiences as disturbing visitors, business conversations, domestic worries, etc. should be strictly avoided.

Diet:—The semi-starvation milk diet known popularly as "Karell Diet" is recommended by some physicians; but this is a low caloric diet and has to be supplemented with other liquids, fruit juices and vitamins. I have given the following line of treatment after an attack of angina pectoris:

(1) 5 units of Insulin 5 c.c. followed in 15 minutes by 100. c.c. of Glucose I.V. 25% is given once daily for two weeks except in non-diabetics.

(2) A simple carminative mixture. 1 oz. half an hour before food thrice daily.

(3) Aminophylline (Aminocardol—Wander) tablets—1 tablet thrice daily for 3 weeks, and reduced to 1 tablet daily for a month. The idea of using this drug is that this has the effect of dilating the coronary artery and increasing the blood flow, so that the heart can withstand when subjected to stress and strain and there is no spasm of the musculature.

(4) The following prescription has been used by me for one week following an attack of angina.

R	Sod-Nitrate	...	gr. 4
	Erythrol-tetra Nitrate	...	gr. 4
	Mannitol Nitrate	...	gr. 4
	Ammonium Hippurate	...	gr. i

F. P. one powder twice daily.

(5) The use of Atropin was once advised by Sir Clifford Albert on the basis that the sudden and fatal outcome in some cases of angina is due to vagal inhibition of the heart.

(6) Sir James Mackenzie who believed that the angina is a cardiac neurosis, was using Bromides and Phenobarbitone as a routine.

Summary of the medical treatment.—I have been using the following line of treatment for my cases:—

(1) A period of complete rest for four weeks.

(2) Amyl Nitrite inhalation during the attacks.

(3) Aminocardol (Wander-tablets)—1 tablet twice daily for three weeks and reduced to 1 tablet daily for a month, following an attack.

SURGICAL TREATMENT:—Angina pectoris has not escaped the grip of surgeons. The first operation was done by Jennesco, removing the cervical sympathetic ganglia. At first the entire chain of superior, middle, and inferior ganglia including stellate were removed on the left side. Later the removal was confined to superior ganglia as suggested by Coffey and Brown. The more recent view is to interrupt the painful impulses through the upper four or five dorsal ganglia by alcohol injections. The most recent development is complete thyroidectomy. The factor involved in relief in angina in thyroidectomy is as follows:—

There is a lowering of the basal metabolic rate and consequent reduction of the work of the heart. This is called the 'Toxic Factor.'

Recently Beck and his associate by their ingenious experiments on mammals have opened a new method for the treatment of angina pectoris. They have sewed portions of the pectoralis muscles to the epicardium, after first ligating the coronary artery and have shown the development of anastomoses in the coronary bed.

Coronary thrombosis.—Parkinson remarks that when a man of advancing years is seized with a sudden, severe constricting pain while at rest in the precordial regions which continues for hours and accompanied by symptoms of shock, we may diagnose coronary thrombosis.

It is always puzzling to explain the sudden onset of coronary thrombosis. There is clinical and pathological evidence to make one believe that it occurs at the site of the previous atheromatous area in a coronary vessel. Leary has suggested that the sudden occlusion is the result of the rupture of the miliary sub-endothelial atheromatous abscess. Another perplexing factor about the pathology of coronary thrombosis is the occurrence at a particular area *viz.*, the left coronary artery one inch from its origin. There is something probably peculiar about this area. It may be a greater bend of torsion or a weakness of that area. That particular defect can explain the hereditary character.

PATHOLOGY:—When a coronary vessel becomes partially or completely occluded the areas of the heart muscle supplied by the vessel becomes infarcted. The areas affected are irregular in shape, pale yellow in colour and often surrounded by red zone. The larger areas may undergo softening, called "Myomalacia Cordis." This may lead to the perforation of the heart. Sometimes the weakened area bulges and forms into an aneurysm. If the endocardium is involved it results in a large secondary ventricular mural thrombus. If it extends to the pericardium there will be a localised aseptic pericarditis. If the patient survives, satisfactory healing takes place due to the anastomosis of the collateral vessels and a healthy scar forms.

SYMPTOMS.—1. Pain in the chest occurs at rest. The amount of pain may vary from none at all to the most severe agonising pain. The duration of pain is also variable; it may be for hours or even days—"Status Anginosus".

2. The appearance of the patient is peculiar. He seems to be in shock. There is anger animi.

3. There is fever and leucocytosis.

Relation of symptoms to lesions:—The pain, the distress, the dyspnoea, and the anger animi are due to the sudden cutting off of the blood supply to the part of the heart musculature. The work of Sir James Lewis has shown that if the blood supply to the skeletal muscles of the right upper arm is cut off by a tourniquet to the right arm and the hand was made to work, then, pain appears in about thirty seconds, and becomes unbearable in seventy five seconds. If the muscles were kept at rest the pain disappears. In the case of heart, the heart cannot afford to stop and rest, and we can judge naturally the continuous pain. The fever and leucocytosis are probably due to the formation of an aseptic abscess in the heart due to the cutting off of the blood supply.

Signs:—On examination during attack the following points are noticed:—General condition—Patient is cold and moist and takes on a grey ashen colour, face is pinched.

C.V.S. system:—Pulse—the volume and tension poor. Blood-pressure—the systolic blood-pressure is low. Heart—heart is slightly enlarged. Heart sounds are diminished in intensity—*tic-tac* rhythms are common. Pericardial friction rub may be present.

Respiratory system:—Moist bubbling rales may be heard all over the lungs.

DIFFERENTIAL DIAGNOSIS:—

Angina Pectoris	Coronary Thrombosis
1. Pain in angina comes on as a result of sudden exertion or emotional excitement.	1. The pain occurs while the patient is at rest.
2. The pain may occur at any part of the day or night.	2. The pain occurs generally between 12 to 6 A.M.
3. The patient is immobile.	3. The patient is restless.
4. The pain is retrosternal.	4. The pain is in the epigastric or substernal region.
5. The pain radiates to the left side.	5. The pain does not radiate.
6. The pain in angina goes off when the patient takes rest or when the emotional excitement ceases.	6. Rest does not relieve pain in a short time.
7. There is pallor without cyanosis in angina.	7. There is pallor with cyanosis.
8. Dyspnoea is not marked.	8. Dyspnoea is marked in coronary thrombosis.
9. Fever is absent.	9. Fever is present.
10. Leucocytosis absent.	10. Leucocytosis present.
11. Blood pressure is generally high.	11. There is immediate drop in systolic and diastolic blood-pressure; later there is diastolic rise.
12. Heart sounds are normal.	12. Heart sounds are diminished in intensity. Enlargement of the heart and <i>tic-tac</i> rhythm are common.
13. Amyl Nitrite relieves the patient.	13. Amyl Nitrite makes the patient worse.
14. Electro-cardiographic changes are present.	14. Electro cardiograph shows:—In lead I, Q is slightly rounded and dipped. Inversion of the T wave is present in lead III. In lead IV there is 'Pardee Curve.'

2. **Differential diagnosis between dissecting aortic aneurism and coronary thrombosis:**—The pain comes on with a greater suddenness in this condition than with coronary thrombosis. Fever and leucocytosis are present in both. The heart sounds are normal and there are none of the irregularities of the heart as in coronary thrombosis. In dissecting aneurism after splitting the wall of the aorta the aneurism and the thrombus may extend and compress any of the branches of the aorta producing diverse symptoms, as giddiness and blurring of vision due to the carotids anuria due to involvement of renal vessels and pain and numbness due to the involvement of common iliac artery. So the only differentiating points are the findings in the heart and the fall in B.P. in coronary thrombosis.

3. *Coronary thrombosis and pneumonia*:—I can distinctly remember when I was called in to see a case diagnosed to be coronary thrombosis. I found the following findings in the case. He had pain in the chest and a suppressed cough with dyspnoea moving ala nasi, cynosis fever and leucocytosis. One characteristic finding I noticed was the presence of index crepitations in the left base with increased V.R. and tubular breath sounds. The patient improved with Penicillip. It is of course possible to err.

4. Acute abdominal conditions as gall stone colic, acute appendicitis, acute intestinal obstruction, acute pancreatitis and perforation of a peptic ulcer, are sometimes mistaken for coronary thrombosis and *vice versa*. In these conditions the pain does not reach so high. A severe dyspnoea and marked tachycardia suggest a cardiac condition.

5. A case of diabetic acidosis and coma may be mistaken for acute coronary thrombosis. A routine urine examination is a valuable feature in the differential diagnosis.

6. Lastly a case of pulmonary embolism with infarction is apt to be mistaken for coronary thrombosis. The pain in the chest is more common with coronary thrombosis. There is generally distension of the veins in the neck, in the pulmonary embolism. The second sound in the pulmonary area is accentuated and there is sometimes a systolic murmur.

PROGNOSIS:—Three things may happen. The patient may die immediately due to cardiac failure. He may linger for a few hours or days or he may recover from the attack. Unfortunately medical men and lawyers who have to do very intelligent work are the ones to be affected by coronary thrombosis.

The experience of Stroud of Philadelphia indicates that the prognosis is more unfavourable in the left coronary lesions, than in the right coronary lesions.

TREATMENT.—The patient should immediately be put in bed and the first important measure to be taken is to relieve the pain. Morphia $\frac{1}{4}$ gr. is given subcutaneously. If the patient becomes unconscious and pulseless as happens occasionally, 0.5 c.c. of Adrenalin 1/1000 is given subcutaneously. Rest is absolutely essential. It should be both mental and physical rest. Disturbing visitors should be strictly prohibited.

Due to the excessive sweating dehydration develops and there is generally loss of chlorides. One pint of drip of Normal Saline is administered. Oxygen therapy is essential to combat dyspnoea and pulmonary congestion. 100 c.c. of 50% Glucose may be given I.V. or may be added to the Saline Drip. No enema is to be given for 48 hours.

I have used for my cases, in addition to the above, slow intravenous injections of Aminophyllin (Aminocardol—Wander). For three of my cases I have been able to notice that there was definitely a better progress by use of this drug, even during the attack; and I have started using this drug routinely during and after the attacks of coronary thrombosis. This drug Aminophyllin dilates the coronary vessels, increases the blood flow and prevents the myocardial infarction.

The rest of the treatment in coronary thrombosis is directed to the complications that arise. The common complications are:—

(1) Paroxysmal ventricular tachycardia. In this condition there is a fall in B.P. and the heart rate rising to about 200. There is a change in the quality and the intensity of the first heart sound. The drug that is commonly used is Quinidine.

(2) The second complication is the development of heart block which may be complete or incomplete.

Is Digitalis a drug to be used in coronary thrombosis? The opinion seems to be that Digitalis is not to be used in coronary thrombosis. Auricular fibrillation is very rare in coronary thrombosis, and it is only in this condition Digitalis can be used.

Diet:—A low calorie diet is one of choice.

A word of caution is to be given to the patients by the attending physician. The patient should be impressed on the absolute necessity of living within his limit of elasticity.

Briefly summarising the treatment of coronary thrombosis the following are the points to be remembered:—

- (1) Rest in bed for three months; and the patient is to remain ambulatory for three months.
- (2) Morphia is to be given for the relief of pain.
- (3) Oxygen inhalation.
- (4) Aminophyllin therapy is to be used.

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The Psychological Approach to Youth*

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I. Introduction.—In a study of the problems of the juvenile personality one should adopt a scientific attitude and avoid deleterious old time doctrines or dogmas.

(1) Youths differ in many ways. We come across different types of young boys and girls requiring diverse ways of handling. In a class of about fifty pupils, there will be a few physically handicapped, some intellectually superior, and others with emotional and temperamental idiosyncrasies. The dull, retiring, depressed youth; the over-dependent youngster; the over-anxious boy or girl; the over-assertive adolescent; and the crippled juvenile—all require individual attention and catering.

(2) The only child in a family is generally regarded as a problem child and is most likely to manifest large variations in behaviour. Where there are a number of children in a family such behaviour difficulties are not numerous.

* Specially contributed to THE ANTISEPTIC.

(3) We come across unsociable youths: Youths who dislike mixing, with other fellows; mentally retarded youngsters who present problems to the parents and teachers simply because they take too long a time to understand the directions of the elders and intellectually deficient to act upon their instructions. Lastly we cannot afford to overlook the special problems of the gifted youths—the superior group.

Under the present system of schooling in our country nothing is being done in way of either discovering or proper handling of gifted or regarded children.

II. Some types of behaviour.—In approaching the young boy or girl for either instructional or re-educational purposes, it should be our first endeavour to discover why exactly he or she is behaving in a particular manner which may be either tasteful or distasteful to the adult mind.

Whimsical behaviour:—Those who are placed in the important position of correctors should bear in mind the simple fact, that in a majority of cases, it is a tendency on the part of a young person to correct or modify his behaviour if directly or indirectly the opinion of the group or the ideals and standards of the age are brought to bear upon him preferably with vivid illustrations. Such influences result in beneficial changes to the youth. In certain large families the parents find it less difficult to maintain discipline as much of it is being done by other adult members in the family.

Variegated and whimsical are the emotional tendencies of youth. Numerous and new are the personality adjustments attempted by them. Young boys and girls often derive thrills from apparently non-pleasurable emotional experiences with the same intensity as they would from pleasant emotions and intellectual experiences.

Some of them seek emotional gratification in direct and vehement violation of group manners and customs and downright defiance of parental and school authorities. They are not reluctant to trespass over forbidden tracts and thereby derive the highest satisfaction in asserting their youthful personalities.

Behaviour underlying adventure—revolt and rebellion:—It is a healthy tendency to find in young boys and girls a keen desire to know the unknown. Most of them have a keener hunger for dashing to do new tasks planned by them and obtaining immense pleasure in overcoming obstacles and solving difficult problems. Ordinarily they rarely find zest for doing tasks ordered by elderly people. Such tasks are treated by them in much the same way as the tasks assigned by school authorities. There is thus a strong tendency to break away from adult standards and prohibitions. But, apart from this propensity for revolt due to aversion to the adult orders, there is a certain basic tendency which appetises the youth to comply with and behave in accordance with the ethical forbidding and social morales.

The effect upon civilisation of this propensity of the youth is something enormous and far reaching. The socio-economic and even moral progress has been the result of such daring experiments by the youth of a country in those spheres. History is full of such events.

Behaviour underlying worry and depression:—Some boys and girls have a greater tendency to worry. They take the little mishaps to them

rather too seriously, and overburden themselves with a load of worry. Often we find some of them melancholic. They are over-serious about all sorts of personal affairs—their facial appearances, nails, pimples, hair cut, and so on. These overburdened and over-serious youths should never be neglected. They must be encouraged to improve their sense of humour. It is very difficult to define or comprehend humour. A sense of humour can be cultivated by making boys learn to tell funny stories, reading magazines in the vernaculars similar to *Punch*, attending humorous motion pictures and taking part in fancy dressings. To some extent this is being done in our schools and colleges. Good humour is protective in value as it frees the individual from morbid imagination. Opportunities for enlarged social mixings can be assured by good humour.

Behaviour underlying self-consciousness:—Most of the young boys and girls seem to be acutely self-conscious in their teen age. It is not uncommon to come across adolescent and pre-adolescent youths spending minutes and hours daily before a mirror. They try to tamper with the pimples on the face, admire or feel depressed over their body development and muscles. They may be seen flinging the arms, clenching the fists, showing the teeth, taking swings and jumping over raised mounds and shallow pits. All these vigorous activities are calculated to strengthen, energise and develop their muscles. The first thing that boys and girls of the teen age do when they get a periodical or a daily newspaper is to search for advertisement columns associated with toilet equipment, physical culture apparatus and such other things. Often they keep these things secret to themselves and do not divulge to their parents.

Adolescents with queer personality traits are often difficult to understand and get along. Parents and teachers should be keen in obtaining the opinions of the experts in the field of psychiatric guidance in understanding and handling these peculiar youths. Boys and girls should not overgrow the addictions of personality and temperamental idiosyncrasies. Such abnormalities whether stammering, fright, difficult tonsils, inferiority feeling or any peculiar twist of personality are likely to grow worse as the years pass.

III. The right approach.—*Overawing discipline vs. willing submission:*—The policy of frightening a youth and overawing him into submission is to be discarded in preference to securing willing obedience and agreeable co-operation by healthy guidance and wholesome discipline. What is the use if our elders obtain superficial submission when boys and girls are teeming with revolt and rebellion inwardly? This outward obedience is a mockery and a hypocrisy. Parents and teachers should minimise opportunities for the boys and girls to practise deception. By making our boys and girls submit themselves to unreasonable, unnecessary and unwise discipline, we are promoting them to develop into querulous, resentful and over-pugnacious adults. Wives and husbands brought up in such over-regulated houses find it extremely difficult to get on amicably; they are resentfully pugnacious, touchy and many a time their behaviour is akin to that of mentally abnormal persons. Their married lives are unhappy and the one is always suspicious of the other.

It is definitely a harmful policy to restrict, prohibit and emphatically forbid the movements of our youths. Such a policy invariably results in turning them into the forbidden tracts. Youths desire to experiment with the proscribed and the forbidden.

Boys and girls in their teens have a keen eye for exploration, discovery and adventure. Most of them take extraordinary risks. They take delight and derive untold pleasure in asserting their independence, because by so asserting themselves, they will be breaking away from the arbitrary and unwise restrictions.

IV. Directing the energy.—*Successful restraint and sublimation*:—Ordinarily boys and girls in their teen ages are full of energy and enthusiastic to do this or that task. The enthusiasm is generally misunderstood by parents and teachers. It is partly true that much of this superabundant energy is spent in undesirable channels. As for instance, when students engage themselves in organising unwanted strikes, etc.

It is exceedingly a very difficult task to direct successfully the energies of young people into useful channels. This superabundant energy manifesting sometimes in undesirable forms of expression cannot be overthrown and cast out of the youthful personality by mere threats, repressions or force of will. Other better, more healthy and stronger ideas must be formulated and built up in their minds to take the place of their mischief-making predecessors.

Restraining the natural impulses to a certain extent is of course essential. But this should never be confused with 'repression.' Repression is invariably associated with subconscious conflict. This involves the available energy being drained and taxed both ways: (1) in repressing the natural impulse; (2) in restraining it for an indefinite length of time. If instead of repression, successful restraint is made to result in sublimation, the available energy can be directed into useful and serviceable channels of social activity. The unfolding and unification of the youthful personality can be achieved if our elders permit and provide opportunities for the little fellows to express themselves in such of those activities calculated to lessening their emotional tension.

Minimise monotony—diversion and relaxation:—In every locality social clubs must be formed and social activities associated with educational organisations besides others be given due attention.

Activities with a large number of pupils participating should never be discouraged. The majority of the pupils in India are forced to lead a monotonous existence. Monotony is one of the basic causes for the employment of the revolt and rebellious mechanisms. It makes little difference whether it is the Christian Missionary schools or the Government managed schools or private Boarding Homes, there is the same monotonous atmosphere and it is this monotony which is mainly responsible for sustained tension. "This tension is certainly fatiguing to the nerves, wearying to the mind and wholly unsatisfying to the emotions." How to minimise this tension amongst our pupils?

When the youthful minds are filled with varied, abundant and interesting memory materials, monotony can be minimised. Diversion, recreation and relaxation in the evenings should form a large part of our boys and girls programme of activities—the types of such activities being determined by the cultural background, geographical and other peculiarities of the region.

Promote social instincts.—Summer camps organised on the lines of the Boy Scouts and Girl Guides organisation will be of immense value in

fostering the social instincts, and cultivating their social nature. In the cross-country camps, boys and girls do something entirely different from what they have been doing. There is change and that is what they need. Organising social services during the annual fairs (Jatras) will promote the social spirit, social life in all its forms is a healthful means of relaxation. A few boys and girls may feel shy and hesitate to volunteer their services. Such of them should be enlisted and properly encouraged.

There are a number of different public or quasi public movements of the present day in India which invite the youths to volunteer their services in their leisure hours.

Organisations for the aged, the blind, the crippled, the refugees—collecting money for orphanages—the Ramakrishna Movement—Hospital Entertainments—Children's Aid Societies—Discharged Prisoners' Aid Societies—Beggars Relief Movement—Organisations for the advancement of the Vernaculars—The Untouchability Movement—these and many other forms of altruistic and philanthropic works are greatly in need of the thought and energy which our youths are daily made to waste in streams of activities monotonous to themselves and revolting to the ethical forbiddings and social morales.

"Drama-acting":—School boys and girls generally take delight in drama-acting. Drama-acting seems to impress the teen age boy or girl more than any other form of social activity. If our teachers and elders are judicious, scientific, and tactful in the selection of the roles, drama-acting will turn out to be a highly corrective instrument in twisting certain temperamental idiosyncrasies. It does no harm to assign objectionable or villainous roles to older boys and girls whose characters are already formed and stabilised. Depressed, poverty-stricken, and ill-placed pupils can be made happier and adequate by making them function in roles which bring them triumph, satisfaction, and success over their petty trifles, failures, and emotional fears.

Day dreaming which is nothing but a shifting and drifting activity of the creative imagination common amongst the adolescents can be prevented if our pupils could rehearse themselves in the practical and masterful roles of triumph and success. "By resorting to drama-acting the creative imagination is kept in directed and controlled channels." Robust dramatisation is far more efficacious than the technic of autosuggestion so well advocated in books on the technic of instruction.

Attending motion pictures need be positively encouraged. The young human mind is much more appreciative of pictures than mere words. If a young boy or girl can visualise himself or herself as superior, triumphant, stronger and adequate over fear, superstition, etc., it will create a deeper impression in the mind than mere threats or words of authority. This acquaintance with motion pictures can be utilised by our parents and teachers in influencing our boys and girls carry on a Arjuna, Kalidasa, Shakespeare, Shivaji, Tagore, Bose or Mahatma Gandhi etc., in the depths of their own creative imagination. Cultivating such an attitude is more healthful than forcing them into uncontrolled random day dreaming.

Rehearsals of the creative image making will result in forming acceptable reaction patterns and trends in the young mind. It will not be difficult for the youths to employ these reaction patterns in successfully meeting reality situations.

I would make a strong plea for the inclusion of school dramatics in our future educational programme. It is either not encouraged or neglected at present greatly to the disadvantages of our young boys and girls. Not only must the system of educating the youths in a country labour to prevent stress, overstrain and wastage, but equally avoid monotony and oppressive atmosphere.

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Planning of Leprosy Work in India*

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Introduction.—In this age of planning it is needless to stress the need and the importance of careful planning for the successful solution of the gigantic leprosy problem facing India. The recent report of the Health, Survey and Development Committee of the Government of India, generally known as the Bhore Committee, has outlined broad principles for the development of anti-leprosy work in the country. These recommendations have been mainly based on the "Report on Leprosy and its Control in India" prepared by a Special Committee of the Central Advisory Board of Health. The purpose of the present paper is not to review the recommendations of the Bhore Committee, but to draw pointed attention to certain matters of outstanding importance. These include:

- I. Ensuring a uniformity of policy and action in the various parts of the country.
- II. The development of group isolation.
- III. The development of social services for the needy patients and their dependants.

I. Uniformity of methods.—Anybody who has seen leprosy work in the various provinces would have noticed the lack of uniformity of policy and methods of work. It is very essential to rectify this defect. It should be the function of the Central Government to set up a machinery to ensure uniformity of methods in anti-leprosy work throughout the country, and to render help and advice to the various Provincial and State Governments. The Bhore Committee recommended for the establishment of a Central Leprosy Institute, one of whose functions is to be the development of an information service providing the latest information regarding the disease and anti-leprosy work in general for the benefit of the government and the organisations interested in leprosy.

The Central Leprosy Institute, when it comes into existence, could very well take up the responsibility of co-ordinating and supervising the anti-leprosy work in the whole of the country. Nothing is known as to what steps are being taken to bring into existence an institute of this kind, but it appears that the proposal has not received the priority it deserves. Steps should certainly be taken to bring into existence a Central Leprosy Institute of India at an early date. Till such time as this Institute comes into existence, some other machinery should be set up at the Centre by the Ministry of Health to stimulate interest and to ensure uniformity of methods in anti-leprosy work throughout the country.

* Paper read before the All-India Leprosy Workers' Conference, Wardha, C.P.

After such a machinery comes into existence, one of the first things to be done should be to define and demarcate the functions of the various agencies engaged in anti-leprosy work in India. These agencies include the Central Government, the Provincial and State Governments, Local Bodies, Mission to Lepers and other Missions, British Empire Leprosy Relief Association, and other voluntary organisations. This would help in bringing about uniformity of methods, and would lead to increased efficiency. The Central and Provincial Governments should take a greater share in, and direct responsibility for, the anti-leprosy work in the country. This would necessitate a revision in the scope and functions of private agencies engaged in anti-leprosy work, and consequently a re-orientation of the policies of such agencies. Perhaps the best lines of work for such agencies would be to engage in social services in connection with the disease—a so far neglected aspect of leprosy.

II. Group isolation.—Isolation of infective cases is recognised to be the only sure method of controlling the spread of leprosy. It is also appreciated that in India with its vast leprosy problem and limited institutional accommodation, it is not possible to isolate all or a majority of infectious cases in leprosy institutions. The existing leprosy institutions can take care of only a fraction of the total number of cases requiring isolation. There is no doubt an urgent need for increasing the number of institutions, but obviously it is not possible in the near future to increase them to such an extent, as to meet all the requirements. There is, therefore, even a more urgent need for evolving alternative cheaper methods of isolation. This need has been recognised, but practically nothing has been done to solve the problem.

Group isolation or village isolation is the alternative method considered to be suitable to Indian conditions. The Bhore Committee endorsed the idea and recommended for the development of group isolation colonies in all the areas where leprosy is a health problem. The Committee was fully convinced that the group isolation colonies would occupy an essential place in the anti-leprosy campaign, because they alone could provide for the isolation of the large numbers of patients requiring segregation. The Committee recommended an annual expenditure of 3 lakhs on the development of group isolation during the first 10 years.

The matter has however received scanty attention. In view of its importance, it is imperative that the matter should receive immediate attention.

Social service.—Leprosy creates social and economic problems which have to be taken into consideration while planning anti-leprosy work. While the medical and public health problems created by leprosy have received certain amount of attention, its social and economic aspects have been almost completely neglected. It should be clearly borne in mind that any attempts to deal with leprosy as only a medical or public health problem are bound to fail.

Following are some of the social and economic problems needing attention:—

(1) *Social stigma attached to the disease.*—Leprosy is often considered a social stigma, and a person suffering from it and sometimes other members

of his family, are subjected to great ostracism. It is sometimes difficult or impossible for the patient to remain in family or village.

(2) *Loss of livelihood*:—The disease often causes inability to earn a living. This inability may be caused by the disease partly or completely incapacitating the patient, but is often caused by exaggerated fears of the employers because of which even non-infective and able-bodied persons suffering from leprosy lose their employment.

(3) *The dependents of the patients*:—The patient has often wife and children, and the loss of employment affects not only the patient but also his wife and children dependent on him. Admission of such a patient into a leprosy institution does not solve the difficulties of the dependents who are left destitute.

(4) *Discharged able-bodied patients*:—A leprosy patient discharged 'cured' or 'arrested,' from a leprosy institution, creates another problem. As long as he was in the institution, he had his needs looked to; when he goes out he is left to his own resources, and finds himself in environments which are hardly sympathetic. No doubt he is no longer a source of danger to others but the healthy people still remain afraid of him, and still maintain the attitude of ostracism against him. He finds it almost impossible to get an employment, and rehabilitation amongst his people is also impossible.

(5) *Crippled patients*:—The disease may leave a patient crippled and unfit to do any kind of work.

In any anti-leprosy planning it is essential to make provision for social services to solve the above problems. The nature of help will have to vary according to individual needs, but provision may have to be made on the following heads:—

(1) *Publicity*:—Extensive publicity using all the modern methods should be employed with a view to making the general public adopt a rational attitude towards leprosy and persons suffering from this disease. This will help in removing the social stigma attached to the disease, and the consequent restrictions on, and sufferings of, the patients and members of their families.

(2) *Financial aid*:—Destitute and indigent patients and their dependents may need grants for maintenance.

(3) *Provision for able-bodied patients*:—The non-infective and able-bodied patients should, if necessary, be trained for suitable occupations, and help may have to be rendered in finding employment for them. The cases discharged from the leprosy institutions as 'arrested' or 'cured' will specially need help for rehabilitation. The establishment of farm colonies for such patients would perhaps be the best method for tackling this problem. These farms, as far as possible, should run on self-supporting lines, after the initial expenses are met from outside sources.

(4) *Crippled patients*:—For the benefit of patients who are left crippled by the disease and are unfit to do any work, there would be need for asylums run on the lines of 'Poor Homes.'

(5) *The children of patients*:—Healthy children of infectious patients need special attention as they are in great danger of contacting the disease if left with their parents. There should be arrangements for these children to be removed to a place where there are no chances of contact. Attempts

should be made to find healthy relatives to take charge of them; in the case of the children where this cannot be arranged, there will be need for special homes. In these homes they should be looked after, educated and given a vocational training so that later they can find suitable employment.

In the development of the social services, the non-official organisations will have to play a leading role. As a matter of fact, these activities should constitute the main function of voluntary, non-official organisations. The Governments should take over the direct responsibility for the treatment of cases of leprosy, and the isolation of the infective cases. This would allow the voluntary organisations to concentrate on the development of the social services.

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Some Blinding Diseases of Malabar*

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TWELVE years of ophthalmic work in this district (Malabar) has given me some idea of the blinding diseases common to this part of the presidency. In the out-patients' department every day a few cases come—cases that are beyond repair with the hope that surgical interference would restore vision. It is a pathetic sight to see them returning with all hopes shattered when told nothing could be done. When you care to go into the history of these cases you will find that most of them—innocent folk from the country-side—have been under the treatment of a native 'eye-physician' for pretty long periods and when the physician wanted to get rid of the patient he advised him to go to the hospital for surgical treatment.

The blinding diseases commonly seen here are in their order of frequency: I. Corneal ulcers; II. Trachoma; III. Glaucoma; and IV. Optic atrophy.

I. **Corneal ulcer** is a serious condition because of the rapidity of its spread and involvement of the whole cornea. In its healing it leaves a scar which impairs vision considerably. The scar of a total ulcer of the cornea occludes vision completely. Of the 3,890 out-patients seen by me in the past 6-7 months, 135 were corneal ulcers. It is not possible to say the degree of corneal involvement in every case, but these were all marked ulcers. From the statistics available, I can just tell you the aetiological factors in the ulcer production as far as they have been noted down. 15 cases were ulcers superimposed on keratomalacic eyes. These were all children in advanced stage of keratomalacia treated mostly by the native physician for 'grahani' and advised to consult the specialist when the eye got involved. 17 cases were hypopyon ulcers, i.e., ulcers with exudates in the anterior chamber. One was a herpetic ulcer and another a phlyctenular one. Four were ulcerations superimposed on injury of the cornea (i.e., traumatic ulcerations). The remaining 97 were ulcers where the distinctive characteristic was the association of dacryocystitis with the ulceration. I cannot say whether dacryocystitis was present in every

*Paper read at a meeting of the Malabar Branch of The Indian Medical Association.

case but it was present in a large percentage and was probably the underlying cause.

The treatment of ulcers of the cornea is not an easy one as results have been very disappointing even in able hands. If the ulcer heals it leaves a scar. If it spreads and heals it leaves a total scar. If the infection spreads internally, panophthalmitis necessitating the removal of the whole contents of the eye-ball is the inevitable result. If the case can be tackled early enough before being meddled by the quack, prognosis has been favourable. Penicillin injections have not produced favourable results in the treatment of corneal ulcers but local Penicillin (*i.e.*, instillations in the eye at frequent intervals) has had a checking effect in the spread of the ulcer. There is an important fact I want to bring home to your minds. This is in the field of prevention. In every case where the lachrymal sac is septic, advise your patient to attend to it immediately as removal of a septic sac is the first preventive measure against corneal ulceration. The incidence of septic sac in the ulcer cases mentioned above would lay sufficient emphasis on the causative factor of corneal ulcers. If the septic sac is removed, you prevent a corneal ulcer and thus a blinding disease.

II. **Trachoma** is the second most frequent blinding disease in these parts. The 28 cases among the 3,890 out-patients are fully established cases where diagnosis is not doubted and my impression is that there are more cases of trachoma though they have been in their early stages. The accepted view is that this is a disease due to a virus infection. The impairment of vision produced by trachoma is all due to the complications and sequelæ. The formidable complication of trachoma is corneal ulceration and this is one that can be prevented by proper treatment. The sequelæ of trachoma are entropion and trichiasis where the upper lid turns inside and eye-lashes rub against the cornea producing ulcerations and scar. These sequelæ respond very quickly to surgical treatment. For example, a Webster's operation is the treatment of choice in entropion.

III. **Glaucoma**.—In my series, I had 25 cases. Glaucoma is a condition where due to inefficient filtration of the aqueous humour, the eye gets water-logged and the intra-ocular tension rises. The resultant increased pressure on the optic nerve produces gradual atrophy of the nerve head and consequent loss of vision. Don't think the onset of glaucoma is heralded always by intense eye-pain, headache, vomiting etc. If these symptoms are present, matters become easy for diagnosis. Usually what I have seen is, the patient complains of gradual loss of vision and the native physician gives him an assurance that it is "cataract" and he sleeps over the disease until sight is totally destroyed. At this stage he consults the specialist for operation of "the cataract." This is the stage where we can do nothing except pray for the patient. This is the picture of the glaucomatous patient usually coming to the O.P. His eye for all outside appearances may be looking normal and he has had probably no pain to induce him to seek the specialist's opinion at an early stage. In every case examined and rule out the possibility of glaucoma. When glaucoma is diagnosed early, further loss of vision can be prevented by a sclero-corneal trephining or any other filtration operations. In many cases vision is restored to normal when trephining is done early. Never allow the glaucoma to "mature" like the cataract. That this disease is more

common than we think of is apparent from the figures of last six months. Of the 172 cases that came up for "defective vision" 25 were definite cases of glaucoma. I think there are more cases than these 25.

IV. **Optic atrophy**.—The most formidable and at the same time rather common blinding disease is optic atrophy. I am unable to deal at length with the various aspects of this disease in this paper as it will take considerable time. The eight cases diagnosed without much difficulty in my series were all advanced stages of the disease where treatment was of little avail. I think there were more cases among the 172 cases of "defective vision" showing various degrees of optic nerve degeneration. Among the commonest aetiological factors of this condition, I think untreated syphilis and incompletely treated syphilis stand uppermost. They have all responded fairly well when tackled in the earliest stages but have reacted differently to treatment in the advanced stages. I have found malarial therapy of immense benefit for early and slightly advanced optic atrophy of syphilitic origin. I have not tried malarial therapy with Penicillin therapy. Here again the condition is often diagnosed by the native physician as "cataract" and allowed to "mature"—thus losing much valuable time.

Before closing I want to recapitulate and re-emphasise some of the points mentioned above: (1) I have mentioned above some of the blinding diseases seen in this district in their order of frequency; (2) these are diseases whose progress can be checked when tackled early; and (3) most of the patients have suffered in the hands of the quack and lost valuable time.

My thanks are due to the Superintendent of the Hospital, Dr. Madhava Menon, for his kind permission to utilise the Hospital statistics.

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Relation of Various Normal Hæmatological Values with Normal Blood Sedimentation Rate in the Punjab

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TABLE I
Normal Blood Sedimentation Rate and Other Hæmatological Values in the Punjab *

	Blood Sedimentation rate Westergren			Red blood corpuscles	Hæmoglobin in grams	Packed cell volume	Mean corpuscular volume	Average corpuscular Hæmoglobin	Mean corpuscular Hb. Content. %
	Range	Average	Standard deviation						
Male	0.5—23 mm.	7.02 ± 5.97 mm.		5.17 ± 0.57	14.78 ± 1.29	47 ± 4.17	90.7 ± 2.8	28.44 ± 2.02	31.44 ± 2.02
Female	3.0—27 mm.	14.4 ± 9.74 mm.		4.612 ± 0.45	13.06 ± 1.15	41.8 ± 1.04	90.6 ± 6.8	28.17 ± 3.3	31.45 ± 4.15

* The Indian Medical Gazette, Vol. LXXXI, No. 8, August, 1946. (By the same authors.)

for respective series. As seen from the proportion of cases in each cell of these tables there exists no correlation between these two characters. The value X^2 was found to be 10.24 and 4.55 and when these values were referred to Fisher's table for 6 degree of freedom they gave a probability figure of 0.12 for males and 0.56 for females, showing that the proportion of cases in each cell of these tables might have arisen by chance. The coefficient of correlation between these two characters was further calculated and the values obtained were -0.4 and -0.1 respectively which are 3.3 and 0.05 times their standard errors of $1/\sqrt{75-1}$ and $1/\sqrt{25-1}$. Again it shows some significant indirect correlation in the male series but none in the females. The values are such that we cannot draw any conclusion for clinical purposes.

TABLE VI.
Packed Cell Volume.

Blood Sedimentation Rate	From 35 to 38	From 38.1 to 42	From 42.1 upwards.	Total
From 1 to 9 mm.	1	3	4	8
.. 9.1 to 15 mm.	2	1	3	6
.. 15.1 to 20 mm.	0	3	2	5
.. 20.1 mm. upwards.	2	1	3	6
	5	8	12	25

X^2 -Total=4.55. P-Total=0.56. F-Total=6.

TABLE VII.
Packed Cell Volume.

Blood Sedimentation Rate.	From 35 to 38	From 38.1 to 42	From 42.1 upwards	Total
From 1 to 9 mm.	1	3	4	8
.. 9.1 to 15 mm.	2	1	3	6
.. 15.1 to 20 mm.	0	3	2	5
.. 20.1 mm. upwards	2	1	3	6
	5	8	12	25

X^2 -Total=4.55. P-Total=0.56. F-Total=6.

IV. Mean corpuscular volume and blood sedimentation rate.—Study of the literature shows that blood sedimentation rate is inversely related to the red blood cell count, the size and the total volume of the cell. This is true particularly in anæmias. Keeping these facts in view attempt has been made to correlate the blood sedimentation rate with mean corpuscular volume.

The average mean corpuscular volumes determined were 90.7 ± 2.8 and 90.6 ± 6.8 for male and female series respectively. The co-efficient of

correlation between blood sedimentation rate and M C V were calculated for males as one sample and for females as another sample and the values obtained were +0.06 and +0.41 which are 0.5 and 2.0 times higher than their respective standard error. The co-efficient value in females is fairly significant. Value of X^2 was further calculated for female series and it was 8.04, which when referred to Fisher's table for 6 degree of freedom gave a probability figure of 0.33, indicating that the proportions of cases in each cell of the Table No. 8 have arisen by chance.

TABLE VIII
Mean Corpuscular Volume.

Blood Sedimentation Rate.	From 75 to 85	From 85.1 to 94	From 94.1 upwards	Total
From 1 to 9 mm.	1	4	3	8
.. 9.1 to 15 mm.	1	3	2	6
.. 15.1 to 20 mm.	1	3	1	5
.. 20.1 mm. upwards.	3	0	3	6
	6	10	9	25

X^2 -Total=8.04. P-Total=0.33

V. Average corpuscular hæmoglobin and blood sedimentation rate.—In normal individuals hæmoglobin and the red blood cell count are directly related to some extent. No conclusive relation between blood sedimentation rate and these two factors is available in the literature. It is said that both are inversely related to some extent with blood sedimentation rate. The author's observations in 75 males and 25 females show no correlation which may be of any significance. Since the variations of red blood cell count and hæmoglobin in normal individuals is not much and no attempt has been so far made in our department to determine the blood sedimentation rate of cases in which both these characters change, it is difficult for the authors to say how far the correlation exists. An attempt to correlate mean corpuscular hæmoglobin in normals has been made and the conclusions are given below:—

The average mean corpuscular hæmoglobin in males and females was 28.4 ± 2.02 and 28.17 ± 3.3 . Seventyfive male cases were arranged as shown in Table No. 9. The value of X^2 as calculated from this table is 16.24 which when referred to Fisher's table with 6 degree of freedom gave a probability figure of 0.013 which is highly significant. Coefficient of correlation between these two characters was further calculated both for male and female series separately and the values obtained were ± 0.06 and -0.37 respectively. In males the value of correlation is quite an insignificant one and is contrary to the probability figure obtained above, and in females the relation between blood sedimentation rate and mean corpuscular hæmoglobin is inverse. We, however, cannot draw any tentative conclusions.

TABLE IX
Average Corpuscular Hæmoglobin.

Blood Sedimentation Rate	From 24 to 28	From 28.1 to 31	From 31.1 upwards	Total
From 1 to 4 mm.	20	15	1	36
" 4.1 to 10 mm.	11	8	0	19
" 10.1 to 15 mm.	4	6	0	10
" 15.1 mm. upwards.	4	3	3	10
	39	32	4	75

X²-Total=16.246. P-Total=0.013. F-Total=60.

VI. Mean corpuscular hæmoglobin concentration % and blood sedimentation rate.—The average mean corpuscular hæmoglobin concentration per cent for male is 31.44 ± 2.02 and for females 31.48 ± 4.15 . The coefficient of correlation between the blood sedimentation rate and mean corpuscular hæmoglobin concentration per cent for male and females gave values of -0.21 and 0.30 respectively which are 2 and 1.5 times of their standard errors. Thus it is significant in males. The value of X² as determined in Table No. 10 for females is 7.12 which when referred to Fisher's table for 6 degree of freedom gave a probability figure of 0.32. The values are not significant and therefore no correlation exists.

TABLE X
Mean Corpuscular Hæmoglobin Concentration per cent.

Blood Sedimentation Rate.	From 25 to 30	From 30 to 33	From 33 upwards	Total
From 1 to 9 mm.	1	7	0	8
" 9.1 to 15 mm.	3	2	1	6
" 15.1 to 20 mm.	3	1	1	5
" 20.1 mm. upwards.	2	3	1	6
	9	13	3	25

X²-Total=7.122. P-Total=0.32. F-Total=6.

Summary.—An attempt has been made to find out relation between the Normal Blood Sedimentation Rate (Westergren) and the various Normal Hæmatological values in the Punjab on 100 healthy normal medical students between the ages of 18-25 years. Total Red Blood Corpuscle count and Blood Sedimentation Rate gave slight significant probability figures in male series but no definite correlation could be established. Packed cell values and Blood Sedimentation Rate showed some significant indirect relation in male series and none in the females. The values were however such that we could not draw any conclusions for clinical purposes. The average Corpuscular Hæmoglobin and the Blood Sedimentation Rate figures when referred to Fisher's table for 6 degree of freedom gave probability figures of .013 which was quite significant but the coefficient of correlation was quite insignificant and so nothing definite could be arrived at. As regards other hæmatological values no definite conclusions could be drawn.

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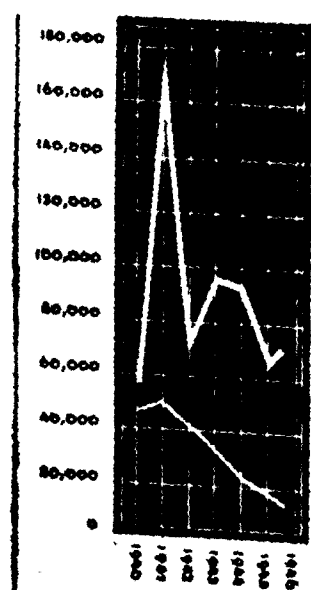
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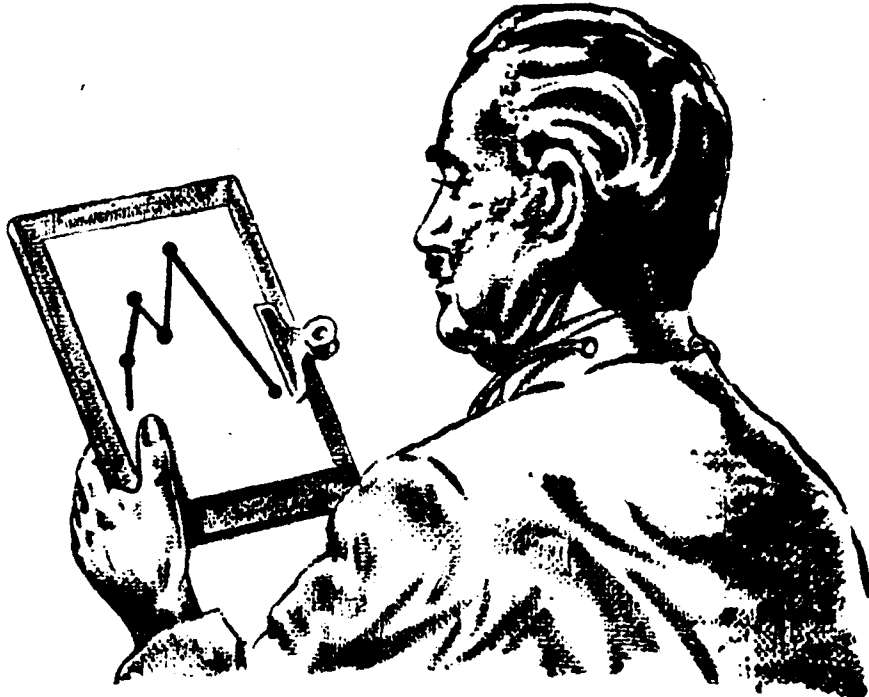
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The Tuberculosis Problem of To-day*

DR. K. K. CHATURVEDI
Medical Director, Margao, Goa.

MUCH has been written already, and still much more has to be written on this subject to bring home to the mind of an average man the importance of this problem facing us to-day. The tuberculosis problem of to-day is of such enormous and varied dimensions that it has become a major headache in the world economics; and every nation is trying to fight out this menace with all available resources. True, that a few of these nations have been fighting successfully this terrible scourge of mankind to a considerable extent, and there are signs that they may ultimately achieve their cherished goal in the near future, yet in spite of all that it remains a baffling problem for a large number of nations of the world even to the present day.

It is a menace to mankind since it affects mostly the people, men and women, at the age period when they are the most useful members of the society. No age is exempt from its devastating clutches, but it is most rife in the second and the third decades of life, and as such assumes a role of a major problem in the national economy.

India to-day is surrounded by many forces which are undermining her growth as a nation—nay even the very existence and it appears that a vicious circle has been created which requires our utmost and carefully considered effort if we can help in eliminating those causes. We see that our ministers and public leaders are giving their best to improve the existing conditions, but it is up to us, each individual man and woman, to help in carrying out their advice and change our unhappy land of to-day into one of eternal glory—an example to others. The problem is mainly an economic one with an improved back-ground of socio-political aspect, and unless each person is conscious of his or her civic rights in relation to his or her fellow citizen, it is very difficult—nay even impossible—to achieve any measure of success only through legislation. That really means a proper type of education and a proper perspective in life with a culture giving us a high sense of duty towards our fellow brethren. Unless this public sense is raised to a high and efficient degree we cannot hope to achieve any degree of success in the problems facing us to-day. It is time that we forget the past and march on the present with heads raised up to reach the horizon of future.

We do not possess to-day exact figures regarding the incidence, morbidity and mortality of tuberculosis in our country, but from all the available sources we gather that nearly five millions of people suffer from this disease every year in India and of these nearly a million are lost every year. This is appalling more so because in its wake the disease leaves so much misery and incapacity among those who have already become a victim to the disease besides sowing seeds in hitherto virgin soils. Herein lies evidently the duty of every medical man and woman in whatever capacity he is placed, to see that he contributes his mite to alleviate the suffering of those already under the grips of the disease and to see that effective measures are taken to prevent further propagation of the disease among communities exposed to infection. This duty they owe towards their own Government, their own country and for the sake of the high ethics

* Specially contributed to THE ANTISEPTIC.

[243]

of their own profession. If the disease is made compulsorily notifiable by the Government, probably it will help much in the prevention of the disease. It is time to act and not to waste in useless and unproductive schemes.

For a while we would like to turn our attention to Goa, where an anti-tuberculosis programme is being carried out under the aegis of the Government and according to a definite programme already laid out. Here we find that the incidence of tuberculosis locally is not very high when compared with other places in India; but a considerable number of people of both sexes suffering from tuberculosis are imported here from places outside, especially the town of Bombay and its suburbs, where a large number of Goanese are employed in various kinds of works in Government offices, shipping companies, various public bodies and in private capacities. It is mostly from here that they acquire their infection and later on are forced by various circumstances to come back to their homes in Goa for treatment and rest. Such being the case it is a matter of great concern to us to see how this can be prevented or improved; and it is this particular situation of events that has forced me to write out this article and bring it to the notice of the Government of Bombay, who are the only competent authority to tackle this problem effectively. I have every hope that the authorities concerned will give this matter all the attention it deserves and ameliorate the conditions of thousands who are suffering from tuberculosis in the city of Bombay itself, a leading centre of all the culture for the whole of the province including Goa.

Economically Goa is not self-sufficient, and the people are mostly dependants on the neighbouring areas of the Indian Dominion and specially Bombay where a considerable population of Goa is earning its livelihood. People here are generally enterprising and have moved to even distant places both in India and outside. We are, however, at the present moment concerned with the conditions met with in Bombay and its suburbs as they are directly influencing us here. The living conditions of these people in the city of Bombay are far from satisfactory, as we learn day after day from patients arriving here for their treatment in the sanatorium. Since this is a major problem of public health, I would like to draw the attention of the authorities concerned in Bombay to see that all effective measures are taken up with a view to completely eradicate the disease from that town, which unfortunately is our main source of supply at the present moment. Treatment of those who are suffering from clinical tuberculosis is only a very small percentage of our total problem, and can at best touch only a fringe of the huge problem. A complete eradication of the disease from a town like Bombay is by no means an easy task and will tax the resources of the Government and the Public Health authorities to the utmost. But, nevertheless, it must be our aim and it has to be accomplished if we want to see our people living under better and a healthier atmosphere and be an asset to the nation rather than a constant drain on her resources.

A detailed history elicited from the patients coming to this Sanatorium for their treatment gives us clearly an idea of where the shoe pinches, and where we have to apply our energies to get rid of this disease. For the sake of convenience the whole problem can be divided into two categories which will be taken here separately:—

- I. The general hygienic measures.
- II. The personal hygienic measures.

It will not be out of place here to add a few words regarding the conditions met with in the town of Bombay before suggesting means for their improvement. Most of the people of Goa coming here for their treatment are men of moderate means. They cannot afford to stay in the healthy localities of the town and in sufficiently commodious houses and hence, occupy flats in the crowded areas of the town. The rooms of these flats, which are generally situated in the congested quarters of the city, are usually 25 to 30 feet in length, 14 to 16 feet in breadth and from 12 to 15 feet in height. Each such room is occupied generally by 15 to 20 persons and sometimes even more with their children and belongings. They cook and sleep in the same rooms with their other friends, and the conditions met with are ideal for the propagation of all kinds of diseases, especially pulmonary tuberculosis. Many of these rooms are insufficiently lighted and some even require the use of electric light during the noon hours. Sun's rays hardly enter them and as for ventilation, a single or at the most two electric fans are the only sources of the movement of the air. Such being the case, no wonder that a good percentage of the occupants in these localities should fall a victim to tuberculosis. And this is not all. The sources of income being scanty and the cost of living in a town like Bombay being comparatively higher than in the suburbs or the rural areas, these people can ill afford to support the other members of their family who are dependant upon them. The ultimate result is a very poor nutrition to all the members of the family and hardly enough clothing.

To maintain a normal health under the conditions of such strain and stress of life is not compatible, and sooner or later their health breaks down. The only supporter of the family being down with tuberculosis, the fate of others who are dependant upon him can be easily visualised. Such is the sad tale of many who have been sick and seek advice and treatment here in this sanatorium. And we have not enough means to help them. Those of the sick who are fortunate to get an accommodation in the sanatorium, are helped to a great extent. They get their treatment and are segregated from the other members of their family. But there are left many who simply remain on the waiting list, and for lack of accommodation get worse during this period of waiting and even lose their lives. The condition is very pathetic indeed, and unless the problem is tackled from the very source and rectified early, the chances are that the condition may get out of our control and may cost the Government very heavily later on. It is our sacred duty to bring the facts forward and seek for all the help from the Government and the Charitable Public Bodies.

While in Bombay, I had once the occasion to work up the incidence of the disease in the town with some of my colleagues who are specially interested in tuberculosis work; and it was a revelation to know that there were nearly 20,000 open cases of tuberculosis in the town of Bombay. These figures may not be entirely correct, and there is reason to believe that there may be many more about whom nothing was known definitely and who were probably wandering about in the town in all the public places. This brings home to us the magnitude of the problem we are facing to-day. A few sanatoria accommodating 20 or 25 cases of tuberculosis, crowded here and there, poorly equipped and not well organised can hardly solve our problem. Taking into account all the available accommodation in all the Sanatoria and Hospitals in India taking care of the tuberculous patients, we understand that they can accommodate at best only 10,000 patients.

The inadequacy of this is self evident and requires hardly any comment. We have to face the problem in its entirety and seek all the available means to cut short the rising tide of this disease. A very large majority of our patients are left entirely to their lot. That is why we hear the same sort of stories repeated again and again by the patients. He suffers from an early infection, feels indisposed, but usually pays no heed to it and keeps on working as usual since he has to support himself and his dependants. Gradually he becomes worse, fever develops, or there is an intractable cough which forces him to seek medical advice. He visits one of the many medical practitioners of the town who is most easily available to him. A large number of these patients are dubbed as suffering from malarial fever or typhoid fever. A thorough examination is not generally possible in each case for various reasons. Treatment is instituted on these lines and very often some amelioration of symptoms takes place. The patient under a false sense of security rejoins his duties in spite of the fact that he is not feeling quite fit. Thus he drags on till the break-down is complete. The fever is constant now, cough and sputum may also be present, there is a loss of weight and energy, and finally the patient is forced to seek the advice of some specialist. By this time his disease is far advanced and his scanty means are nearly depleted. A more exhaustive examination is now instituted supplemented with laboratory tests and an X-ray film of the chest is ordered. Thus the nature of the disease is revealed when it is well established and in some cases even far advanced. The diagnosis being completed, the patient is generally advised to leave Bombay on grounds of bad climate and suggested a change to his own native land for recuperation. Finally, these people with their health lost, and resources depleted, arrive in Goa to see what further lies in store for them. By the time these patients arrive to seek advice and treatment in the sanatorium here they generally resort to all sorts of local treatment even by quacks, with the result that they finally arrive in a very advanced stage of the disease with lungs riddled with cavities and the general health utterly lost with marked toxæmia present.

This has been our experience day in and day out, and we feel that if the problem of tuberculosis in Goa has to be harnessed effectively we must seek to take all help from the Government and the Public Health authorities of Bombay, and check an influx of the patients too large for us to cope with adequately with the means at our disposal. Things in the town of Bombay can only be improved by active measures from the Municipal Corporation with all aid from the Government in that direction. The existing conditions in the town have to be modified and improved in a way that a fuller control is obtained in the eradication of the disease. The task is by no means an easy one looking to the present conditions in our country. Scarcity is seen on all sides, chiefly in the sphere of essential commodities like food materials and clothing. To these is added another problem of the shortness of accommodation. Bombay, since this last war, has been experiencing a great dearth of adequate houses for accommodation as a result of an increase of population. To these difficulties are further added the problem of present internecine quarrels in our country entailing in its wake practically all the slender resources of our present government. Nevertheless, the basic needs remain the same, and in order that we can successfully fight against odds, a concerted effort both by the Government and the Public Bodies on the one hand and the general

masses on the other is absolutely necessary if we are to achieve our final objectives. We are aware of these facts when we discuss the problem of our fight against tuberculosis. Our Government has to formulate a long term and a short term programme in this connection and we, as loyal subjects, must agree to support them whole-heartedly.

I. Taking up the subject of **general hygienic measures**, these can be improved and modified according to the needs by various kinds of legislation, an improvement in the living conditions of the town, improved statistics, solving the problem of better nutrition, clothing, and education of the masses and creating in their mind a public consciousness so essential for a successful outcome to any campaign like this. Suggestions are offered here with a desire that if implemented they may lead to an early improvement in our present position with regard to the problem of tuberculosis, and we hope our Government will give them all the consideration that they need.

1. Improvement in the condition of nutrition is the first requisite for a successful fight. It is a factor of prime importance if the general resistance of the masses is to be raised to a satisfactory level. Poverty, unhealthy conditions, poor physique, and high mortality rate are all directly or indirectly dependant on this single factor. Herein lies our greatest problem, and the Government must see that all the resources are mobilised in this direction, so that each and every individual is assured an adequate supply of essential food-stuffs. Our foreign rulers did not pay the necessary attention that it deserved, but they had no obligations as well for the same. The position is very different now, and the Government is responsible for the health of each and every individual. Efforts are being made in these directions, and we appeal to our brethren to see that they succeed, and that each one of us is provided with the necessary food-stuffs at the cheapest possible rates to assure a high standard of general health. This being settled, about 50% of our major problems regarding a fight against tuberculosis is settled. I need not go much into the details of this part of the problem as its importance is well realised by the Government and they are taking all necessary measures to assure a better supply of food-stuffs from all the resources in this country as well as from outside. It is a world problem at the present moment and India is no exception. Mahatma Gandhi has suggested in this connection a voluntary fast by individuals at least once a week to economise and improve the food situation today and there is much to say in its favour. It will make us self-supporting and will generally improve our morals so necessary in these days.

2. The problem of proper housing is not less important, especially in a town like Bombay. It is very necessary that the Corporation authorities should see that there is no overcrowding in the flats of the huge buildings of the town. Public Health Authorities owe a duty towards their own people to see that their health is not impaired in any way which is avoidable. The present condition in most of the buildings is far from satisfactory. A complete census of all such buildings should be taken for this purpose, and during this process all cases of tuberculosis "Open" or "Suspected" should be segregated to buildings especially provided for the purpose. These buildings, or as we may call them "Observation Units", should be well provided with all facilities to carry out routine and necessary examination of these cases. These units should make part of the Tuberculosis Dispensaries to be discussed in the succeeding paragraphs.

The Municipal Authorities should allot the available space in these flats to a definite number of tenants to be decided by them. The owners of all such flats should be held responsible to the Municipality for:—

(a) The proper number of tenants occupying a particular building. A record of the same should be maintained by them for inspection by the Health Authorities of the Corporation. Infringement of the regulations should be made punishable.

(b) The maintenance of proper sanitation, ventilation, and repairs of such buildings. A nominal extra charge may be allowed for this by the authorities to be realised by the owner of the building and this too should be fixed according to certain regulations to avoid all unnecessary complications later on.

(c) Wilfully allowing tuberculous patients to occupy any part of their buildings. In case if by chance a patient has occupied any part of such a building without the knowledge of the owner, and the fact comes to his notice later on, he should immediately intimate the Health Authorities concerned about this fact, so that they may be able to take proper measures.

For each person in a lodging at least 500 to 1000 cubic feet of space should be allowed, depending upon the conditions of the ventilation available. Not only this, but any building which is not planned according to the detailed principles of sanitation, with adequate provisions for sunlight, ventilation, open spaces, and accommodation, etc., should on no account be allowed to be constructed by the Public Health Authorities. Such condemnation may seem very harsh in the beginning but is certainly necessary for the long term programme of the health authorities. Unless the requirements are fulfilled, a building should not be passed for the occupation of tenants.

A routine examination of the living conditions in these tenements should be instituted by the Corporation and requires all emphasis. It is far better that small huts or blocks are constructed at cheap rates in the suburbs of the town which can suit the pockets of an average person, and are constructed according to the strict sanitary rules, than to allow overcrowding in the huge buildings in the town with all their inadequate hygienic arrangements and situated in the busy localities of the town. The attention of the Government is drawn to this one fact pointedly so that proper provisions are made and all overcrowding is eliminated. Under the same provisions of law all unhygienic buildings should be demolished and reconstructed. Government should brook no influence in these matters from whatever sources it may arise.

3. An equally important measure in this connection is the provision of all sanitary and hygienic measures in all public restaurants and hotels, tea stalls and cold drink shops. Here it should be made compulsory for the management to see that all utensils, glasses, etc., are properly cleaned and sterilised before any person is served in them. It is a very frequent source of infection to a large number of people who may chance to visit these places. An average man hardly has time or will to see that he is served in thoroughly cleaned utensils. They take note only of the outside cleanliness which may be very deceptive. It is a matter of great importance and no relaxation in rules should be tolerated by the inspecting Public Health Authorities.

To ensure a better control on all such public places, they may be duly issued a licence by Public Health Authorities, who should also supervise them frequently to see that proper hygiene is maintained. Those hotels or restaurants which are not willing to abide by these rules may be asked to close down.

In this very connection it may be suggested that a properly instituted "Food and Drug Adulteration Act" may be promulgated, prohibiting by law the use of any harmful ingredients in the preparation of various food-stuffs or their adulteration. A Special Bureau may be opened by the Government for this purpose, and all preparations put in the market should be previously analysed here and their contents known, before they are accepted fit for public consumption. There are a large number of such stuffs in the market to-day which require a close scrutiny of the Government, such as artificial ghee, milk and milk products, jams, marmalades, tinned products and a host of others. All of these require a proper check up to avoid harmful and deteriorating influence on the health of the consumers.

4. Transportation of sick persons especially suffering from infectious disease and tuberculosis forms an important part of the programme against the spread of tuberculous infection. No discrimination is shown to-day in either the railway or the ship journey, where all kinds of people can travel freely in company of one another. This is a subject requiring full appreciation by the Public Health Authorities. It is necessary in this connection to notify the public against the indiscriminate use of accommodation in these conveyances; and both in the railway trains as well as in the ships provision should be made for separate compartments to be kept reserved for the use of only such persons, and each train and each ship should have such a unit fixed to it before it is allowed for public use. This, we feel certain, will to a large extent cut down the incidence of tuberculosis in our population. It will further add to the convenience of the passengers as well as of the railway or ship medical authorities, if before commencing a journey the person concerned intimates to them the nature of his or her disease and asks for proper arrangements to be made in advance. People, voluntarily breaking these principles of hygiene and not travelling in the special compartments provided by the railway or the ship companies, should be made criminally responsible for this neglect.

5. Compulsory notification of all the cases suffering from tuberculosis is a very desirable piece of legislation. There are a large number of patients undergoing treatment in Bombay or in any other town of this or other provinces in India, whose whereabouts are hardly brought to the notice of the Public Health Authorities. This is a menace to the health of the city in general in so far that such people hardly take account of their actions with regard to Public Health laws. They spit indiscriminately in any and every place without ever thinking about the consequences. It should be the duty of every medical man or woman who is treating such a case to immediately bring it to the notice of the Public Health Authorities of the town, so that proper measures may be taken immediately for segregation of such persons and a routine examination of all the contacts. This will also lead to a correct assessment of the morbidity from this disease—a valuable piece of information for statistical purposes.

The single main cause in the propagation of tuberculosis is the T. B. laden sputum of the patients, and the indiscriminate spitting, coughing

sneezing or even laughing and talking may lead to infection of others. Such spitting in public places, railway trains, buses or tram cars, and even on the roads and buildings should be **absolutely interdicted** by law and all measures should be taken to so educate the public mind that they may inculcate a sense of their public duty which is very much lacking to-day. It is so common in the experience of everybody in the every day life that hardly any comment is necessary. Indeed it is a social evil and can only be got rid of when the individuals realise their duty towards the public in general.

No amount of legislation alone can achieve that which can be accomplished through a proper type of education. Nevertheless, an attempt in the right direction should be started and by public lectures or cinema films such evils may be made known to the masses.

6. Every attempt should be made to increase the already existing accommodation for tuberculous patients to a satisfactory level. If we can so arrange that for every ten patients, who are suffering from clinical disease, one bed is provided, a great deal of the pressing problem will be settled. Even then a fairly large number of patients will be left without accommodation, but many of them can institute home treatment which forms a very important item in the programme of the treatment. Bombay city is hopelessly behind the right mark in this respect, and it is the duty of the City Fathers to see that admission is not denied to the taxpayers. There are a number of suburbs near the town where proper accommodation facilities can be made by starting inexpensive sanatorium buildings manned by competent and fully trained staff to look after the sick.

Climate, which is so often stressed by a majority of medical practitioners even now, certainly does not play such an important role in the treatment of the tuberculous as is generally believed. A healthy and nice climate is as important for the tuberculous as it is for any other chronic disorder; and if one can secure a healthy and salubrious locality so far so good. But certainly it cannot be and should not be attempted at the expense of one's financial status and other factors so essential in contributing indirectly to one's well-being, such as a peaceful and calm mentality. All that is essential in this connection is a well organised sanatorium or hospital unit and a fully trained staff entrusted with the care of the sick. There is no reason why the people of Bombay should be driven to other places to secure treatment there, dislocating them from their homely environments and putting an extra burden on an average patient. Those who are better placed in life, let them by all means go to healthy hill resorts or even to foreign countries if they so choose.

7. One of the main functions of the tuberculous specialists should be an education of the lay public with special emphasis to the etiology, prophylaxis and the detection of the early symptoms which may lead them to seek proper medical advice at an early date. This can be achieved by intensive propaganda, leaflets, cinema films and education of the youngsters in the school age regarding the essentials of hygiene and prophylaxis. In fact every attempt should be made to create in the lay man a Tuberculous-consciousness. Money spent in these measures is not a waste but is sure to bear good fruits. Sunshine and air, which nature has so abundantly provided in our country, should be utilised to the fullest advantage. T.B.

cannot withstand the sterilising effect of the sunshine very long, and thus we can see that all places must be provided with an abundance of sunshine. The ultra-violet rays in the sunshine not only kill the tuberculous germs but also many other pathogenic bacteria and cocci and it is due to this factor alone that we are saved from wholesale ravages of many diseases.

8. And finally it will not be out of place to add here a few words regarding the maintenance of Tuberculosis Service by the Health Ministry. This can be conveniently divided into four categories:—

(a) *Tuberculosis hospitals and sanatoria*:—These are fully equipped with all facilities for the modern treatment of the disease including a fully equipped Surgical Unit, a Clinical Laboratory where all kinds of tests and cultures can be carried out, ultra-violet and infra-red ray facilities, with provision for good nutrition and a life free from worries and under complete discipline. The wards of the buildings should be so constructed that there is no overcrowding in any single unit, and that a division of cases can be maintained on different clinical groups of the patients. As a rule not more than 8 patients should be allowed in each general ward, and private accommodation should be provided for more serious or fastidious patients. Since most of the patients are obliged to stay for a fairly long interval of time, there should be provision for various kinds of entertainments for both the sick and those who can move about, and a well maintained kitchen.

(b) *Tuberculosis dispensaries*:—They form an important integral part of the service. The dispensaries should be studded in the various localities of the town in a way that they can serve a larger part of the population in that area. These should be well equipped as regards facilities for all clinical, laboratory, fluoroscopic and X-ray examinations and all the elementary treatment of the ambulant cases. It is generally good to have at least half a dozen beds available in each dispensary for keeping emergency patients and those undergoing special observation. It goes without saying that the Medical Officer in charge should be well trained in all methods of diagnosis and survey work in connection with tuberculosis. Tuberculin tests and fluoroscopic and X-ray control of all suspected cases and contacts should form an important part of the programme of this unit. These dispensaries, in addition to the Medical Officer, should have on the staff at least two trained nurses, two clerks and two boys in each, and can thus take care of all the ambulant cases in that particular locality, offer suitable advice for patients undergoing home treatment, and refer all those who require more elaborate treatment to the Sanatoria or the Hospitals as the case may be. The records in these dispensaries should be very carefully maintained.

The Sanatoria and the Hospital, on the other hand, can refer back patients to a particular dispensary of a particular locality who have been successfully treated there and no longer require to be detained there. Thus these two units can work harmoniously helping one another. It is essential that the medical staff employed in the sanatoria or the hospital and the dispensaries should have a standardised training to secure complete harmony in work.

(c) *Mobile Units*:—For those who are so situated that they cannot be served by the dispensaries, or where there are no facilities for conducting

X-ray and fluoroscopic examinations, these units will serve as a connecting link between the distant-placed sufferer and the Sanatoria or the Hospital. Each of these mobile unit has all the facilities for conducting the necessary examination for the diagnosis and control of the treatment of tuberculous patients. These motor vans are fitted with portable X-ray plants laboratory facilities, and have a utility cabin to give all elementary treatments to the patients. They are to be manned by a driver, a nurse, a boy and a Medical Officer. Mobile Units can to a large extent help in the programme of home treatment of those who can afford to pay for it, or for some reason cannot avail of other facilities. Moreover, rural survey can be best conducted through these mobile units. Adequate accommodation for all those who are suffering is not a matter of an easy solution and even under the best conditions many will be left without it. For such patients these Units can serve a very useful purpose.

(d) *Rehabilitation units*:—No programme for tuberculosis can be complete unless this final link is supplied in rendering the patients fit to resume their normal vocation in life. It is a known fact that tuberculosis is not easily cured. Even under the best possible conditions the patients take a fairly long time to be fit to work as normal persons. All that can be expected from the various hospitals or the sanatoria is to arrest the disease in such a way as to render the patients fit to mix up in the society, make them T.B. negative with abatement of all active signs of the disease. But this is not all. If such patients are left to themselves, and are forced to earn their own livelihood sooner or later they are bound to break down. It is during this period of the arrest of the disease and the time when they can resume normal activities of life, that all care and rest is necessary to lead to a successful issue the whole programme of treatment of tuberculosis. To achieve this a period of rehabilitation is necessary for a large majority of patients and should be provided according to the individual needs.

The whole programme is a costly one and requires all care and consideration of the Government. It is, nevertheless, an important economic problem and means have to be found out to meet these expenses.

For this purpose Government may choose localities best suited for the establishment of these Village Settlement or Rehabilitation Units. It goes without saying that each one of these units ought to have its own Managing Board and the constant supervision of a Tuberculosis Specialist so that a continuous watch may be kept on the progress of the patients. The patients are provided here with board and lodging, free or on payment as the case may be. All facilities for the medical treatment of the patients should be provided in these Settlements. The discipline should be strict, with a view to train these persons for their future life and as a means of living propaganda. All essentials of a hygienic and careful living should be inculcated in their minds. At the same time arrangements should be made for the proper entertainment and social life of these persons, to minimize the staleness and drudgery of life. In order that the whole plan may be self-supporting to a certain degree, it is advisable that these patients may be engaged in some kind of handicraft or work, the proceeds of which may be utilised for the running of the institution. Thus sewing clothes, basket-making, cycle and motor mechanics, watch-making, gardening and other light agricultural activities, printing and typing, and a host of other useful and interesting industries which may both fetch some income to the institute and at the same time take away the monotony of life of the inmates. These

industries may prove of great benefit to the individuals much after they have left these Rehabilitation Centres. The over-all supervision of a medical man requires further emphasis, as he will be the only person to apportion to each individual his duties and work according to his capabilities, and who will finally be responsible for their health and upkeep.

It is hoped that the above suggestions, if implemented in the spirit they have been presented here, will go a long way to improve our present position with regard to tuberculosis problem. The last word has not been said in this connection, but each item suggested has been carefully considered with regard to its usefulness and practical applicability under the present circumstances. As things improve further, improvements and additions can be added to these till we can finally succeed in completely eradicating the disease from our country. No attempt has been made to minimise the costly nature of this problem, but as pointed out elsewhere it is imperative to find out the finances to meet this urgency.

The suggestions will not be complete without adding a few words about tuberculosis in cattle. This is a problem which again requires all consideration on the part of health authorities. Milk of infected cows and the meat of tuberculous animals is an outstanding menace to the public health. Of course in India the usual custom is to take all milk which has been boiled previously and as such the chances of milk-borne tuberculosis are reduced to a very great extent. Nevertheless infected cattle cannot be tolerated by any public health organisations and it is an urgent necessity that the government should appoint proper public health inspectors to see that none of these diseased cattle are used either for the milk supply or for the meat supply of the population. Such cattle should be totally destroyed and a definite plan to carry out this programme is necessary as it will entail large expenditure.

II. *Personal hygiene*, though not strictly within the direct supervision of the Health Authorities, is nevertheless, as important as any other measure of public hygiene or sanitation; and for an ultimate success of any Anti-Tuberculosis campaign, the personal training of individuals in the art of proper hygiene is very essential; for it is the only effective way in which these measures can be brought home to the masses. In this connection one thing should always be our main and guiding principle and that is to avoid all primary infection by T. B. and a complete control of the infecting organism.

1. Tuberculosis is still ubiquitous, as is proved by the figures from various institutions of different countries. The first thing, therefore, to avoid such infection is to render the soil innocuous, i.e. to improve and maintain a good general health which is directly affected by the environments, quality of food, general hygiene, and daily exercise etc. Now, the very reasonable way to prevent the incidence of tuberculosis is by increasing the resistance of our body against the infecting organism by all means at our disposal; and herein lies the importance of a general hygienic education to children of school age which will form a sound basis for the rest of their life.

Prophylaxis of delicate children, especially born of tuberculous parents, is most important. They should be guarded against all infection, especially tuberculosis, and brought up with great care. They should be separated from their parents if they happen to be active cases of

tuberculosis. The nose and throat of such children require special care. Diseased adenoids and tonsils should receive urgent attention and removed if necessary. The children should live in the open air as much as possible and special care of their dietary is necessary. All milk given should be boiled or pasteurised. In a number of countries, especially France, active immunisation of children is being carried out with (B.C.G.) Bacillus Calmette-Guerin. Though the ultimate value of this procedure is not finally settled, more than 2,000,000 individuals, mostly children, have already been inoculated with this vaccine, and the advocates of this procedure are very enthusiastic about it. Much controversy is still prevailing as to its efficacy, but it is worthwhile a trial under properly controlled conditions. Those children, who are already exposed, require a careful and special watch.

2. General hygiene with regard to our body and food is absolutely essential for a healthy preservation of individuals. For tuberculosis, special care is necessary for oral hygiene, including gums, teeth, tonsils and also nasal passages. Cleaning of mouth after each meal and before retiring is a daily necessity. In special circumstances gargles and even antiseptic applications should be resorted to. The same applies to nose. Tuberculous patients should give an extra care to their oral hygiene.

Sputum of tuberculous patients is the most potent single factor in the spread of this disease, and in all open cases of tuberculosis a very special care regarding their sputum, sneezing and coughing etc. has to be taken. A number of workers, especially Cadac and Mallet, Cornet and Kuss have shown experimentally that dried sputum of the tuberculous patients and the droplets ejected from their mouth during the acts of sneezing and coughing retain their infectivity for a considerable length of time. Even when mixed with dust of the rooms or roads they remain so chiefly in the places where there is no free access of sunlight. This also proves the great sterilising properties of the sunlight which, when allowed a full play, can be a source of natural sterilisation. For that very reason most of the furniture etc. from the rooms of the tuberculous patients can be rendered sterile by the bright sun of India. All articles such as rugs, towels, handkerchiefs, bed-linen, cups, saucers and other utensils etc., coming in contact with tuberculous patients directly or indirectly require special care to avoid all infection. Both the patient as well as his attendants should take note of this to avoid all inadvertent infection. All sputum coming out during coughing and sneezing should be received in paper napkins or linen handkerchief and never on bare hands. It is a good practice for tuberculous patients to keep large paper bags hanging on their bed-sides, receive all excreta in paper napkins and put them in these paper bags. The whole of this can be burned at the end of the day and new ones substituted. Linen handkerchiefs which cannot be burnt should be boiled for ten to fifteen minutes in a solution of soda, washed and dried for further use. All indiscriminate spitting should be treated as public offence, and should be put a stop to by suitable legislation. T. B. patients should be particularly careful about this. Constant care and restraint is the only solution to avoid this pernicious habit.

Wholesome, properly cooked and unadulterated food is a vital necessity for each one of us, and both the individuals as well as the government should see that this problem of the people is adequately met with, especially in our country where the problem is so acute all the time. It is a pernicious habit

to partake of food in the same dish with others, so commonly seen in many families and several communities. The habit should be entirely discouraged, and in case of tuberculous patients never allowed. All T.B. patients should have separate utensils reserved for their own use.

3. Housing problem needs all the attention of the Municipal Corporation. It needs all the attention of the occupants as well. Besides what is done by the Public Health Authorities, it should be the endeavour of each individual to secure well-ventilated, sunny houses with open spaces around and a clean locality. All kinds of overcrowding should be avoided, and if a T.B. patient has to be kept in a house, special arrangements should be made to provide for him a separate suite of rooms, specially a sleeping room and a bath-room. In fact he should be so kept that there are no chances of conveying the infection to the other members of the household. Of course, such things arise only in the case of well-to-do persons who can afford to have their treatment at home. T.B. patients should take care even when they are talking or laughing. They should never kiss children or allow any body to sleep with them.

Purdah is still observed in many parts of India especially among the Muslims. It is a custom which requires all discouragement, and all advocates of national health should see that it is gradually eliminated in its entirety.

4. Marriage with regard to tuberculosis patients has some special significance and the people concerned should very carefully understand their responsibilities. First of all, marriage cannot be allowed in cases of active disease of any one of the partners. It is a social offence. Regarding the persons who are arrested cases of the disease, the problem is not very easy again to decide. The personal risks to the male partner is not so great as in the case of the female partner. In the former, under satisfactory conditions of general health with external environments favourable, and good family antecedents, marriage may be allowed with all precautions for moderation. Not so is the case in the latter, where child-bearing complicates the whole picture. It is always safe to avoid pregnancy in such cases, though with a good general health, absence of any hereditary taint and with favourable environments marriage may be permitted. Among married persons, when either of the party is suffering from active disease, the risks have been found greater in the case of healthy male partners than in healthy female partners. Opie and McPhedron have made special studies on the subject in about 533 cases of married couples. Their figures are 45.6% infection for husbands and 35.5% for the wives. It is as important here as anywhere else to avoid all infection as far as possible.

5. Finally a word may be added about the choice of profession for the tuberculous patients. They have to change their entire outlook on life. As a rule, they should eschew all unhealthy pursuits, such as working in smoke and in closed atmospheres. The final choice depends upon a number of factors and circumstances; and a general rule may be laid down that all professions chosen should be such as to provide a maximum amount of open air and sunlight, and straining the physical resources to the lowest possible level. Here it is that Government have to come forward to solve the problem of many, and in special cases even to allow such patients a life of pension and ease.

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The Treatment of Measles and its Common Complications*

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Introduction.—Although measles is so common a disease, very little literature has appeared on the subject. The reason for this might not be far to seek. Like the many other diseases attributed to the filtrable viruses, measles too has a more or less obscure ætiology, although the claim of these viruses in the case of measles, has been almost definite. Consequently, the physician is not able to suggest anything concrete by way of treatment for this disease; at best, he has to rely mainly on a general line of treatment followed for the common acute infectious diseases, and as a result his treatment is essentially symptomatic. Added to this is the general superstitious belief on the part of the lay public in our country that measles is a divine disease and that to take treatment for this is to invite disaster by incurring divine wrath. Caught between the patients' unwillingness to take treatment and his own inability to suggest anything concrete, the average physician is inclined to pay scant attention to the treatment of this common disease, with the result that a good many cases of measles are not treated at all. This can be altered only by educating the public on the right lines which is not so easy a matter, and by the physician taking more interest in the treatment of this disease.

Ætiology, pathology, symptomatology, etc.—Before proceeding with the treatment proper, it may be worthwhile to deal with those parts of its ætiology, pathology, symptomatology etc., which may have some bearing on the treatment in question. As mentioned earlier, the disease is attributed to a filtrable virus which resides in the secretions of the respiratory tract, and direct infection is the rule, a very intimate contact being not essential. The infectivity may be present as long as four days before the appearance of the rash, and then it rapidly declines. A small diplococcus which forms green colonies on blood agar isolated by Ruth Tunnickliff is also suspected to be the causative agent. Inoculation with blood, bronchial secretions or tears can reproduce the disease. The eruption is an inflammatory process in the dermis. Koplik's spots are minute epithelial degenerations on the crowns of the papillæ of the buccal mucous membrane. Secondary infections with various organisms are common in this disease.

A polymorphonuclear leucocytosis is characteristic of the incubation stage of the disease. It also takes place in all its complications. There may be a slight enlargement of the cervical, inguinal, axillary and other lymph glands of the body, all pointing to infection.

Besides a mild aberrant variety in which only Koplik's spots are characteristic, severe types like toxic, pulmonary or hæmorrhagic forms of measles are recognised, each denoting the particular nature of the attack.

Complications.—Among the complications, the common ones involving the respiratory system include laryngitis, bronchitis, broncho-pneumonia and pneumonia.

Ophthalmic complications include blepharitis, conjunctivitis and corneal ulcers.

Those of the digestive system include stomatitis, and most important of all that I have observed, are gastritis, gastro-enteritis, enteritis and entero-colitis with dysenteric manifestations. In fact, the latter is the most common complication that I have encountered. Whether this is part of the inflammatory process of measles or even a hæmorrhagic type of it, or whether it is a superimposed dysenteric infection on an already weakened system, I have not been able to conclude for lack of laboratory facilities. I have observed cases in which patients have passed more blood, or blood and mucous, as many as hundred times a day. The picture is one of typical infection with intense toxæmia.

Suppurative otitis is one of the most common complications of measles.

But for rare cases of convulsions at the onset, and delirium during the height of the temperature, I have not encountered anything by way of complications of the nervous system.

Treatment.—Prophylaxis:—Besides the usual precautions like segregation and isolation, it has been suggested that prophylactic injections of the blood serum from healthy convalescents in measles, produce passive immunity, but, I have not so far had the opportunity of trying this treatment. I wonder whether any of my professional brethren has had such an opportunity, and that in fact exposes the truth that we have to advance far in this sphere before such a state of affairs comes into being. Until then, we have to rest content with treatment that is essentially curative.

Treatment proper:—Cases of measles treated by me can be classified into two, viz., those who came for treatment in the initial stage (in most cases the patients themselves being not aware of the nature of the disease), and those who never came in the initial stage but turned up subsequently for some attendant complication or other. Among the former can be included those who came for treatment in the beginning for "fever and cold" but stopped the same as soon as they realised the nature of the disease.

In the first series of cases, as soon as a diagnosis of measles is made, my own practice is to start chemotherapy with the sulphonamide group of drugs. In order that the patients should not stop treatment if they know that the case is one of measles, I always make it a point not to let out the diagnosis as long as I can, and at any rate until the eruptions make their appearance. By this procedure, much valuable time for the above therapy can be gained as it is not difficult for the average physician to diagnose many cases of measles by the initial signs like Koplik's spots, typical sneezing, dry irritating cough and, last but not the least, the injected conjunctivæ, all of which show themselves much before the actual eruptions make their appearance. This is all the more so, when an epidemic of the disease is on. Knowing that the disease belongs to the infectious group and that a certain diplococcus is also suspected to be the causative agent, it is only natural that the Sulphonamide group of drugs should be thought of, as our first line of defence. In the same way, it will not be surprising if Penicillin is found effective in the treatment of measles. An analogy for this can be found in the treatment of smallpox by the above two drugs. Unfortunately the patient's own prejudices towards treatment by injection to which we

* Specially contributed to THE ANNALS.

have to resort to until oral therapy becomes more common and less costly in the case of Penicillin, and the dearth of Penicillin itself, still stand in the way of using this drug in the treatment of measles. Personally, I would like to try Penicillin for measles, and it will not be a surprise if it is found very effective. For the present we have to be satisfied with Sulphonamide therapy. The choice of the particular Sulphonamide depends on the nature of the disease and the prevailing complication. I have had the opportunity of treating about hundred cases of measles during last year's epidemic here. In my practice, in most of the uncomplicated cases the choice was Sulphathiazole; and a child of two years was given on an average about 15 grains i.e. 2 tablets of Cibazol or M & B 760 per day, divided into four doses. Whether the above line of treatment would actually abort the attack, it is too early to state, but so far as my experience goes, I have observed that none of the cases put on the above line of treatment developed any serious complications, an uneventful recovery having been the rule. I have noted this result in my own children and prompt therapy in the above line saved from severe complications. A serious drawback was that in some cases, the Sulphonamides were vomited but this was effectively combated by Sodium Bicarbonate administered either separately or along with the Sulphonamide drug. Simultaneously, the general line of treatment with regard to rest, easily digestible food and sustenance of the patient's energy, was followed. During the febrile stage, bland liquid diet like milk and barley water with plenty of glucose, orange juice etc., was freely allowed. Absolute rest in bed was insisted upon. The conjunctivæ were cleaned with boric lotion and silver proteinate solution 5 to 10% was instilled into the eyes. The hygiene of the mouth was attended to by frequent salt water gargle. In some of the cases treated on the above line, it was noticed that as soon as the eruptions appeared, the patients stopped treatment. Nevertheless, it can be confidently said that patients who have had at least 3 days' treatment on the above line, escaped many serious complications. It will be surprising to state here that among the hundred or so cases that I treated there was not even a single mortality.

The second group of cases comprises those who failed to take any treatment during the attack proper, but turned up subsequently for some or other attendant complication. In this group can be included those who took insufficient treatment for a day or two in the beginning of the attack, but stopped the same as soon as the diagnosis was known. But, I have observed in some of these cases that the initial administration of Sulphonamides has a modifying influence on the complications, even though insufficiently given. Here I would like to point out that whereas many patients were unwilling to take treatment for measles proper, when the complications developed and the seriousness of the case increased, they themselves volunteered for treatment. This is probably because, they could do nothing for dealing with the complications on their part. This was particularly so with the serious respiratory and gastro-intestinal complications. Here they were even willing to submit the cases for injection, which they would have never allowed in the beginning. In this group, I have treated a number of cases of laryngitis, bronchitis, broncho-pneumonia and pneumonia. The extremely rapid respiration and pulse rate, and the general cachexia of the patients might seem appalling, but I have observed that prompt measures will certainly save the cases showing that appearances are particularly deceptive in measles. Even cases with a pulse rate of

200 a minute, invariably recover provided active measures are taken. Plenty of fluids should be allowed to the patients; cardiac and respiratory distress should be combated by massive doses of Coramine both orally and parenterally, preferably repeated every four hours or longer according to the severity of the condition. As for laryngitis, M & B 693 in doses of 2 tablets daily for a child of 2 years has been found very effective. In all these cases, the Sulphonamide of choice is certainly M & B 693, and dramatic results follow its administration. Good improvement can be noticed in as short a time as 24 hours. For bronchitis, broncho-pneumonia etc., the importance of absolute rest in bed should not be under-estimated. General treatment to sustain the patient's energy by the administration of plenty of Glucose by mouth should be resorted to, orange juice during this period not only gives more energy to the patient, but is also well liked by him. Application of antiphlogistine or any other suitable substitute to the chest will also help to resolve the consolidation in the lungs. Whether these respiratory complications are due to the infection of measles itself, or due to some secondary infection, it is not possible to decide definitely, but judging from the results of treatment with M & B 693, it would seem that these complications are caused by secondary infection by organism susceptible to M & B 693, rather than by the original infection. Whatever that may be, the dramatic result following the administration of M & B 693, makes it imperative that it should be administered in every respiratory complication of measles.

Ophthalmic complications too call for general therapy with Sulphathiazole and in severe cases additional local treatment with Thiazamide Eye ointment Soluseptacine ointment, or Penicillin Eye ointment will give excellent results.

Stomatitis of the catarrhal type should be treated by cleansing the mouth with Hydrogen Peroxide and local application of Glycerine acid Boric. I have not observed any case of gangrenous type of stomatitis following measles, although it has been said to occur. In fact, stomatitis and other oral complications can be prevented if the hygiene of the mouth is properly attended to from the beginning. I have found that the administration of vitamin C by mouth in doses of 50 mgms., thrice daily for child of 2 years, proves very useful in the treatment of stomatitis. Side by side with this Sulphathiazole by mouth is also called for. By this line of treatment, the stomatitis heals in two or three days, and no chance ever occurs for tissue destruction.

Gastritis is a very distressing complication of measles, and in this condition, the patient is not able to retain anything as even water is vomited. In such cases, I have found that the administration of Sulphaguanidine in doses of 15 to 22½ grains per day for a child of 2 years, mixed with 3 grains of Sodium Bicarbonate for every dose, does good. The tablets of Sulphaguanidine should be powdered and mixed with the dose of Sodium Bicarbonate. It must be administered in cold water or even ice water if the latter is available. It is significant here to state that the administration in very cold water stops the vomiting much better than when administered in warm water. Moreover, patients with measles, object to take anything warm, as in the opinion of the lay public, measles is a heaty disease and that anything administered warm will aggravate the trouble.

Gastro-enteritis is still more serious, as the dehydration accompanying the diarrhoea and vomiting might be very severe. The motions might be very frequent and will contain plenty of mucous. The same kind of treatment as for gastritis should be given for this condition also. In addition, the administration of Kaolin by mouth will prove very effective not only by stopping the diarrhoea, but by its absorbent action it will serve well to remove toxæmia. For this purpose, I give drachm doses of Crookes Colloidal Kaolin, or B.D.H. Collo-Kaolin, both of which can be administered as a suspension in cold water. I have observed that in such cases, the action of Bismuth is very disappointing. A better and a more palatable method of administering Kaolin is in the form of Kaopectate (Upjohns) in doses of one teaspoonful for every motion until the motions are definitely formed and at longer intervals afterwards. This treatment has the additional advantage that the astringent properties of the Pectin in Kaopectate prove more useful in stopping the diarrhoea. The same line of treatment can be followed in cases where the motions are dysenteric too, and the results will certainly be very remarkable. In all these cases, the administration of Sulphaguanidine combats the infection proper while Kaopectate stops diarrhoea and dehydration. Plenty of fluids like barley and glucose water should be administered. Dilute orange juice will also be useful. During this stage buttermilk is a very useful diet, as its astringent properties will be of much advantage. For the same purpose, whey water can also be given. Under such treatment, I have seen that there was complete recovery in all the cases. In the gastrointestinal complications, the Sulphonamide of choice is Sulphaguanidine. In addition to its low toxicity, its selective action on the gastro-intestinal mucosa is far better marked than that of Sulphathiazole or Sulphapyridine.

Suppurative otitis calls for the administration of Sulphathiazole by mouth, and local instillation of Thiazamide powder with 1% Proflavine Sulphate, after cleansing the ear with Hydrogen Peroxide. A better method is to instil Penicillin drops in the strength of 250 to 500 units per c.c. of isotonic saline solution.

Convulsions and delirium at the onset can be controlled by Dial injections and Gardenal or Bromides by mouth.

Conclusion.—In conclusion, I would suggest that Sulphonamides should be administered for every case of measles and its complications, as the results are very encouraging. Here it will not be out of place to add that fairly high doses of the drug, are necessary to produce maximum concentration in the blood which is essential to produce the desired result. The practice of administering the same in very small doses cannot be too strongly condemned, as such a procedure by increasing the resistance of the infecting agent is likely to make the same Sulphonamide-fast.

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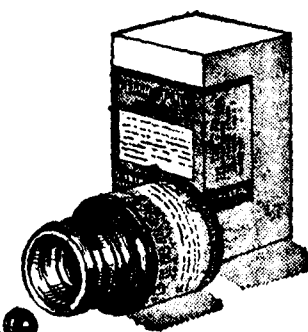
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Cases and Comments

Allergic Manifestations with Respiratory Symptoms Due to Round-Worm Infection

B. M. SINHA, L.M.P., L.T.M.,
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ROUNDWORM, as a cause of allergic manifestation with respiratory symptoms is not often sufficiently realised. Recently I had the occasion to treat two young boys who were suddenly taken up by worst symptoms, one with symptom of broncho-pneumonia with high fever and another with symptoms of asthma and urticarial rashes.

CASE I.—G., a young intelligent boy, one evening was suddenly taken up by broncho-pneumonia symptoms with pain in chest and abdomen. When I examined him I found him in great distress with very rapid respiration and temp. 103°F. With one day of symptomatic treatment (Sulfadiazine therapy) the fever dropped down but asthmatic symptoms continued for another 3 days. On enquiry it was learnt that the patient had passed round-worms a few weeks before. After much consideration Santonin was given followed by Saline purgation resulting in expulsion of 3 adult worms. Much to the surprise of everybody all the allergic manifestations disappeared and the boy became alright. After a fortnight another course of Santonin was repeated.

CASE II.—A., a young boy, was another victim of this disease. The boy, when I examined, had not slept for the last 48 hours. His look was blank and dull and speech was incoherent. He manifested other psychic symptoms such as melancholia and symptoms of delusional insanity. He would not drink or eat anything. On examination I found that his tongue was coated and nothing else abnormal was detected. The boy was panting incessantly and seemed to be in great distress. Urticarial rashes were present on the chest and abdomen.

Examination of lungs did not reveal any foreign sounds. Temperature was subnormal but respiration was very brisk.

To start with I gave him one Tab. of Dial (Ciba) for sleep which acted very well. Next morning I gave him a mixture containing Sodii Sulph, Magsulph, Mag. Carb, Tr. Card Co etc., for evacuation. On the 3rd day of the treatment I was informed that the boy had passed one round-worm. On this report I administered Santonin which acted marvellously resulting in further expulsion of two adult round-worms. When I again examined the boy I found that he had completely recovered and all the psychic manifestations disappeared.

Discussion.—The infection by *Ascaris Lumbricoides* to human being takes place in a very peculiar manner. The ova containing the mature embryos which comes with the stool of the infected person is swallowed accidentally by a person who is going to be infected.

In the intestine the embryos come out and burrow into the liver and through the hepatic vein into the right heart and then to the lungs where they mature. From the lungs they creep up along the trachea, glottis and

then back to the intestine again where they grow to full maturity in 8-10 weeks.

When large number of embryos enter into the lungs they may cause broncho-pneumonia, pneumonia (as in Case No. I) or allergic manifestations as in Case No. II.

The mature worms excrete toxins which are: (1) anaphylaxins; (2) neurotoxins; (3) hæmolysins; and (4) endocrinotoxins.

These toxins may cause systemic intoxications which is manifested as pallor, weakness and psychic symptoms.

Conclusion.—Allergic manifestations due to ascariasis is not a rare instance. While practising in rural areas where proper disposal of stool and general cleanliness of the children are not properly attended to, cases of the type I have recorded above are often met with, but on many occasions we miss the diagnosis. We should consider first the common diseases, failing which we should take into account the less commoner diseases.

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Clinical Exposition of a Case of Chronic Hypertension

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Sassoon Hospital, Poona.

My excuse for presenting the following case is not the uncommonness of the disease. The case abounds in a number of points of clinical interest which one rarely comes across together in one patient. In addition, it illustrates how fatal damage may be done by temporary rise in blood pressure produced by mental strain in a case of hypertension associated probably with a progressive vascular disease. These considerations are, I think, enough to merit its publication.

Case report:—A lady, aged 48, was referred to me for blood transfusion as she was very anæmic and would not respond to the usual therapy satisfactorily. She was admitted in the hospital on the 1st June 1947.

HISTORY:—The lady had anæmia and chronic headache for over 10 years. In fact, she had the 'headache habit' since adolescence. She had four children—the eldest is 30 years and the youngest is 16 years old. There was no history of miscarriages. After her last delivery she had what was diagnosed as 'osteomalacia'. For the last about 15 years she had been a chronic invalid due to persistent anæmia, dyspnoea on exertion, and repeated headaches.

On examination she was found to be a pale but a fairly well nourished lady, who found it difficult to lie in bed due to breathlessness and preferred to sit up most of her time. There was a little œdema round about the ankles. Liver border was felt one finger below the right costal margin and was tender. Veins in the neck showed engorgement even while sitting up.

She appeared to be an ever-anxious type of lady. She had marked anorexia.

Cardiovascular system:—Apex beat was seen and felt in the nipple region. It was forcible and heaving. First sound in the mitral region was loud and booming. Pulmonary second sound was accentuated. Aortic sound had a ringing character. Pulse was full and bounding, and suggested vascular thickening. Blood pressure was 225/135 mm. Hg. Other systems did not show anything much abnormal on physical examination.

Urine report:—Sp. gravity—1.005; Albumin—trace present; Few red blood cells and hyaline casts were seen on microscopic examination.

Blood report:—Total R. B. C. count—2.4 million cells per c.mm.; Total W.B.C. count—8,500 cells per c.mm.; Hæmoglobin—38% (Sahli); Colour Index—0.7; Differential count was normal; Kahn test—negative.

Fundus examination:—No evidence of hæmorrhages or exudates; evidence of arteriosclerosis and narrowing of vessels.

Blood urea estimation:—31 mg. per 100 cc. of blood.

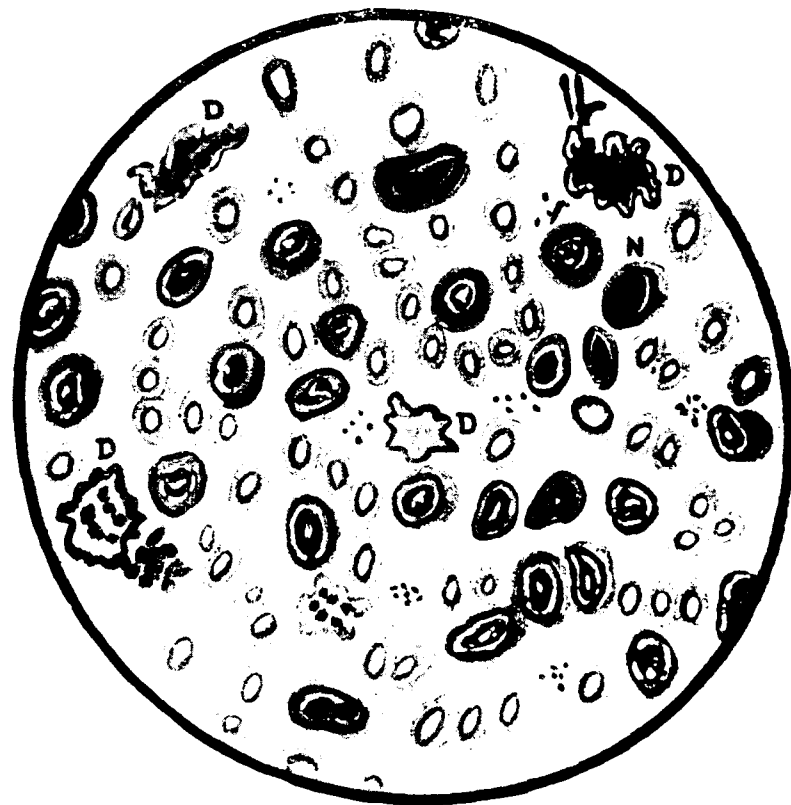
Intravenous pyelography:—It was not undertaken in view of the patient's condition.

X-ray examination:—Roentgenoscopy and roentgenography showed enlargement of the heart to the right and to the left to some extent. A shadow on the left side of the base of heart resembled aneurismal dilatation of the transverse parts of the aorta. (See plate).

Electro-cardiography:—There was absence of ventricular preponderance. T in leads I & II was diphasic, and upright in leads III & IV. S-T segment was iso-electric in all leads. (See electrocardiogram.)

Treatment.—The patient was immediately put to bed with strict bed-rest. As there was evidence of rightsided cardiac failure, Digoxin tablets were started one six hourly. Some intolerance was manifested in the beginning but later on by grading the dosage tolerance was induced. For left ventricular weakness, Inj. Aminophyllin in 25% Glucose was administered intravenously on alternate days, in addition to Digoxin Thianitol (Fairdeal) tablets one B.D. were given to relieve peripheral tension. Inj. of Liver Extract and Iron orally were given at convenient times. Under this intensive treatment, the dyspnoea became gradually less. Secretion of urine improved in quantity, œdema disappeared and anæmia decreased. Her general condition improved remarkably with the return of appetite, and she was scheduled to return home to continue the treatment in the afternoon of the 17th of June '47. But man proposes and God disposes. For, in the meantime matters were developing against emphatic medical advice, which fatally crashed all prospects of a live return home. As the patient was feeling better, she was planning tonsillectomy of her youngest daughter aged 16 in the hospital. On my getting the information, I explained her the dangers of her plan particularly in her case as she was a high-strung and ever-worrying type of a lady. I explained to her that her apparent improvement was just like a 'bungalow of cards' which would tumble down with the smallest breeze. She was as if standing on the 'edge of a precipice' as long as her blood pressure remained high and a little balance on the wrong side would shatter her life beyond hope. It was explained to her that the anxiety caused by the absence of her daughter for an operation would send her blood pressure higher and would bring about a catastrophe. The advice was discarded on the plea that she belonged to a

A Case of Acute Lymphatic Leukemia
T. V. Venkatesan.



A sketch from the blood slide of the lymphatic leukemic patient.

[Vide page 265.]

5. Left and rightsided failure were manifest in the same patient.

6. Severe anæmia is so often a close accompaniment of hypertension that many times the latter is likely to be missed unless a thorough examination of the patient is made. Such cases are not uncommonly treated as pernicious or a severe secondary anæmia. This mistake in the present case prompted the medical attendant to advise blood transfusion when really blood letting was, if at all, indicated. The anæmia is often intractable and may respond to some extent to large doses of Iron and Acid Hydrochlor. dil. The cause of this unyielding anæmia, according to my belief, is probably hypoplasia of the bone marrow resulting from its anoxia due to arteriolar spasm, though Hypochlorhydria with deficient absorption of iron may also be contributing to some extent to it.

7. Fundus examination showed only a marrowing of vessels and arteriosclerosis. It did not give any indication of the oncoming catastrophe by manifesting appearances as in malignant hypertension. It is generally believed that the presence or absence of retinal hæmorrhages in fundus oculi forms one of the chief prognostic features in hypertension.³ Contrary to this view, it may be said from this case that the fundus oculi may not show signs of malignant hypertension even when cerebral vascular crisis is imminent.

8. Renal function as suggested by blood urea estimation may be normal as in this case, with impending cerebral hæmorrhage in hypertension. Presence of albumin and red blood cells in urine suggests microscopic hæmorrhages in the kidney tubules. This occurrence appears to have some prognostic significance in view of the cerebral hæmorrhage that followed. Thus microscopic renal hæmaturia is likely to prove a dependable guide in anticipating an early vascular rupture in the brain in hypertension.

Summary:—1. A case of chronic hypertension is described in which cerebral vascular rupture is believed to be brought on by (coincided with ?) a period of extensive mental strain.

2. Eight points of special interest are discussed.

3. Following observations are made which do not appear to have received sufficient attention in clinical medicine:—

(a) Presence of microscopic hæmorrhages in the kidney preceded cerebral vascular rupture in this case. It is suggested that this sign may prove a dependable guide in anticipating cerebral hæmorrhage in a case of hypertension.

(b) It is suggested that an important factor in the etiology of anæmia in hypertension is hypoplasia of the bone marrow probably resulting from its anoxia produced by arteriolar spasm.

(c) Cerebral hæmorrhage in hypertension may take place with normal kidney function and with a fairly normal fundus.

(d) Importance of mental stress in precipitating cerebral hæmorrhage by raising blood pressure in hypertension is emphasised.

I am grateful to the Civil Surgeon, Poona, for his kind permission to publish this case.

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48, Shukrawarpet,
Poona City.

A Case of Acute Lymphatic Leukemia

T. V. VENKATESAN, M.B.B.S., F.D.S. (Lond.),
The Government Hospital, Madura.

"LEUKEMIA is a disorderly non-altruistic proliferation of the myeloid or lymphoid cells or the monocytes. Depending on the type of cells affected it is called as myeloid or lymphatic leukemia or monocytic leukemia."

Acute lymphatic leukemia is a rare disease. Males are more commonly affected than females. The onset is abrupt with fever, rigors, prostration, aching pains in the limbs, head-ache and hæmorrhages beneath the skin or in the mouth. The cervical lymphatic glands are the first to be enlarged. A hæmorrhagic pleural effusion is a common complication and may give rise to much dyspnoea. The spleen is enlarged.

Blood changes:—The total W.B.C. count is very variable, usually above 70,000. It may be as high as 500,000. The lymphatic cells constitute 99% of the total cells. The R.B.C. count falls. The colour index may be one or even greater anisotytosis, poikilocytosis and all the signs of blood regeneration as reticulocytes polychromatic cells and nucleated cells are present.

Course:—Death is the rule and the exception in this disease. It may take place in a week or may drag on for six weeks. A patient (male) by name T., was admitted in the male medical ward on 8-9-'46.

Cardinal symptom:—Dyspnoea of three weeks' duration.

On examination the pallor and the enlargement of the superficial lymph glands, especially those of the neck, attracted my attention. Some of the glands were discrete and some were matted together. On the chest a number of tortuous veins will be seen. The superficial epigastric and the mammary veins were enlarged.

Respiratory system:—Inspection: Movements diminished on the right side. Palpation: V.F. absent on the right side. Percussion: stony dullness on the right side. Auscultation: V.R. absent on the right side—absence of breath sound.

Cardio-vascular system:—Pulse: Equal on both sides. Heart: Apex heart outside the left midclavicular line. Normal heart sounds.

Abdomen:—Spleen enlarged 3 fingers breadth below the costal margin. Liver palpable to 2 fingers breadth.

Pathological reports:—Urine: Sugar—nil; Albumin—nil; Reaction: acid.

Blood: R.B.C. 4'1. million. W.B.C. 1,41,000.

Kahn: negative. Sedimentation: 1 hour—28; 2 hours—36.

Slide shows lymphoblasts and lymphocytes. (Vide picture).

Other reports:—X-ray chest: 9-9-'47. The whole of the right chest is practically opaque and there is certainly a good deal of pleural effusion. Apart from the displacement of the mediastinum to the left, the upper mediastinal shadow seems to be enlarged.

11-9-'47. Paracentesis thoracis done with Dieulafoy's apparatus. Twenty ounces of hæmorrhagic fluid let out.

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APR. '48]

A CASE OF HYDATID MOLE—U. L. JHA

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Diagnosis:—The enlargement of the lymphatic glands and spleen together with the characteristic blood changes enables the diagnosis to be made. The great increase in the W.B.C. count, the presence of lymphoblast and lymphocytes help in the diagnosis.

The case was referred to the radiologist for deep X-ray therapy for the mediastinal glands. As there was still much fluid it was decided that the therapy may be deferred. Meanwhile the patient was getting more and more dyspnoea. On 15-9-1947 paracentesis was done again and forty-nine ounces of hæmorrhagic fluid was let out. On 16-9-'47 it was found that the patient's general condition was going down. He was developing severe dyspnoea with cyanosis. The following symptoms were noted:—

- (1) Severe dyspnoea and cyanosis.
 - (2) Copious frothy expectoration, blood-stained, rose coloured sputum from the nose and mouth.
 - (3) Pain and feeling of oppression in the chest.
- On examination, it was found that the pulse was rapid and thready. The face presented an anxious expression. The body was cold and clammy. The chest movements were hurried. There were bubbling rales all over.

Diagnosis: Pulmonary oedema.

The patient was put on the following lines of treatment:—

- (a) Oxygen inhalation.
- (b) Venesection was done and ten ounces of blood was let out to combat cyanosis.
- (c) Atropine $\frac{1}{100}$ gr. S.C. and repeated two hourly.

Patient died in five hours after the onset of pulmonary oedema.

The interesting aspects about this case are: (1) Acute lymphatic leukemia is rare and (2) the sudden onset and the termination.

Autopsy was done. The spleen was moderately enlarged. The mediastinal lymph glands were enlarged.

I thank the Superintendent of the Government Erskine Hospital for giving me permission to report about this case.

185, New Street,
Madura.

A Case of Hydatid Mole

U. L. JHA, L.M.P.,
Medical Officer, Mandro Dispensary, Bihar.

25-1-'48.—A Mohammadan came and reported that his wife was bleeding per vagina. She was pregnant. As the patient was a strictly *pardah* lady no examination even external was agreed. Interrogation revealed:—

- (1) She was in the 5th month of gestation.
- (2) She was multipara (3 children).
- (3) Bleeding—moderate in quantity—oozing in character—5-6 day's duration.
- (4) No pain in the abdomen.
- (5) No history of trauma or disease in the private part.

The case was considered to be either one of (1) threatened abortion or (2) placenta prævia.

The patient was prescribed Calcium Lactas gr.x thrice daily and instructed to take complete rest in bed and if these measures failed to give her relief to have her examined internally for placenta prævia.

The above measures failed to do any good and the husband in his bewilderment, tried several remedies prescribed by numerous quacks who abound in that area. But unfortunately none could give any relief and the patient got into a precarious condition. I was called in and this time the party agreed to undergo any examination and treatment. I found the patient on examination on 9-2-'48 as detailed below :—

- (1) Face—pale, extremely anxious and covered with cold sweat.
- (2) Temp.—Subnormal.
- (3) Pulse—Almost imperceptible.
- (4) Respiration—42 p.m.
- (5) Abdomen—Soft but distended—uterus 3 fingers above umbilicus—no foetal parts palpable—foetal heart sound absent.
- (6) Patient profusely bleeding and in labour pains which were not infrequent.
- (7) P. V. revealed :—(a) os—2 fingers dilated.
(b) os—filled up with blood clot.
(c) gushing blood contained a number of globules of various sizes. They were like water lobes.

Diagnosis was now quite clear. It was a case of hydatid mole.

Treatment.—(1) The clot of blood was dislodged and uterus was evacuated with two fingers of one hand working in the uterus and other hand pressing on the fundus externally. The content came out in a mass. It was typically like bunches of grapes of various sizes ($\frac{1}{4}$ " to $\frac{1}{2}$ " in diameter). Uterine wall was extremely thin and when the organ contracted on itself it became very small in size.

- (2) An abdominal binder applied.
- (3) Pituitrin $\frac{1}{2}$ c.c. I.M.I.
- (4) Glucose 12.5 %—50 c.c. }
Soluseptacine 10 %—5 c.c. } I. V. I.
- (5) Mist. Post partum $\frac{3}{4}$ i T.D.S.
- (6) Absolute rest and cleanliness advised.

The patient was kept on item No. 5 for 4-5 days and made an uneventful progress. Now she is quite free and is on Mist. Iron Tonic $\frac{3}{4}$ i T.D.S.

The point worthy of note is that one should not forget to examine the nature of the discharged blood. In this case the diagnosis could have been made earlier had the blood been examined for its nature and content. I am really very sorry for my failure.

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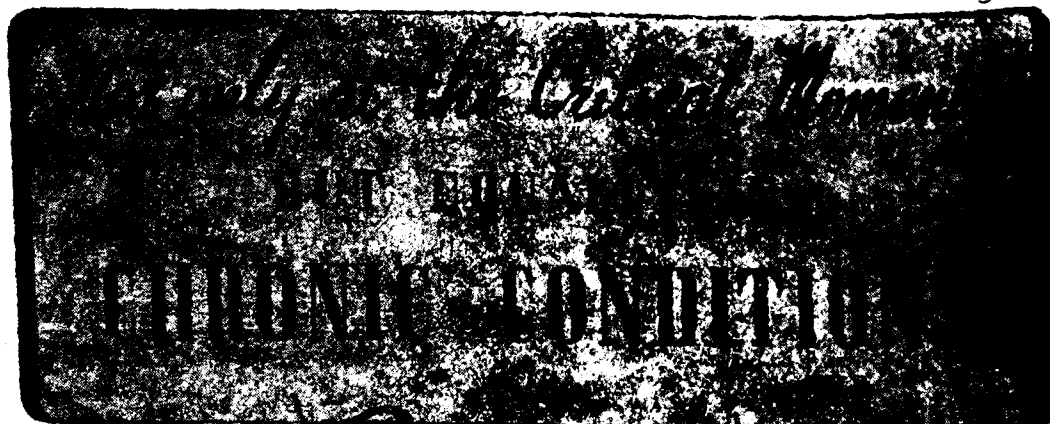
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A Few Case Notes

Dr. NANI GOPAL DAS,
Medical Practitioner, Kalna.

CASE I. **Hæmorrhagic algid.**—Patient H., M., 18 years, student. General features: under nutrition, premature grey hairs and sore tongue.

Physical examination:—Lungs:—Toxæmic, accentuated breathing simulating pre-congestive breathing. Heart—N.A.D. Spleen: typical ague up to umbilicus. Liver—N.A.D.

19-2-'48.—Acute onset of fever last night after coming from a wedding party the previous day. 4 hæmorrhagic stools with free blood up to $\frac{1}{2}$ a bowlful at a time. Diffuse mucosa on the linen smeared with blood in the sample shown. On enquiry history of intermittent dysentery.

R	Sodi Bicarb	...	gr. x
	Sodi Chlor	...	gr. v
	Extr Kurchi Liq	...	℥ x
	Adrenalin	...	℥ i
	Aqua ad	...	℥ vi

Ft. Mist iv doses T.D.

Vit. C. Tab. qs. Sulphonamide tablet qs. Cal. Lactas qs. Ft. pulv. iv. Div.

I suggested next parenteral Coagulen (Ciba), if the hæmorrhage is not stopped after medicines.

Towards the evening the patient was all O.K. except Temp. which increased at mid-day by $\frac{1}{2}$ or 1° . The toxæmic breathing which was supposed to be pre-congestive in suggestion of coming from a wedding's exposure at early Falgoun was less accentuated.

Then with assurance from the mother, I boldly pushed one Q. Biydrochlor without waiting for further evolution of symptoms. At early morning the patient was perfectly well with no temp.

20-2-'48.—Patient all O.K.

R	Sodi Bicarb	...	gr. x
	Ol. Cinnamon	...	℥ i
	Extr Kurchi Liq	...	℥ v
	Aqua ad	...	℥ iv

4 such T.D.

Sulphonamide Tab. qs. Vit. C Tab. qs. Cal. Lactas qs. Ft. Pulv. iv Div.

21-2-'48.—All O.K. Mist. and Pulv. repeated.

22-2-'48.—All O.K.

R	Spt Am Aro	...	℥ x
	Tinc Nux Vom	...	℥ x
	Tinc Ferri Perchlor	...	℥ v
	Liver Extract	...	℥ x
	Aqua ad	...	℥ vi

Ft. Mist iv doses T.D.

23-2-'48.—Quino-hæmogen (B.I.) Multi vitamin Tabs. to continue.

Discussion.—(1). The case is obviously a chronic malaria without adequate Quinine for long.

(2) The lowered resistance brought in the complication. Secondary catarrhal mucus due to upper hand of the intestinal flora.

(3) Blunders likely to be made in these cases whether Emetine will be the first stroke the radical therapeutic or Q.

(4) Had the Q. not been pushed as we occasionally have to do in private practice the case would prolong to a remittent course on a symptomatic line merging into a typho-dysenteric picture upon chronic malaria probably ending in the end of the life.

(5) If there be fallacy I shall welcome correction.

CASE II. **Reflex pneumonitis.**—13-11-'47. About noon I was called to a case as a consultant to an acquainted H.M.B. A boy of four years of labour class suddenly fainted with acute dyspnoea and highly accentuated breathing with rhonchi of various kinds. The case seemed to be an advanced pneumonia just on the border of post consolidation and pre-resolution of a few days. Still now afrebile.

I at once suggested, of M & A. My dear H.M.B. also told me that he was also thinking of Opi according to Nass. I pushed $\frac{1}{2}$ c.c. M & A St.

R Sodi Bicarb ... gr. v
Pot Citras ... gr. v
Spt Am Aro ... m. v
Tinc Belladonna ... m. v
Tinc Dig ... m. ii
Aqua ad ... 3 iii

4 T.D. to be continued after waking. He waked at midnight. At morning I saw him playing.

(1) Reflexes were hurriedly examined. The shock appeared to be superficial due to afferents from respiratory crisis.

(2) The pneumonitis, was of non-infective type and it occurred in reaction to viscerosensory afferents due to false passage of rice-grains.

(3) Mechanism of treatment:—Purely the lungs were offered rest by M & A and nature was left to remedy. After midnight the boy waked and vomited a few grains of rice and muco-catarhal fluid.

Luckily no subsequent symptoms evolved and it was all O.K. next morning with lungs as calm and normal as possible.

CASE III. **A subtypical beri beri**—Hagu, a Hindu labourer, adult male, suffering for over a year from intermittent diarrhoea, fever etc., for which he had palliative treatments elsewhere. He had been treated by two or three Emetines, he said.

After which he had oedema general, mostly making the calf area and eyelids. During the course of the same years two of his stout adult brothers had died from the same oedema and diarrhoea, muco-hæmorrhagic.

Examination reports:—(a) Stool: diffuse mucus + streaks of blood. Macroscopically even indigested starchy faecal matter.

(b) Typical pendulum like.

(c) Abdomen—Peculiar rigidity of the rectus muscles.

(d) No fever when under my treatment. Spleen, liver not palpable due to abdominal rigidity.

Depending upon (a) and (b) and taking it to be the failing sequelæ of the famine of 1350 B.S. I started the following treatment.

19-11-'47.—R Sodi Bicarb ... gr. x
Pot Acetas ... gr. x
Liq Am Acetas ... m. x
Am Chlor ... gr. v
Hexamine ... gr. v
Extr Kurchi Liq ... m. x
Aqua ad ... 3 i 4 T.D.

Diet advised on the restricted lines. Bael Morroba and milk in the morning. Rice with soup at noon and chissa in the evening.

20-11-'47.—**Berin (Glaxo) I.M.**

R Pot Acetas ... gr. xxx
Liq Amon Acetalia ... m. xv
Spt Am Aro ... m. x
Tinc Hyocy ... m. x
Hexamine ... gr. v
Aqua ad ... 3 vi 4 T.D.

Mist. according to symptoms.

As a miracle the next day, the rigid abdomen was as soft as possible and the oedema much reduced.

21-11-'47.—**Ferri et Quincitras**—Mag Sulph—Am. Chlor.—Tinc. Digitalis—Tinc. Hyocy—Acid Sulph dil—qs. of each Aqua—3 i 4 T.D.

22-11-'47.—R Sodi Bicarb ... gr. x
Sodii Benzoas ... gr. v
Am Chlor ... gr. v
Hexamine ... gr. v
Sodi Sulpho Carb ... gr. i
Livergen ... m. x
Liq Punarnava Liq ... m. x
Aqua ad ... 3 vi

12 Such one dose T.D.

Vit. C Tab. qs. Cal Lactas qs. Ft. Pulv iv Div

24-11-'47.—**Symptomatic Mist. and pulv.**

25-11-'47.—Complaint intense griping and tenesmus due to purging of the last two days which were purposely done to counteract the effect of Emetine.

R Sodi Salicylas ... gr. v
Pot Brom ... gr. x
Glycothy ... m. x
Am Chlor ... gr. v
Aqua ad ... 3 vi 4 T.D.
Bismuth Carb qs. Cal. Carb. qs. Pulv 4.

30-11-47. Report of relief after passing residual mucus. Chronic colitis vaccine (A.C.) 1 c.c. No. 1. Mist. Carminative et Sedative.

Now it is three months since he is alright and working a whole day labour regularly in the fields before my eyes.

Discussion.—Though it may be argued that Berin can make clinical subsidence of oedema, the reversibility of starch metabolism and cell permeability are both to be considered herein.

Recently a female of the same place came with diarrhoea oedema marked on calf muscles, and pendulum like heart sounds. She cured on Mist. Alba and Pulv. Berin etc.

CASE IV. **Urticaria in pellagra.**—Etiman Bibi, Mohammadan female, came with swollen cheeks itching and burning. Desquamation of the epithelia with tiny scabs duration 8 years. History of occasional eruptions diffuse over the body and burning. Afrebile.

The case was diagnosed as avitaminosis with urticaria due to recurring constipations.

TREATMENT:—15-12-'47. Berin (Glaxo) $\frac{1}{2}$ c.c. I.M.

R Mag Sulph ... 3 p.
 Sodi Sulph Carb ... gr. i.
 Liq Arsenicalis ... m. i.
 Hexamine ... gr. v.
 Tine Nux Vom ... m. x.
 Aqua ad ... 3 i. 4 T.D.

16-12-47. Complaint of aggravation of itching and burning.

R Sodi Bicarb ... gr. x.
 Tine. Belladonna ... m. v.
 Aqua ad ... 3 vi. 4 T.D.
 Sulphur ppt. ... gr. i.
 Pulv Amyl ... gr. v. 4 T.D.

18-12-47. Lactolan 1 c.c. I.M. Occurrence of reactionary shock relieved by an Adrenalin I.M. St.

R Sodi Bicarb ... gr. x.
 Hexamine ... gr. x.
 Zine Sulph ... gr. 1/8.
 Aqua ad ... 3 vi. 4 T.D.
 Sulphur ppt. ... g. 1/8.
 Pulv Amyl ... gr. v. 4 T.D.

28-12-47. Lactolan 2 c.c. No occurrence of shock.

R Sulphonamide ... tab. 3.
 Hg. with Creato ... gr. i.
 Sodi Bicarb ... qs.
 Ft. Pulv. vi. div.

Though there was no sign of peripheral neuritis, I was not sanguine of the prospect of the case and thinking of cutaneous leprosy, the male guardian of the patient came with his angina of the throat and reported his aunt's perfect cure.

CASE V. Soft chancre.—Patient, H.M., history of intermittent genital sores for the last six years. Confession of habitual exposures. Married. At present frank sores on the glans, multiple, exudative, painless, irregular outlines, with epidermal involvement only. Treated about a few years ago, cured temporarily but recurred occasionally before coming to me.

TREATMENT:—Provocative G. Vaccine (B.I.) I.M. onset of fever within the first 24 hrs. Prescribed Mist. Alba 3 i. T.D. and Pulv. Cibazol T.D. Cured from reactive fever. Acetarsal (M & B) I.M. twice. Results not sanguine. Berin (Glaxo) I.M. once. Not sanguine. Milk once not sanguine. These injections were done in adequate succession. In the meantime local application of antiseptic sedative ointment was done.

Sometimes elapsed to procure the next drugs. Then special soft Chancre vaccine (U.D.) given 3 doses. Subsidence of external ulcers. It is about two long years since he is free from relapse.

Salient points:—The patchy lesions appeared first in form of a papule which spread into cuticular ulcer which shed serous.

Did the vaccines give only protein immunity response? Then what was the effect of milk? Trial of Sterodin did not occur to me then.

Lakshmanpara P.O.,
 Kalna Di., Burdwan.

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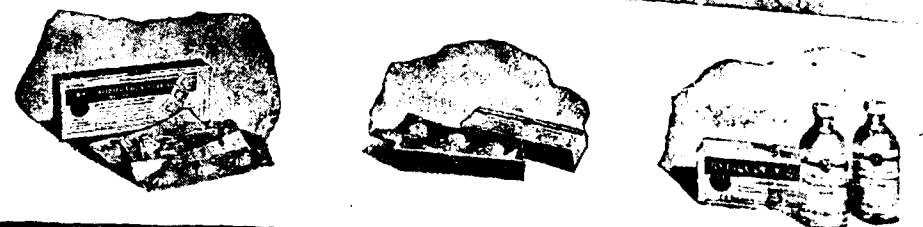
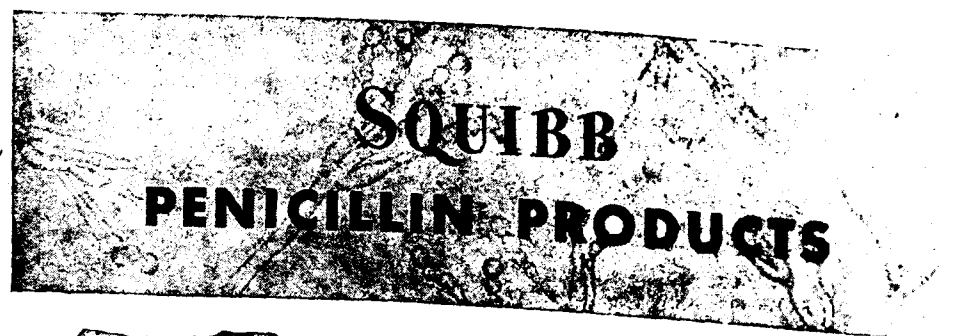
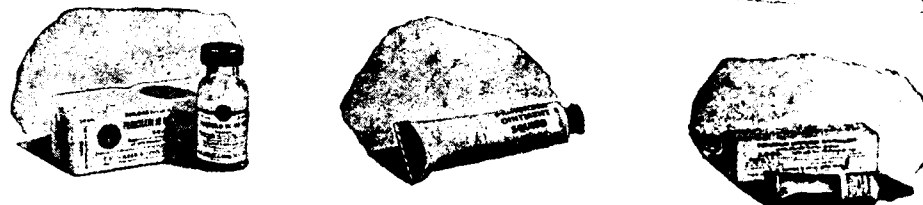
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No. 4

Need of the Hour

THE Premier of Madras, the Hon. Shri O. P. RAMASWAMY REDDIAR, desires that the medicos should think and plan how best they can serve the people. The mind of the medical profession also is working in the same direction. "The medical profession and the services which are free from the grip of foreign domination have necessarily to take upon themselves the responsibility and the privilege of improving the health and happiness of every man, woman and child in our country. They of the medical profession will be stultifying themselves if they do not take up these services," observed Dr. M. V. KRISHNA RAO in the course of the Presidential Address at the Fourteenth Andhra Medical Conference held at Nellore on the 27th ultimo. The minds of both are working in unison. What is wanted is active and sincere co-operation between the Government and the medical profession to tackle the grave and serious problems of public health and medical relief which stare them on their face. While it is a matter for gratification that the Central Government and many of the provinces have established liaison between the administration and the organised medical profession, here, in Madras, the recognition accorded to the Indian Medical Association Branches is hedged in with conditions, which are hardly conducive to that happy and harmonious relationship that should subsist between the two if results are to be achieved. We trust that the Government will look into the matter immediately and make active and effective co-operation possible by removing the conditions imposed for recognition and proving to the profession that they have absolute trust in them.

How can public health be safeguarded and medical relief extended when there are not sufficient number of qualified medical practitioners? As Dr. E. SUNDARARAMA REDDY, the Chairman of the Reception Committee, observed, at least 12,000 practitioners are required to look after the health of the people on the basis of one for every 5,000 of the population, so far as the Province of Madras is concerned. But there are now only 4,000 medical practitioners. The position is the same, if not worse, in other provinces also. It is therefore to be expected that the President should express considerable disappointment at the action of the Government in

deferring the schemes for the building of colleges in Guntur and Madura which were sanctioned last year, and he appealed to the Government to take up the building schemes. It is no good regretting the lack of sufficient number of qualified medical practitioners to serve the people on the one hand, and deferring schemes for the establishment of even colleges sanctioned on the other. The President has also suggested that with a view to ensuring medical relief to the masses all over the province the Government should evolve a scheme of medical education that will enable even matriculates to become doctors after a six years' course. The time that is attempted to be saved in one course is only sought to be added to another course. While there is already much grumbling that even the present course is unduly long and the demand is made that it should be reduced, it is very doubtful if many people would agree to prolong the course specially for the matriculates to six years, leaving the period for the Inters and B.A.'s intact as it is now, thus necessitating two different classes for them. Besides, it is not the dearth of students of the qualifications now required that is responsible for the present lack of sufficient number of qualified medical practitioners. It is the absence of sufficient number of colleges and the inhuman and, if we may say so, cruel manner in which the doors of the medical colleges are banged against many deserving students seeking admission, on grounds wholly unjust, that has brought about the present state of things. If more medical colleges are required, more medical colleges should be established, and till such time such establishment becomes an accomplished fact it should be made possible for the existing colleges to take in more students. It is this which the profession as a whole and with one voice should urge upon the attention of the Government.

"Medical research is indeed and ought to be inseparable from medical education. In our province, adequate facilities do not exist in the medical colleges and hospitals for research for want of adequate staff and funds and lack of encouragement from the State and University. Time has arrived for our medical colleges and post-graduate departments attached to the hospitals and colleges to be handed over to the Universities with sufficient funds", observed Dr. KRISHNA RAO. The Surgeon-General, Col. BHATIA, who declared the Conference open, also stressed the need for research. "Medical colleges," he said, "should also be institutes of intensive medical research. Research was of fundamental importance for a proper understanding and rational interpretation of nature and ultimately to devise remedies. India should no longer be the passive recipient of the medical knowledge gained by other countries. As a free nation we have a great contribution to make to the medical learning of the entire world." And the Hon. the Premier of Madras, switching a new X-ray apparatus in the General Hospital, Madras, said, "The apparatus I am now switching has been obtained from abroad. Hereafter you must make these instruments in this country and I am sure both the Central and Provincial Governments will help in this direction." Only another way of urging the need for research. Thus the profession, the services, and the Government are all of one mind in regard to this matter. Why can't the representatives of the three sit together, draw up a plan and take steps to implement it?

The President urged the need for health education on a vast and improved scale at all scholastic levels of all age groups and by every vehicle available. "There is a great role," he said, "for the medical profession to play in the national programme for health education to children and adults

in the country. The physician and the practitioner have to become the propagators of rational scientific health knowledge to the Indian masses. We cannot and ought not to wait for the State to do this." He suggested three measures for immediate adoption: (1) Every high school should have a medical man as a part time teacher as well as school physician; (2) Doctors should take an active interest in the scheme of basic education and study the practical methods of training children in health habits; and (3) Journals, leaflets and books in the mother tongue have to be produced in an attractive manner for use by the literates. A close co-ordination between organisations for medical research and public instruction has to be developed. The hand of co-operation has thus been extended by the medical profession and it is for the Government to grasp that hand and make the best use of it for the greatest good of the people.

State Insurance for Workers

THE Atlantic Charter was written from above water and the writing has disappeared as fast as it was written. Therefore all talk of securing for all "improved labour standards, economic advancement and social security" has been clean forgotten. The other day an Employees' State Insurance Bill providing for certain benefits to employees in case of sickness, maternity and employment injury has been passed by the Indian Parliament. The history of National Health Insurance can easily be recollected. It was introduced in Great Britain more than thirty five years ago by a man of courage and imagination, Mr. DAVID LLOYD GEORGE, who led Britain to victory in the first world war. It was at that time considered revolutionary, but it became out of date within two decades and a new plan of social security called the Beveridge Plan had to take its place. Conservative and narrow-minded as the Government of India of the pre-Independence era have always been, they only wanted to make a show of making a move, and in appointing a special officer to report on the matter, narrowed and limited the scope of his enquiry by asking him "to prepare a preliminary scheme to serve as a basis for discussion with a view to the introduction of legislation to provide for Sickness Insurance for industrial workers in some of the major industries of India."

The Special Officer's initial note and questionnaire appeared biased that the Bombay Medical Union turned in a long and considered answer. They rightly emphasised that the scheme was far too narrow and restricted in its scope to earn unqualified approval. The major drawback was that it was not intended to be applied to all workers, urban and rural. In so far as it was meant only for workers in the major industries it left out of account a large mass who deserve assistance from public funds by reason of their citizenship primarily and by reason also of the fact that they contribute a not inconsiderable percentage to Central and Provincial revenues. The other fundamental drawback was that it did not contemplate Sickness Insurance to other than workers so called. It excluded from its purview the dependents of workers whose economic status did not justify the oversight. The Bombay Medical Union had also some pertinent things to say about the Special Officer's veiled but unmistakable bias in favour of the Medical Service System, which would deprive the worker of his freedom of choice.

It was on the basis of the report of the Special Officer that a Bill was drafted by the Government of India. The Select Committee which examined the measure made substantial changes in the Bill in directions favourable to workers. The original Bill provided for its application only to perennial factories; the revised Bill empowered the appropriate Government, after consultation with the proposed Employees' State Insurance Corporation and with the approval of the Central Government, to extend the benefits of the legislation, in part or whole "to any other establishments or class of establishments, industrial, commercial, agricultural or otherwise." The exemption limit for non-contributory beneficiaries has been extended from ten annas to daily wages below one rupee. It has also been left to the State Insurance Corporation to extend the period of 56 days for which cash sickness benefits could be drawn, beyond that period, after gaining experience of the working of the measure.

The clause relating to payment of contributions provides that these should be payable not only in respect of weeks during which the employee rendered service and received wages but also in respect of weeks during which he was on authorised leave or was unable to work because of a lock-out or a legal strike—with the further qualification that in respect of a legal strike contribution would be payable only if wages were paid either in part or in full. Under the scheme as finally approved workers with a monthly income of Rs. 260 and below would all receive approximately seven-twelfths of their monthly earnings by way of sickness or disablement benefit. In regard to medical care and attendance to families of insured persons, the Bill as passed lays down that if a Provincial Government is in a position to provide for medical care and treatment not only for the insured workers but also for his family and if the Corporation is in a position to bear the extra expenditure, then the benefit should be extended to the family of the insured person. Larger representation on the Corporation and the Standing Committee has been accorded to workers and employers. The Government of India will meet two-thirds of the cost of administration of the scheme during the first five years, while the Provincial Governments will be meeting a part of the cost of providing medical care and treatment to the insured workers.

The Bill as finally passed is not all that is desired or necessary. As the Labour Minister, the Hon. Mr. JAGJIVAN RAM said, "it opens a new chapter in the history of labour legislation in this country." It is only a beginning of social security measures. Its scope is, of course, limited, but the benefits may be expanded and extended to any extent in order to cover the various categories of the working classes in this country. And in the hope that the Corporation, the Provincial Governments and the Central Government will take the earliest opportunity to extend the scope of this Act as soon as conditions permit, we welcome the measure as a first step.

Dr. Venkappa Fund—Appeal for Contributions

We, the undersigned signatories, feel it our duty and consider it a great privilege to sponsor an appeal to commemorate the valuable services rendered by Dr. D. V. VENKAPPA, one of the oldest members of the medical profession in Madras.

For nearly four decades he has done yeomen service to the medical profession not only in our Province, but throughout India. Dr. VENKAPPA's services on behalf of the Licentiate Medical Practitioners and his great work for the All-India Medical Licentiates' Association are well-known. His indefatigable efforts to get the grievances of this class of medical practitioners redressed, to raise their status and improve their standard of teaching, and his work as Provincial Secretary of this Association, need no emphasis. He has been Editor of the *Indian Medical Journal* for over 4 years and has contributed considerably to improve the tone and get-up of the Journal. He was a Member of the Madras Medical Council for over 7 years, was an active member and office-bearer of the Indian Medical Association, was President of the South India Branch for an interim period as well as Vice-President of the Madras Branch and Member of the Provincial Council. He has worked unceasingly for the amalgamation of the two Medical Associations in our country.

Dr. VENKAPPA is now past 65; but in spite of age and declining health, he is still actively working on behalf of the profession. We therefore feel it our duty to honour one whose career has been marked by great sacrifices for the profession and who has taken keen interest in all movements for the improvement of the medical profession which he loved so well. We feel it our duty to honour such a colleague of ours and show our appreciation of his services by the presentation to him of a suitable purse.

With this object we have formed ourselves into a Committee and are issuing this appeal both to medical men and to such others of our countrymen who know him, and request them to contribute liberally to the purse we propose to present him in the near future.

We request that all contributions may be sent to Dr. U. KRISHNA RAU, Worshipful Mayor of Madras, who has kindly consented to act as Convenor of this Committee.

1. DR. T. S. TIRUMURTI,
President, South India Provincial Branch of I.M.A.
2. DR. K. C. NAMBIAR,
President, Madras Branch of I.M.A.
3. DR. S. THAMBAYYA,
Ex-President, Madras Branch of I.M.A.
4. DR. P. B. ANANGARACHARI,
President, Madras Branch of Ind. Med. Licentiates' Association.
5. DR. C. NATHAMUNI NAIDU,
Finance Secretary, All Ind. Med. Licentiates' Association.
6. DR. K. RAMA RAO,
Secretary, I.M.A. & All Indian Licentiates' Association.
7. DR. K. L. NARAYANA RAO,
Secretary, I.M.A., Madras Branch.
8. DR. R. SANKARAN,
Member, Provincial Council, I.M.A.
9. SRI T. A. RAMASWAMI REDDY, B.A., B.L., Advocate, Madras.
10. SRI G. NARASINGA RAO.
11. DR. U. KRISHNA RAU,
Mayor of Madras & Vice-President, I.M.A.

Madras, 10th March, 1948.

Gleanings From Medical Press

MEDICINE and THERAPEUTICS

Aerosol treatment with penicillin and streptomycin—Recently Baruch, *et al.*, in experiments on white rats found that penicillin is absorbed effectively by the inhalation route, and that autopsy and microscopic section of the lung tissue revealed very little difference between penicillin treated and control rats, indicating no irritant effect of the penicillin. Cultures have been made on sputum immediately after penicillin aerosol treatment and have revealed no pyogenic organisms in the majority of cases. Increased blood levels are reached by having the patient take a deep breath and hold it a few seconds after treatment. Ten to 20 percent of the total amount of penicillin given in this manner is found excreted in the urine. Dr. Veach reports favourable results in several cases of chronic bronchitis, non-tuberculous, and bronchiectasis using streptomycin combined with penicillin. In all cases of bronchiectasis the sputum was rapidly reduced, being only one-fourth to one-fifth as much at the end of the first week of treatment.

At the recent meeting of the American Medical Association in Atlantic City, Dr. Joseph D. Kelley stated that sinus surgery was being rapidly eliminated by the use of penicillin aerosol therapy. Since hemophilus pertussis is extremely sensitive to streptomycin, a number of investigators are administering streptomycin by nebulization and are obtaining excellent results. Dosage for aerosol treatment consists of the administration of 25,000 to 50,000 units of penicillin and 1 gm. to 2 gm. of streptomycin either separately or combined, once to five times in twenty-four hours. Using oxygen to nebulize the solution, a flow of 6 to 8 litres of oxygen per minute is needed and using compressed air a pressure of 10 to 20 pounds is sufficient. An ampule of aminophyllin can also be used in the nebulizer for the bronchospasm. Dr. Veach, in treating cases of acute sinusitis with considerable swelling of the nasal mucosa and blocking of the nostrils, uses 5 to 10 drops of tuamine or a similar decongestant preparation to facilitate the passage of the aerosol mist into the sinuses. Conclusions reached are:

1. The inhalation of penicillin and streptomycin aerosol is of definite value in respiratory infections.
2. In certain respiratory infections it is more effective than intramuscular injections.
3. It is easy to administer, not unpleasant to the patient, non-toxic and gives us a useful addition to our armamentarium for the treatment of diseases of the respiratory tract.

(Veach, Oscar L., Whitney Trust Building, Sheridan, Wyoming; *Rocky Mountain M. J.* 44: 816-817, October, 1947—*Medical News Letter*, Dec. '47.

Recent advances in the knowledge of "Virus Hepatitis."—John R. Neefe, School of Medicine, University of Pennsylvania, Philadelphia, Pa. *M. Clin. North America* 30:1407-43, November 1946.

Some of the data concerning the etiology, epidemiology, pathology, clinical manifestations, diagnosis, treatment, prevention and control of "virus hepatitis" (group term used to include infectious hepatitis, homologous serum hepatitis, etc.) resulting from the intensive investigations of recent years have been assembled. Observations leading to the tentative classification of the etiologic agents as "viruses," their known characteristics, and the studies indicating that at least two types (or strains) of virus are concerned in the problem of "virus hepatitis" are reviewed and a tentative classification based on the present knowledge of etiology and epidemiology is suggested. The type of virus responsible for the spontaneously occurring form of hepatitis (so called infectious or epidemic hepatitis, catarrhal jaundice, etc.), and which induces acute hepatitis in human volunteers after an interval that rarely exceeds forty-five days regardless of whether the route of entry is oral or parenteral, is referred to as virus IH. The type of virus responsible for the form of hepatitis (so-called homologous serum hepatitis, etc.) occurring two to six months after parenteral entry by means of intentional or accidental introduction of blood or blood products, and which does not induce resistance to infection with virus IH, is referred to as virus SH. Possible sources of error involved in classifying hepatitis as infectious hepatitis or homologous serum hepatitis on the basis of the history of the individual case and the effect of such errors in the interpretation of data are cited as an indication of the desirability of using the general term "virus hepatitis" for cases in which the type of virus is not relatively certain. Data showing the variation in response (incidence and ratio of icteric to non-icteric cases) of different age groups to infection with virus IH are presented and the epidemiologic and clinical implications are discussed. The available information concerning geographic distribution, the influence of season, race and sex, the incidence, the morbidity and mortality, and the incubation period are considered briefly in relation to both virus IH and virus SH hepatitis. The epidemiologic and experimental data indicating the existence of resistance to reinfection (homologous "immunity") with the virus IH or SH and the lack of such resistance to infection with the heterologous type of virus (IH or SH) are cited, and the possible relationship of these observations to the incidence of virus IH and virus SH hepatitis in the general population, and to the

protective effect of human gamma globulin are considered. Evidence concerning the methods of transmission of the two types of hepatitis virus is reviewed in some detail. In respect to virus IH, experimental and epidemiologic data indicate that the intestinal-oral circuit is one of the important mechanisms of spread. Respiratory transmission remains a strong possibility but proof of its importance is lacking. Transmission by parenteral introduction of infected blood or its products may occur but possibly accounts for only a small proportion of the apparent infections with virus IH. The proved methods of transmissions of virus SH all are artificial and involve the parenteral entry of the virus by way of blood or its products introduced intentionally or accidentally. Some of the clinical aspects are emphasized, including the high morbidity, the mortality, the lack of relationship between severity of initial symptoms and the ultimate course, the frequency and importance of hepatitis without jaundice, the factors leading to relapse, and the importance and clinical types of so-called chronic hepatitis. Diagnostic aids are discussed with particular reference to value and selection of hepatic tests. The basis and clinical application of the current principles of treatment (rest and nutrition) together with the available measures for prevention and control, including the role of gamma globulin in passive protection, are discussed. Theoretic observations concerning the risk of blood or blood product transmission of hepatitis viruses are included.—*Quarterly Review of Medicine*.

Recent studies on the function of the adrenal cortex—C. N. H. Long, Yale University, New Haven, Conn. *Bull. New York Acad. Med.* 23:260-82, May 1947.

In the study of the function of any endocrine gland 3 basic factors must be considered: (1) chemical nature of the hormone secreted; (2) mechanism that activates the secretion; (3) effect of the hormone on the metabolic activities of the organism.

Through the work of several investigators the chemical nature of the hormones of the adrenal cortex has been determined; it has been found that they are steroids; and some of these steroids, the corticosterones, have now been synthesized.

Other investigators have found that the secretion of the adrenal cortex is activated by a specific factor from the anterior lobe of the pituitary which has been isolated in a highly purified form and is known as the adrenotropic or corticotropic hormone. In studying the mechanisms of the action of this anterior pituitary hormone, the author and his associates have come to the following conclusions on the basis of animal experiments. Changes in the ascorbic acid and cholesterol content of the adrenal can be used as a measure of the activity of the cortex; the ascorbic acid is probably related directly to the secretion of the hormone; while the cholesterol probably serves as a

reservoir of the precursor of the hormone. The various stimuli that increase the secretion of the adrenal cortex in all probability first activate the adrenotropic secretion of the anterior pituitary. The anterior lobe activation is brought about either by a decrease of the level of the cortic hormone in the blood, or by some other unknown change in the blood reaching the anterior pituitary. Epinephrine, the release of which occurs under various stimuli, increases adrenal cortical secretion. It may do this by direct action on the adrenal cortex (Vogt's theory), by stimulating the anterior pituitary or by its effect on the composition of the blood that passes through the pituitary.

It is well recognized that the adrenal cortex is an important factor in the regulation of electrolyte and carbohydrate metabolism. Adrenalectomized animals or humans with adrenal cortical deficiency may die from electrolyte loss or depletion of carbohydrate; the administration of sodium salts or carbohydrate may relieve some of the symptoms, but does not return them to a normal state. The adrenal cortical hormone must, therefore, have some other function. More recent experiments by the author and his associates and others have shown that adrenal cortical hormones also accelerate the catabolic phases of protein metabolism. It is recognized also that adrenalectomized animals, while they may be kept alive by the administration of sodium or carbohydrate while living under quiet undisturbed conditions, cannot tolerate changes in the external or internal environment that are easily tolerated by normal animals.

It has long been known also that there is a close relationship between the adrenal cortex and the lymphoid elements of the body. The author's associates at Yale, in studying this relationship more closely, have found that when the cortic hormone or the adrenotropic hormone is injected into normal animals there is a rapid decrease in blood lymphocytes which is due to a rapid lympholysis resulting in an increase in the gamma globulins of the serum since the gamma globulins are the fraction of the serum proteins that carry specific immune bodies, these findings suggest that the adrenal cortex hormones may play an important part in the development of specific immunity to infections; and it is possible that this same factor (the increase of globulins vital to the body cells) plays an important part in nonspecific resistance to such factors as heat, cold, trauma, etc., which adrenalectomized animals cannot withstand as normal animals do.—*Quarterly Review of Medicine*.

The indication, dosage, and mode of administration of sodium bicarbonate with sulfonamides.—Joseph H. Rohr, M.D. and Paul S. Rhoads, M.D.

The quantitative factor in alkali administration with sulfonamides is often misunderstood or grossly neglected.

If sufficient alkali is given to maintain a urinary pH of 7.5, the sulfonamide can pass

through the renal tubules in a 1000 mg. per cent concentration in solution and without precipitation. If no alkali is given, or insufficient alkali is given, to maintain a pH of 7.5, 100 or 300 mg. per cent concentration may precipitate with resultant anuria and death.

The dosage of alkali necessary to maintain an alkaline urine will vary with the patient and with the disease, but a minimum daily dosage should be established for routine use which will insure a urinary pH of 7.5 for the average patient and can be regulated for the occasional patient whose alkali requirement is abnormal. We have found 24 gm. of sodium bicarbonate daily, divided into four or six equally spaced doses, kept the urine alkaline in most patients without producing clinical or chemical alkalosis. For patients who cannot take oral medication, intravenous 1/6 molar sodium lactate or sodium bicarbonate may be used.

Clinical or chemical alkalosis did not occur in any of the patients taking 24 grams of sodium bicarbonate daily.

Patients were given 24 gm. of alkali daily in four or six divided doses in the form of plain sodium bicarbonate powder in water, sodium bicarbonate and sulfadiazine in a combination tablet which was crushed and mixed with water, sulfadiazine and sodium bicarbonate with citric acid in a combination tablet so that an effervescent mixture was produced when dropped in a glass of water, and a tablet of sodium bicarbonate with citric acid given in water as an effervescent mixture and the sulfadiazine given as a separate tablet. No significant difference in urinary levels with plain sodium bicarbonate and the effervescent form was noted.

Thus, an effervescent alkali is as effective as plain alkali, does not adversely alter absorption, blood or urine concentration, is more acceptable to the patient, and is therefore the alkaline preparation of choice.—*Digest of Treatment.*

BCG vaccination—Plans of the United States Public Health Service.

The following recommendations and conclusions were approved in 1946 at a Conference on BCG vaccination held by the Tuberculosis Control Division of the U.S. Public Health Service

1. BCG vaccine should not be made commercially available at present.

2. BCG vaccination conferred increased resistance to tuberculosis for the limited period of time covered in a group of studies presented at the conference.

3. Medical literature fails to reveal any proved cases of progressive disease as a result of BCG vaccination.

4. BCG vaccination can be done without causing severe local reactions. The intracutaneous method of vaccination is recommended for use at present.

5. In the studies presented, BCG vaccination converted a large percentage of non-reactors (to the tuberculin test) into reactors.

6. Need for revaccination and time interval between vaccination require further study. A single laboratory should be established by the Tuberculosis Control Division to produce BCG vaccine for the whole country for use in research programs proposed at this conference.

7. Extensive investigations should be carried on cooperatively with recognized research groups throughout the country during the coming years, especially in population groups highly exposed to tuberculous infection.

8. It was recommended that the Tuberculosis Control Division set up a controlled study in a community containing 100,000 or more people, to determine immediate and long-range results.

9. Further research is strongly recommended to determine the efficiency of the vaccination and also to attempt to develop a vaccine composed of dead bacilli.—*American Review of Tuberculosis*, March, 55: 294-296, 1947.—*Digest of Treatment.*

Therapy of anemias in infancy and childhood.—The treatment of erythroblastosis fetalis has already been discussed. Slipped cord ligature, trauma or asphyxial bleeding are usually responsible for hemorrhage in the newborn. Elimination of asphyxial states reduces the incidence. In the former transfusion is valuable. Hypoprothrombinemia neonatorum, practically has been eliminated by administration of vitamin K to the mother and child. Transfusion of blood is indicated in hemophilia and in congenital thrombocytopenic purpura. If the latter cannot be controlled in this manner splenectomy is necessary.

Chemotherapy and transfusion of blood are indicated in infections accompanying bacteremia or acute hemolytic anemia or in bleeding and purpura caused by a depression of platelets. This condition is no longer very common. No known cause has been found for chronic hypoplastic anemia which takes place in the latter part of the neonatal period. Blood transfusion appears to be the only effective treatment. Splenectomy is still without sufficient evidence of its value. Some advocate the use of marrow stimulants.

The anemias which occur in children of one month to two years are usually caused by iron deficiency. It is possible that other elements needed for the synthesis of hemoglobin such as chlorophyll, copper, trace elements and protein may also be lacking. However, this does not necessarily indicate the use of the many preparations containing numerous materials.

Copper is known to be necessary as a catalyst in hemoglobin synthesis and to be involved in iron utilization. However, supplementary copper therapy is not necessary as a routine but only in those cases where the infant was given a milk diet exclusively or where the condition does not

respond to iron therapy and there are no other conditions affecting this. The usual dosage of copper in such cases is 1 cc. per kilogram of body weight of a 0.5 per cent solution of copper sulfate. Older children receive smaller doses.

Routine use of liver fraction is not necessary since the status of liver in hypochromic microcytic anemias in children has not been established. Vitamins are only necessary for good nutritional balance. Pureed liver, in doses of 20 Gm. daily up to 2 years of age and 40 Gm. to children of 2 to 6 years, may be given.

In iron deficiency it is necessary to ascertain all of the causes and eliminate them as well. Such causes may include failure of absorption and utilization of necessary materials or the iron reserve may be deficient due to maternal anemia during gestation, premature and multiple births, or premature ligation of the umbilical cord. Since there is a need for more iron to compensate for the increased blood volume the onset is hastened and rapidly becomes more severe.

A typical prescription for the administration of ferrous iron is as follows:

Ferrous sulfate	9.0 Gm.
Spirit of peppermint	1.0 cc.
Solution of amaranth	1.0 cc.
Syrup of citric acid	60.0 cc.
Simple syrup to make	120.0 cc.

Four cc. of this preparation provides approximately 0.16 Gm. (2.5 gr.) of anhydrous ferrous sulfate. Acid vehicles are used since acid facilitates ionization of the iron. Absorption of iron may be supplemented by use of reducing agents such as ascorbic acid or citrus fruits. The ferrous salts are preferable since smaller doses can be given and thus there is less irritation in the gastrointestinal tract. Ferrous gluconate is preferred by some.

Although the dosage of iron preparation is subject to wide variations the following schedule of doses for ferrous sulfate is recommended as being effective: birth to 2 years, 0.26-0.39 Gm. (4-6 gr.) daily; 2 to 6

years, 0.39 Gm.-0.62 Gm. (6-8 gr.) daily; and 6 to 12 years, 0.65 Gm.-0.78 Gm. (10-12 gr.) daily. If ferric and ammonium citrate is preferred it should be administered in the form of a 10 per cent solution in daily doses of 2 cc. per Kg. of body weight. Small doses should be given at first and gradually increased. A reticulocyte count will show how effective the therapy is.

The reticulocytes should begin to rise within three days of institution of therapy and a peak is reached in seven to ten days. This peak is usually in an inverse ratio to the level of hemoglobin. The lower the beginning hemoglobin value the higher will be the reticulocyte response. As normal hemoglobin values are approached the rate of increase in hemoglobin slows considerably.

The dosages presented here and elsewhere in this article for ferrous sulfate may seem excessive but it has been shown that large doses are necessary and that the body utilizes only the amount it requires and excretes the excess.

Pernicious anemia is relatively rare in children under 12 although states resembling this condition have been observed. A megaloblastic anemia accompanied by leukopenia with degenerative changes in the granulocytes and thrombopenia has been reported. This has resulted from infections of the upper respiratory tract or a nutritional disturbance of some type. A response of the reticulocytes was noted when folic acid or liver extract was administered. Relapses do not occur following adequate therapy. Folic acid is administered orally in daily doses of 5 to 20 mg. and intramuscularly in doses of 1 to 2 mg. Crude liver extract is given in doses of 1/2 to 2 units daily.

Liver, folic acid or iron have no effect in the anemia accompanying scurvy unless there are other complications. Specifics for this condition are ascorbic acid or citrus fruit juices. An immediate reticulocytosis occurs upon institution of such therapy.

—*Medical Times.*

SURGERY

Principles governing total gastrectomy.—According to Pack and his associates the removal of the stomach and tributary lymph nodes en bloc is the ideal operation for gastric cancer. Total gastrectomy is both an excision of the entire stomach and dissection en masse of the related lymph nodes. The operation is designed to include the greater omentum, the lymphatics and nodes along the greater curvature, the nodes of the left gastropancreatic fold, the juxtacardiac nodes, the right gastroepiploic nodes, the infrapyloric and the retropyloric nodes, the lymph nodes of the lesser curvature, the gastrophrenic omentum, the nodes along the celiac axis and the nodes in the gastrosplenic ligament, and if they cannot be separated from the spleen or if there is local extension into the spleen, the

spleen itself is included in the en bloc dissection. It may even be feasible to include the peritoneum of the entire lesser sac in the dissection.

The authors review observations on 41 patients who underwent total gastrectomy. Thirty-seven stomachs were resected for carcinoma, and one for an extensive reticulum cell sarcoma. Of the three lesions which proved to be benign, one was non-cancerous linitis plastica, probably on a syphilitic basis, and two were large benign ulcers high on the lesser curvature.

There were 12 women and 29 men. The average age of patients was 54 years. The youngest patient was 30 and the oldest 79 years. About three-fourths of the patients had had symptoms for less than one year, pain being the most frequent symptom.

After discussing the indications for total gastrectomy and the roentgenologic and gastroscopic aspects, the operative technic is described and illustrated.

The decision as to whether to form a retrocolic or an antecolic anastomosis depends in great part on the length of the jejunal mesentery, but in most cases an antecolic anastomosis is to be preferred.

In remarks about the postoperative care the authors say that analysis of their series has revealed a significant factor which may overshadow the advantage of maintaining protein balance with an orojejunal Levine tube. In the 16 cases in which a jejunostomy has been done, there were four operative deaths, only one of which was due directly to a pulmonary complication, while among the 25 patients who had Levine tube feedings there were five deaths. It is apparent that the irritation from a foreign body in the nose and throat may cause considerable nasopharyngeal secretion, and with the voluntary protective splinting of the pharynx possible depressing the cough reflex pulmonary complications may be invited. There may be reason to withdraw the tube much earlier than ten days and rely on a less nourishing routine.

In the total series there were 13 operative deaths, a mortality rate of 31.7 per cent. Seventeen patients survived an average of 18 months; eight of these without nodal involvement at the time of operation averaged 26 3/10 months.

Of the 11 patients still living on December 1, 1945, one has evidence of recurrence of his cancer. Seven patients who had resections for carcinoma have no evidence of recurrence and three, who had the operation for benign lesions, are asymptomatic. In the series for cancer, there are five patients who survived more than three years. All these presented no evidence of extension to tributary lymph nodes at the time of operation. (Pack, G. T., 155 E. 72nd St., New York 20, N. Y., McNeer, G. and Booher, R. J.: *Archives of Surgery* 55:457-485 October, 1947).—*Surgical News Letter*.

Decortication in the treatment of chronic empyema.—Curreri and Gale point out that in chronic empyema the deposition of fibrous tissue on the pleural surfaces results in an immobile, unyielding and nonexpandable lung.

As early as 1894 Delorme realized that while thoracoplasty accomplished its objective by obliterating the pleural space, it also produced anatomic deformity, and physiologically was not ideal because of the reduction in pulmonary function. He advocated a decortication of the binding scar from the visceral pleura. Theoretically the idea was sound, but surgical knowledge was insufficiently advanced in 1894 to execute this procedure successfully.

In World War II Churchill and his thoracic teams in the European theater

were confronted with numerous hemothoraces and pyohemothoraces with non-expandable lung. Thoracoplasty in these otherwise normal persons would most certainly lead to permanent semi-invalidism. They met this challenge by reconsidering Delorme's decortication. The time was now ripe for a real trial of this approach to the problem. Well trained thoracic surgical teams, antibiotics and blood resulted in a low mortality and a minimum of complications. The number of cures was remarkably high. They concluded that the optimum time for surgery is within six weeks following the injury. Subsequently, because of increasing fibrosis, it becomes progressively more difficult to remove the membrane or peel. In acute cases it is only necessary to remove completely the peel from the visceral pleura.

At the meeting of the American Association for Thoracic Surgery in 1946, Tuttle suggested the use of decortication in acute pyogenic empyema, and Gurd reported three cases in old tuberculous empyema with fair to poor results. The authors present two cases of chronic pleuritis successfully treated by decortication. They stress that reexpansion by decortication of chronic nontuberculous inexpandable lungs is feasible. In chronic effusions it is usually necessary to remove the parietal pleura and occasionally the mediastinal pleura as well as the visceral pleura. Intrapleural continuous negative suction is an important aid in maintaining expansion, particularly if the visceral pleura is injured. The type of inflammatory exudate may influence the ease with which decortication is performed.

Discussing the application of decortication in tuberculous empyema the authors say that this type of effusion introduces the added factor of pulmonary tuberculosis, which must be considered before this surgical procedure can be entertained. It is important to know the extent of pathologic change in the underlying pulmonary tissue and bronchi. Obviously, if both lobes are involved decortication is useless unless it is followed by immediate complete thoracoplasty. In the presence of tuberculous bronchitis or stenosis, reexpansion by decortication may reactivate the disease or may produce shifting of the mediastinum with overexpansion of the apparently contralateral lung. The authors believe that decortication for tuberculous empyema with nonexpandable lung should be reserved solely for those cases of disease limited to the upper lobe and with no evidence of tuberculous bronchitis. In such cases decortication following thoracoplasty of the upper part of the chest would collapse the diseased lobe and retain good function in the apparently healthy lobe.

(Curreri, A. R., Madison 5, Wisconsin, and Gale, J. W.: *Archives of Surgery* 55:387-394 October, 1947. The authors are connected with the Department of Surgery, University of Wisconsin Medical School).—*Surgical News Letter*.

The supraspinatus syndrome.—It has been pointed out that lesions of the supraspinatus tendon and subacromial bursa are the commonest cause of pain in the shoulder.

In the middle range of abduction of the humerus the supraspinatus tendon and its bursa are pressed against the acromion. If there is a lesion of either tendon or bursa this pressure causes pain and reflex muscular spasm. The cause of such a lesion is usually trauma.

Pain may lead to disuse, adhesions and limitation of movement.

The cardinal symptoms are aching of the shoulder, painful arc of movement and a sharp stabbing pain on any start or sudden movement of the arm.

The method of treatment is conservative or operative.

The operative treatment consists of acromiectomy. This procedure removes pressure in the tendon and bursa and permits full range of painless movement.

After operation the arm is immobilized in a sling for a few days. A week after operation active exercises should begin.

Where there is true limitation of movement, acromiectomy should not be done before all adhesions have been broken down by exercise.

Conservative treatment consists of rest by immobilization of the arm in a sling or in abduction on a frame or in plaster for not longer than 3 weeks. After the 1st week exercise of the shoulder through a full range of movement should be done twice daily to prevent adhesions. About two-third of the patients recover spontaneously with conservative treatment.—J. R. Armstrong, M.D., London, *The Lancet*, January 18, 1947:94-96, 1947.—*Medical Times*.

Surgical treatment of hypertension.—According to Smithwick the purpose of modifying hypertension and the course of hypertensive cardiovascular disease by surgical intervention upon the sympathetic nervous system is to decrease peripheral resistance to blood flow through the vascular bed and thereby lower blood pressure. In addition, it has been thought that the magnitude of reflex variations in blood pressure can be reduced, thereby rendering blood flow more stable and lessening the intermittent stress and strain on the vascular bed.

The author describes a method which has been utilized to induce variations in blood pressure by stimuli which activate the sympathetic nervous system, to study blood pressure in a standard fashion. The test consists of studying a patient first in the horizontal position, then in the sitting position and finally in the upright position, taking blood pressure and pulse readings every sixty seconds for five minutes in each

position. Maintenance of blood pressure exactly the same in the upright as in the horizontal position is a function of the sympathetic nervous system. It is a good example of homeostasis. The cold test is performed as follows: the patient is stimulated by dipping his hand in ice water up to the wrist for one minute, following a five minute observation in the horizontal position. Readings are taken after thirty seconds and after sixty seconds of immersion and then once a minute for five minutes thereafter.

A normal individual may exhibit all the abnormal reflex responses of the hypertensive patient to the postural and cold tests. He may hyperreact to the postural reflex, to cold lying and to cold standing, although the readings throughout the test are well within the normal range. This is what has been referred to by Hines and Brown as a normotensive hyperreactor, an individual who reacts excessively to stimuli that activate the sympathetic nervous system and is presumably more likely to develop hypertension later in life.

Some patients with intermittent hypertension have a pattern, the significance of which is not definitely known as yet. This pattern is characterized by an abnormal reflex elevation of blood pressure on assumption of the upright position. It is presumed that some particular vascular area is behaving abnormally and that this is initiated by shifting from the horizontal to the upright position. Whenever the patient is up and active he has hypertension; when he is in the horizontal position he does not. It is not yet known which vascular area is involved. Among such patients there are some, usually males, whose vascular beds degenerate before they get to the stage of continued hypertension. That is, vascular disease develops in the stage of intermittent hypertension.

It is important to recognize that a person is a hyperreactor for he should be watched more closely than a normal reactor. The author has operated on very few such patients, but the post-operative record of one of them two years after operation showed his electrocardiogram reversed to normal, his eyegrounds completely normal and his abnormal physiologic responses completely abolished. In other words, he was obviously developing severe vascular damage on the basis of a primary physiological vasoconstriction which was completely modified by interrupting the sympathetic nerve supply to a considerable portion of his vascular bed.

After citing observations on other patients with intermittent hypertension, who are hyperreactors, the author says the type of case he has operated on in the majority of instances is the patient with continued hypertension and cardio-vascular disease.

The author reviews the results obtained in 439 cases who were followed for from one

to eight years. Certain specific contra-indications to surgery have been ascertained; and the so-called excluded group is differentiated from the so-called selected cases.

In two tables the author compares the results obtained in 120 cases who belong to the so-called excluded group and in 319 cases who would not be excluded and in whom operation would be justified.

The selection of cases for surgery has improved to the point where one can be 75 and 85 per cent certain of what appears to be a worth while result. The circumstances under which the results of operation are most likely to be unsatisfactory as well as the method of study to be employed are outlined in the appendix to this paper.

(Smithwick, R. H., Boston, Mass.: *Cincinnati Journal of Medicine* 28:637-656 October, 1947. The author is Professor of Surgery, Boston University School of Medicine, Surgeon-in-Chief, Massachusetts Memorial Hospitals.)—*Surgical News Letter*, Nov. 47.

Granuloma inguinale: Streptomycin therapy and research.—Robert B. Greenblatt, M.D.; Robert B. Dienst, Ph.D.; Herbert S. Kupperman, Ph.D., M.D., and Cecil R. Reinstein, B.S.

This report is a brief summary of the experiences of the past year gained by the University of Georgia group working on granuloma inguinale.

The patients selected for the treatment of granuloma inguinale with streptomycin fell into the following categories: (a) Patients who had not received any form of specific therapy. In many of these the lesions were of relatively short duration, i.e., less than 6 months. (b) Patients who had responded to supposedly adequate antimonial therapy but in whom relapses had occurred. (c) Patients who had been inadequately treated over a period of many years and who had become chemoresistant.

In all 58 patients of this series, Donovan bodies were demonstrable either in smears or biopsy section before the institution of streptomycin therapy.

DOSAGE.—The dosage employed ranged from a total of 3.3 Gm. to 94 Gm. The drug was given intramuscularly in divided doses every 4 hours. The most effective dose appeared to be 4 Gm. per day for a period of 5 days for a total dose of 20 Gm.

TOXIC EFFECTS.—Involvement of the 8th nerve was not observed. Toxic reactions, consisting of pruritus, were noted in 4 patients. One of these patients, in addition to the pruritus, exhibited an urticarial dermatitis of the extremities and trunk and a perioral vesicular eruption. This patient did not respond to benadryl, as did the others, and the antibiotic was discontinued. With the rapid mode of therapy, febrile reactions were noted in over 50% of the patients, but these usually subsided by the 3rd or 4th day.

RESPONSE.—The clinical response was rapid. Patients volunteered subjective improvement within 24 hours after the institution of therapy. Objective evidence of healing was noticed in 48 to 72 hours. Extragenital lesions healed more rapidly than those in the genital area.

Daily smears from the lesions showed that Donovan bodies disappeared in about 6 days, on the average, after the initiation of therapy.

RELAPSES.—Relapses occurred in 4 patients. The total doses employed in these cases were 33, 36, 28 and 49 Gm., respectively. The two patients who received less than 4 Gm. were re-treated with 32 and 44 Gm. respectively. Complete healing followed, and to date no evidence of recurrence has been noted. The patient who had a recurrence of her lesions after receiving 28 Gm. was given a second course of therapy of 94 Gm. This patient, however, became refractory to the antibiotic, since healing failed to occur. She was then placed on antihomoline, and a marked degree of improvement followed. But further healing seems to be arrested in spite of continuous therapy with antimony compounds.

The response of the Donovan body to streptomycin is marked. The Donovan body does not fragment or decrease in gross size and appearance. The nuclear substance, however, rapidly loses its normal straining characteristics and appears to be wholly comprised of the remaining capsular material.

Thus, experience gained in the treatment of 58 patients with granuloma inguinale by the use of streptomycin permits the conclusion that this antibiotic is the most effective drug available and is far superior to the antimonials.—*Digest of Treatment*.

Neoplasms of the small intestine.—J. C. Root, M.D.

Neoplasms of the small intestine should always be considered when a patient is seen with obscure intestinal symptoms or with bleeding from the bowel of undetermined origin. Ewing states that carcinoma of the small intestine is comparatively rare, forming about 3% of all intestinal cancers. Tumors of this type constitute the majority of the small intestine neoplasms. The next most common type is that of the sarcoma group. Sarcoma may occur in any portion of the small intestine but is seen more often in the ileum. A third type of neoplasm to be considered is the carcinoid or argentaffin tumor which is also seen with greater frequency in the ileum than in the proximal portion of the small intestine.

The most common symptoms of malignant tumors of the small intestine are those due to mechanical obstruction and to intestinal bleeding. The former is more often seen in the carcinoma group since these tumors arise in the mucosa and are primarily of the intraluminal type. Obstruction may be

produced by constriction of the lumen from the classical "napkin ring" type of growth or by encroachment upon the lumen of the bowel by a projecting mass. The early symptoms are those of obstruction.

The roentgen examination is the most important procedure for diagnosis of lesions of the small intestinal tract and any one, or a combination, of three techniques may be employed. These consist of barium by mouth with interval examination, the so-called "small intestinal enema" with duodenal intubation, and the barium enema into the colon. Examination in the last procedure depends upon sufficient barium mixture passing through the ileocecal valve for visualization of the distal portion of the ileum. Of these procedures, the first named is of more value for lesions in the proximal and mid-portions, and the last for visualization of lesions in the distal or terminal portion of the ileum.—*Digest of Treatment*.

Intra-arterial penicillin in the surgical treatment of infections of the extremities.—Ordie Shaffer, M.D.

Unfortunately fibrous or osseous barriers and vascular impairment have frequently made high local concentration of penicillin unobtainable when given by the usual routes. Now, however, it has become possible to overcome some of these obstacles by the intra-arterial administration of penicillin.

The patient is given 1 gr. papaverine hydrochloride hypodermically 20 minutes prior to the intra-arterial injection to aid in the vasodilation of the extremity since circulatory impairment is frequent in these cases. A second adjunct consists of soaking the foot (and leg) in a warm 1:9000 potassium permanganate solution for 20 minutes prior to the injection. For the injection, a 20 cc.

syringe with an attached 20-gauge needle $2\frac{1}{2}$ inches long is used. A blood pressure cuff is placed just above the knee with the center of the cuff over the medial aspect of the thigh. The cuff is inflated to a subdiastolic blood pressure (60 to 80 mm. of mercury). With the surgeon standing on the right side of the patient the point of maximum pulsation of the femoral artery on the involved side below the inguinal ligament is palpated with the left hand, and the artery stabilized with the index and middle fingers. The injection is done most easily in a plane perpendicular to the leg rather than at an acute angle. Proximity to the artery is noted by arterial pulsation transmitted to the syringe. A bright red stream pulsating into the syringe denotes that the needle is within the lumen of the artery. The color of the blood may vary in different individuals but a good intermittent pulsation is taken as positive evidence of arterial blood. Care taken not to introduce the needle to too great a depth after getting within the lumen will obviate a transfixion of the artery and is easier than introducing the needle at an angle. Injections are done at a rate of 1 cc. per second, and, immediately after withdrawal of the needle, digital pressure is applied over the site for a few seconds to obviate hematoma formation. In the case of the upper extremity, the blood pressure cuff is applied proximal to the infection (usually at some site above the elbow) and inflated to 80 mm. of mercury. Then the injection is made either at the brachial artery of the elbow or at the distal portion of the axillary artery. The blood pressure cuff is maintained at 80 mm. of mercury for ten minutes. 50,000 Oxford units of penicillin dissolved in 10 cc. of saline solution has been used. The injections have been given once or twice daily.—*Digest of Treatment*.

DERMATOLOGY

The sulphone treatment of leprosy.—Ernest Muir, M.D., F.R.C.S. Ed.

The drugs commonly known as sulphones are derivatives of diaminodiphenyl sul-

phenyl sulphone), "promizol" (2,4'-diamino-5-thiasulphenyl sulphone), and "sulphetrone" (tetrasodium phenylpropyl-amino-diphenyl-sulphone tetra-sulphonate). Promin was first used in the National Leprosarium, Carville, U.S.A. (Faget *et al.*, 1943). It was found to be excessively toxic by oral administration but to be tolerated intravenously in daily dose up to 5 g. Following on the first published results on promin, Muir (1944) began a trial of diasone in Trinidad. Fearing that diasone might be toxic by mouth like promin, he first gave it intravenously, but later found that it was well tolerated orally in daily doses up to 2 g. A more recent sulphone derivative, promizole, is considered by the Carville workers (Faget, Pogge, and Johansen, 1946) to give possibly even better results than the first two preparations, though it has not yet been tried out sufficiently. This can be given orally in daily doses up to 6 g. Lastly sulphetrone (B.W. & Co.) is under trial, and the first reports indicate promising results.

The results obtained with these sulphones appear to be similar, though they may vary

phone. It was their antibiotic effect in controlling the growth of *M. tuberculosis* in experimental animals and *in vitro* (Feldman *et al.*, 1942; Potter and Prenzala, 1944) that first suggested trial in leprosy. Strangely, they have so far shown much more evidence of usefulness in leprosy than in tuberculosis.

The sulphone derivatives which have so far been tried in leprosy are "promin" (U.S.A., "promin"; in England, "promazine") (diaminodiphenyl sulphone—*nn*-did-nide") (diaminodiphenyl sulphone—*nn*-did-nide"), "diasone" (disodium, extrose sulphonate), "disalone" (disodium, formaldehyde sulphonylate of diaminodi-

in the degree of toxicity, the amount of the effective dose, and the speed of results.

MODE OF ADMINISTRATION.—*Suitable type of case.*—It is the lepromatous or severe type of leprosy to which sulphone treatment has been applied—that is to say, the type which so far has been least amenable to treatment by chaulmoogra and other drugs. I have had no experience with sulphones in tuberculoid and uncharacteristic cases, nor have I seen any published results in these types.

Toxic effects.—Faget *et al.* (1943) mention the following toxic signs as occurring: decrease in blood cells, leucopenia, allergic dermatitis, allergic rhinitis, mild and ephemeral headaches and nausea, and lepra reaction including iridocyclitis. Further observation has, however, shown that with suitable dosage most of these can be avoided. In my experience anaemia (chiefly due to destruction of red cells) and increased reactionary exacerbations are the two toxic indications to be guarded against, and these are apt to occur principally in patients in poor general health and/or in an advanced stage of the lepromatous type, and in the initial stages of treatment. Before beginning treatment the patient should be examined for anaemia, and when this is present, as it often is in severe lepromatous cases, a preliminary course of full doses of ferrous sulphate or carbonate should be given.

Dosage.—My own experience has been chiefly with diasone (Muir, 1944, 1946), and the dosage here described is what is recommended in the use of this drug. Considerably higher doses have been used with promin and promizole (Faget *et al.*, 1943, 1946). It is advisable to begin with small doses in all cases, and gradually raise the amount according to the tolerance of the patient. In doing this the important indications are: the stage of the disease; the general condition of the patient, especially as regards febrile and focal reactionary signs; the condition of the blood; and the presence of anaemia. If the haemoglobin percentage is below 70 a preliminary course of iron should be given, and if this is not effective injections of liver extract should be added.

Diasone is generally made up in 5-gr. (0.32 g.) capsules or tablets. When the haemoglobin is at or over 70%, begin with 1, 2, or 3 tablets according to the general condition of the patient. This should be taken in one undivided dose, preferably an hour after food, so as to promote quick absorption and the highest blood concentration. Reactionary signs are not a contra-indication to beginning the treatment, but are a warning not to raise the dose too rapidly. Whatever the initial dose, repeat it every second day for the first week unless they are signs of exacerbation. In strong early cases without septic or other complications one tablet may be added after the first week on the intermediate days and increased gradually till, after three or four weeks, the patient is taking 3 tablets daily for six days a week. It may, however, be a considerable time before a weaker or more

advanced case reaches this dosage. The haemoglobin should be tested every week to begin with and iron (and if necessary liver extract) continued in all cases with a percentage below 80 or 90. A fall below 70% or the intercurrent of increased reaction calls for temporary suspension of diasone or diminution of the dose. When a dose of 3 tablets a day for six days a week has been reached it is well to suspend treatment for one week every month. Apparently when full dosage is suddenly resumed after this temporary stoppage the blood concentration rises to a higher level for a time. In patients who have improved and are free from signs of anaemia and reaction the dose may be gradually raised to 6 tablets daily six days a week for three weeks a month—this being regarded as the maximum average dose, though it may be increased or diminished according to the body weight of the patient.

EFFECTS OF TREATMENT.—These vary according to the stage of the disease. In a severe, advanced lepromatous case with ulcerating leproma of the limbs, ulceration of the nasal and other mucous membranes with obstruction of breathing, and with severely affected eyes going on to blindness, the first effects, which often take place within a few weeks, are the healing of ulcers, clearing of the nose, and arrest of the eye condition with improved vision.

The next effect is seen in patients with chronic or subacute allergic reactions indicated by slight rise of temperature and/or the frequent appearance and subsidence of nodules and other inflammatory skin lesions; these symptoms gradually subside. At the same time permanent nodules and other raised skin elevations become slowly absorbed and flattened out, leaving marked wrinkling of the integument. This improvement generally requires a few months.

The third stage in recovery, and the only one in early or less advanced cases, is the gradual lessening of the number of bacilli found in sections and smears from the skin and in smears from the nose. Thus three-plus cases become two-plus and then one-plus, and one-plus cases become negative. The time required for this appears to vary with the advancement of the disease: some early cases have become negative in four to six months, but more advanced cases may require four, five, or even more years. One of the most striking signs of improvement is that seen in the affected eye and especially in the cornea, where, because of its transparency, the arrest and a certain amount of recession of the lepromatous infiltration can be observed with a lens or corneal microscope.

There is one important point on which evidence is not yet available—that is, whether or not a point is reached at which the type changes, the lepromatous case being transformed into a tuberculoid one with a negative "lepromin" test becoming positive. Theoretically the lepromin test is negative in the lepromatous case because the

antigen (i.e., lepra bacilli) are in such great excess of antibodies formed that an effective allergic reaction, which would destroy the bacilli, cannot take place. As the bacillary antigen becomes less and less, is a point reached at which an effective reaction can take place? If so, it would be indicated by a positive lepromin reaction, and we should have an additional factor helping to clear up the residual bacilli. I have found indications in one or two cases that this may occur to some extent, but further evidence is needed.

LENGTH OF TREATMENT.—In any case, treatment should be continued at least until repeated bacterioscopic examinations have given negative results over a period of six months to two years, varying directly with the advance of the disease at the beginning of treatment, and with the length of treatment required to produce the first negative bacterioscopic results. Faget (1947) reports that 19 prominent-treated patients have been discharged as disease-arrested following twelve consecutive months of negative bacterioscopy. Of this number three were under treatment for 1½ to 2 years, three from 2 to 3 years, six from 3 to 4 years, and seven from 4 to 5 years. There have been no relapses. . . . The period of observation following arrest of the disease has varied from a few months to 2½ years.

Iodides have a specific effect in showing up concealed lepromatous foci. It is possible that their careful administration in cases that have become bacterioscopically negative may be of use in determining the length of further treatment required, and perhaps in speeding up the elimination of residual foci; but this matter still calls for very careful investigation.

Regulation of established treatment.—Particulars have been given of the dangers attending the initial treatment with diasone. But once the patient has taken his maximum dose for a few months without diminution of haemoglobin content or reactionary symptoms, and has made definite improvement as regards both leprosy and in his general health, the same precautionary methods cease to be necessary and treatment may be continued by an intelligent and reliable patient in a minimum of supervision. A visit by the doctor once a month is often all that is needed. This fact is particularly helpful to patients under domiciliary treatment.

MODE OF ACTION.—It is still uncertain how the sulphones act. Fite and Gemar (1946), after examination of biopsy sections from 32 patients under promin, concluded that tissue changes are "atrophic in character with extremely slow and gradual lessening of numbers of organisms in the lesions to the point of final disappearance in 10 of 32 cases examined. . . . The important finding is that promin appears to eliminate bacillary infection of the blood vessels and blood stream, thereby preventing the formation of new lesions. The atrophy of focal lesions is also more apparent in areas with a more generous blood supply. The results indicate

strongly that the best results may be expected in those cases in which treatment is begun in a comparatively early stage of the disease."

A satisfactory hypothesis is as follows. Ordinarily in lepromatous cases the cellular ingestion of bacilli and their multiplication in the cytoplasm result in the formation of "globi," the rounded masses of bacilli found in all typical lepromatous cases. The global bacilli gradually die and are transformed into a non-acid-fast lipid matrix which imbeds the still acid-fast bacilli. Thus in untreated cases the living bacillary element in a globus gradually becomes extinct, and its place is normally taken by fresh globi. It may be supposed that the sulphones act not by destroying bacilli but by preventing the multiplication of bacilli and the formation of fresh globi.

If this hypothesis is correct it would account for: (a) The finding of globi in smears from the nose and skin of treated patients, in which there are no acid-fast bacilli or in which the bacilli are thin and ghost-like. (b) The long time required in the clearing up of bacilli in fairly advanced cases. This will be made clear when it is mentioned that human leprosy bacilli, killed by boiling and injected into rats, can still be found retaining their acid-fastness after 18 months.

THE FUTURE OF SULPHONE TREATMENT.—The history of leprosy in the last 30 or 40 years is strewn with the wrecks of so-called "cures." Knowing this, one is hesitant to put forward claims for the sulphones which might fail to be confirmed. It will take years before we can say with any confidence what the final results are, whether a complete and lasting cure is possible, what is the relapse rate, and whether relapsed cases will yield to further courses of treatment.

Confidence is given, however, by the fact that experienced workers all over the world who have carried out the initial trials have without exception obtained favourable results such as they had never before found with other remedies. Many have reported definite improvement in practically all cases that have been under treatment for at least six months.

The history of a rising scale of effectiveness in other drugs, such as the sulphonamides, gives reason for hope that sulphone derivatives may be produced which will give even more rapid and effective results.

SULPHONES AND THE ANTI-LEPROSY CAMPAIGN. *The supply of the drugs.*—Few of the countries where leprosy is rife are wealthy, and the patients who require treatment most are as a rule the poorest of the poor. In a campaign against leprosy there is, therefore, need for a drug which is not only effective but which can be made available to the poorest patient in countries like Africa, India and China.

Fortunately the raw material of the sulphones is not expensive, and although the outlay on manufacture must at first be considerable the cost should rapidly diminish with mass production. It is calculated that 1,000 5-gr. (0.32-g.) tablets of diasone

should, on an average, suffice for one patient for one year, and the present cost of this is in the region of £8. If treatment is to be extended to a gradually increasing proportion of the one or two million lepromatous cases calculated to exist in the world, there will be a considerable call on the budgets of governments, and on the generosity of philanthropic bodies.

Effect on control:—The two chief difficulties in the control of leprosy have been; (a) open infectious cases, through ignorance, fear, and shame, or want of opportunity, are not isolated until they have had a chance, often lasting, several years, of spreading the disease to their relations and other contacts; (b) that the treatment available has been painful and hard to persist with over a long period and, even when persisted with, has in the majority of lepromatous cases been unable to arrest the disease.

It may be expected that once the effects of sulphones become widely known they will attract early cases which would otherwise

have concealed the disease as long as possible. Thus to a gradually increasing extent the danger of infection should be cut off at its source.

Need of personnel:—One of the chief difficulties in anti-leprosy work has always been the lack of doctors. In the medical profession there has been a prejudice against leprosy, either on account of fear or because it was considered that so little could be done for it. In Brazil the Government offers an extra allowance beyond the ordinary service rates. But the best work has always been done by those who have felt they have a vocation, and many such doctors and other workers, once they have overcome the prejudices which surround the subject of leprosy, have become enthralled by the clearer prospect of effective treatment and control, it is to be hoped that more doctors with a pioneering and venturesome (not to say philanthropic) spirit will offer to do the work.—*British Informative Service.*

Book-Reviews

A Text Book on Pathology of Labor, the Puerperium and the Newborn—By Charles O. McCormick, A.B., M.D., F.A.C.S., 1947. Second edition, 514 pp. with index. 272 illustrations including 24 in color. C. V. Mosby Co., St. Louis.

This volume is an outgrowth of a series of the author's lectures for the students at Indiana University. The concise and direct style of presentation and the comprehensive scope covering the major and minor complication of labor, the puerperium, and the newborn render the book suitable to general practice. Some new chapters have been added to this edition. Further emphasis upon chemotherapy, including some reference to the use of streptomycin in the treatment of puerperal infection, has been made. Further discussions upon cesarian sections and the importance of R.h. factor have been presented. Two new forms of anesthesia and analgesia have been

described, and twenty-five more aphorisms have been added.

Handbook of Communicable Diseases—By Franklin H. Top, A.B., M.D., M.N.H., F.A.C.P., 1947, 85 color illustrations and 13 color plates. C. V. Mosby Co., St. Louis.

This book is intended as a text and a handy reference. An attempt has been made to present the material in as concise a manner as possible. This is the second edition. In this three chapters have been completely rewritten, chapters on influenza and rickettsial diseases and fourteen new chapters have been added. The book is primarily an outgrowth of the author and his predecessor Dr. John E. Gordon. The illustrations and color plates are good and instructive. We recommend the book to every one in the profession.

News and Notes

Restrictions on Sale of Quinine Salts Relaxed

At present Quinine Sulphate, Quinine Bisulphate, Quinine Hydrochloride and Quinine Bihydrochloride imported under licence into India can be cleared from the Customs only after the importer has executed an agreement to sell 60 per cent of the consignment to Government at prescribed rates and to sell the remaining 40 per cent only to duly approved persons or institutions at prescribed rates. It has now been decided, says a Government of India Press Note, to relax these conditions. Hereafter consignments of these Quinine Salts import-

ed under licence can be cleared on the importer executing an agreement not to sell the Quinine Salts above the prescribed rates and to submit quarterly reports to Government showing how the quinine was disposed of.

Applications for import licences will continue to be made to the Chief Controller of Imports, New Delhi. Import licences will be granted subject to certain conditions which can be ascertained from the Import Trade Controllers.



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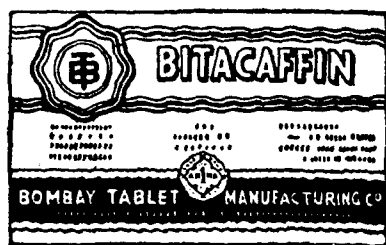
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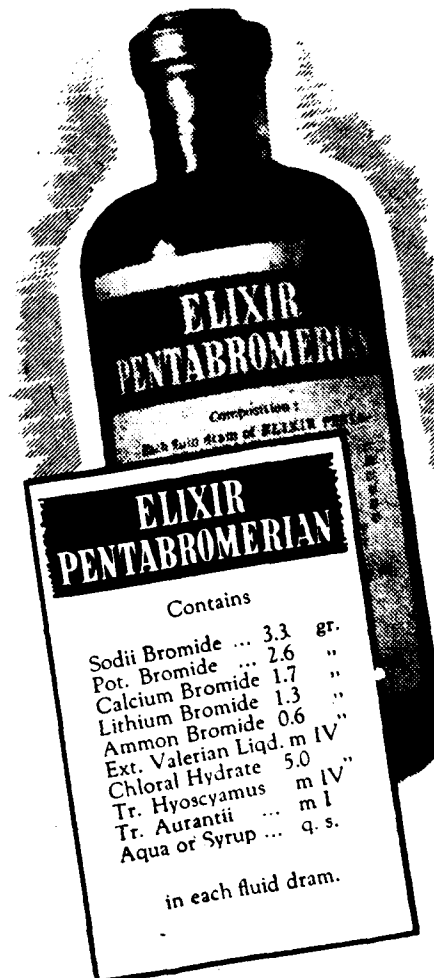
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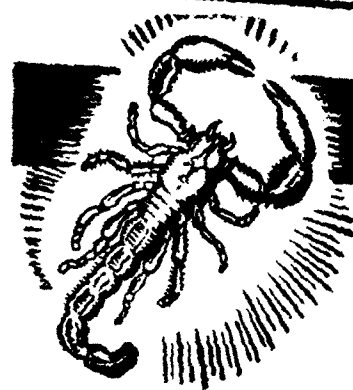


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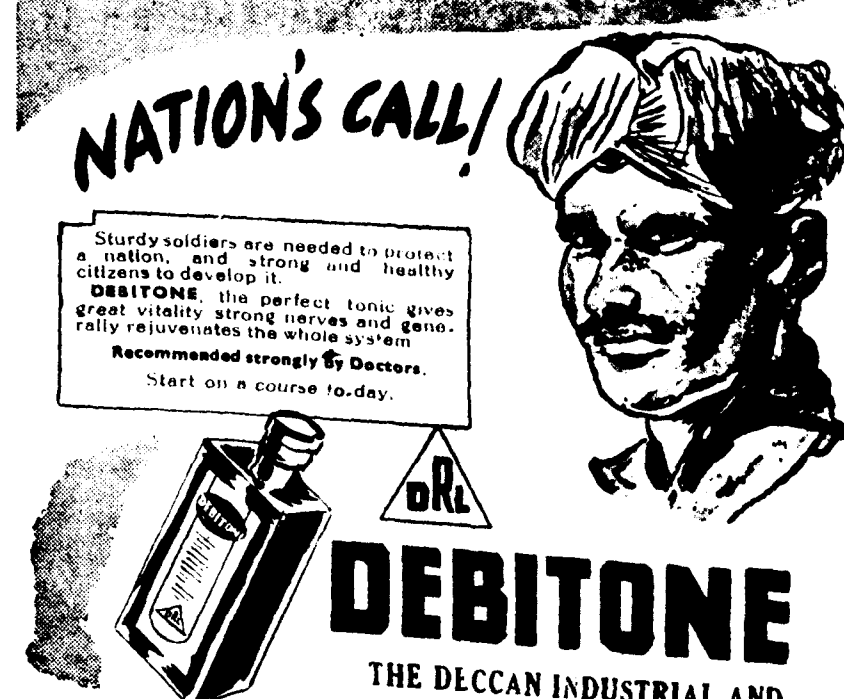
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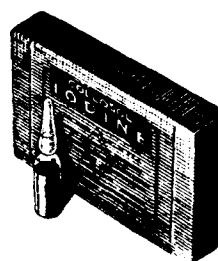
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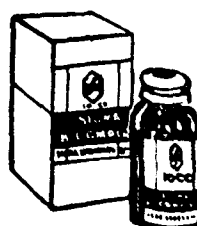
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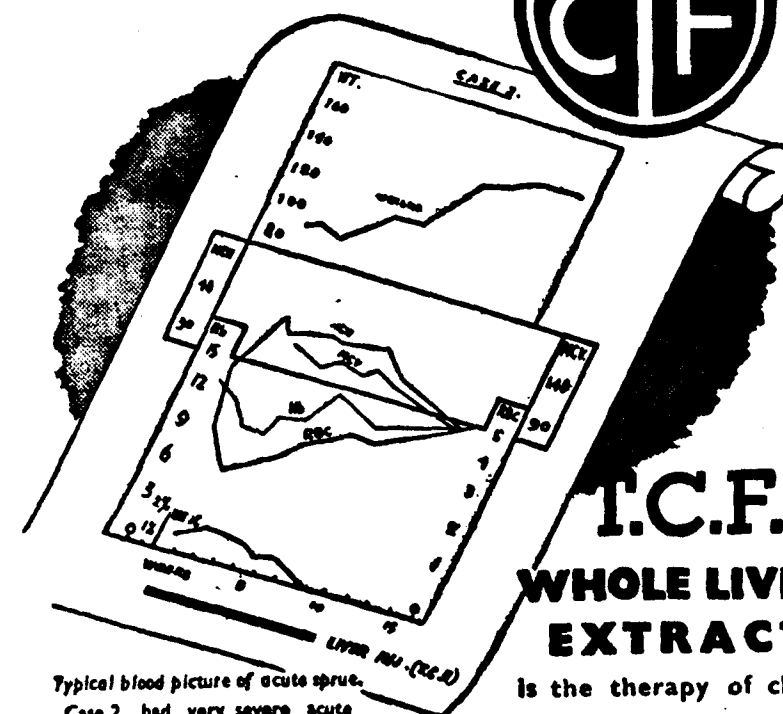
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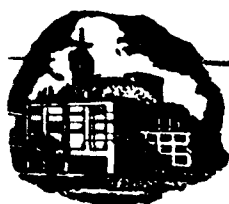
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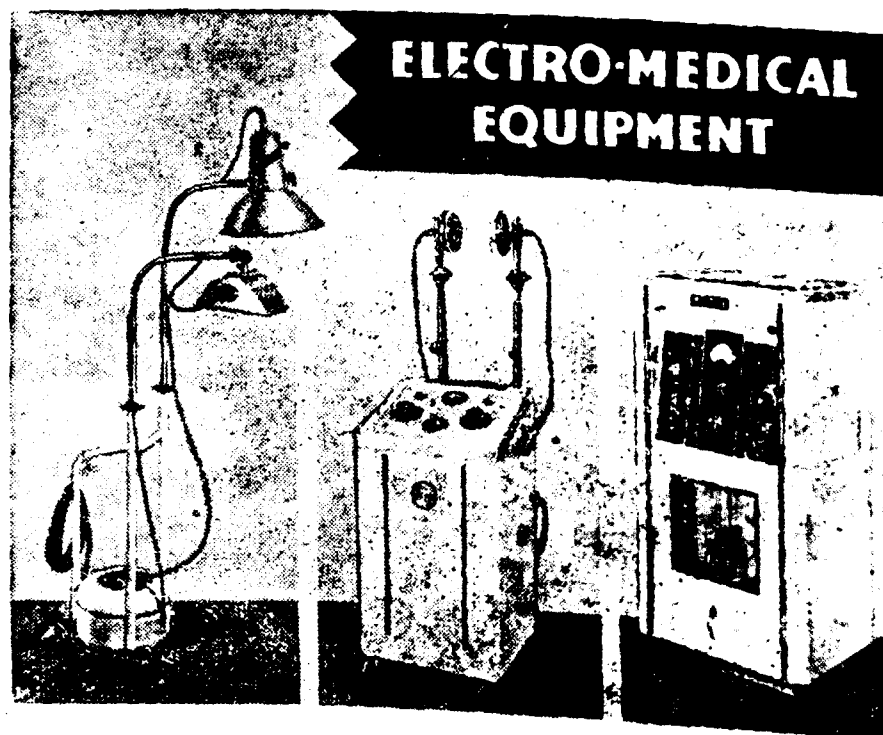
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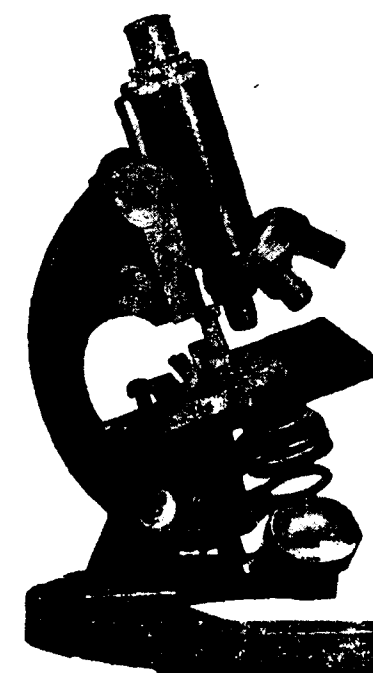
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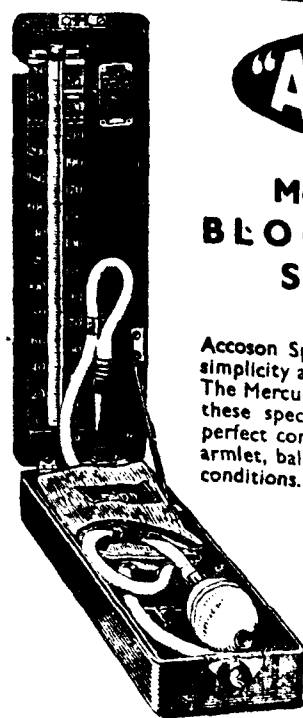
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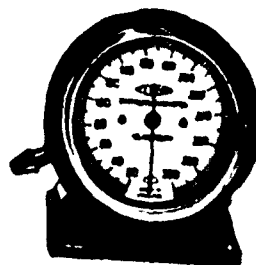


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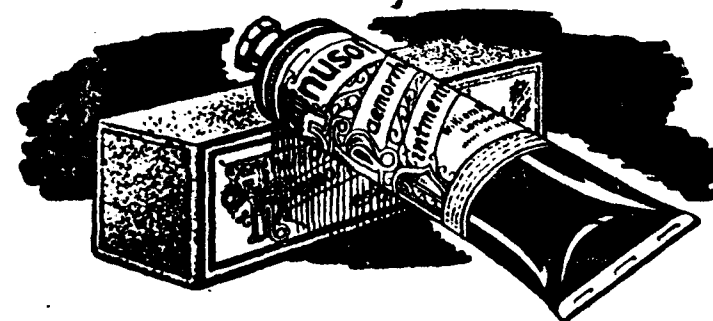
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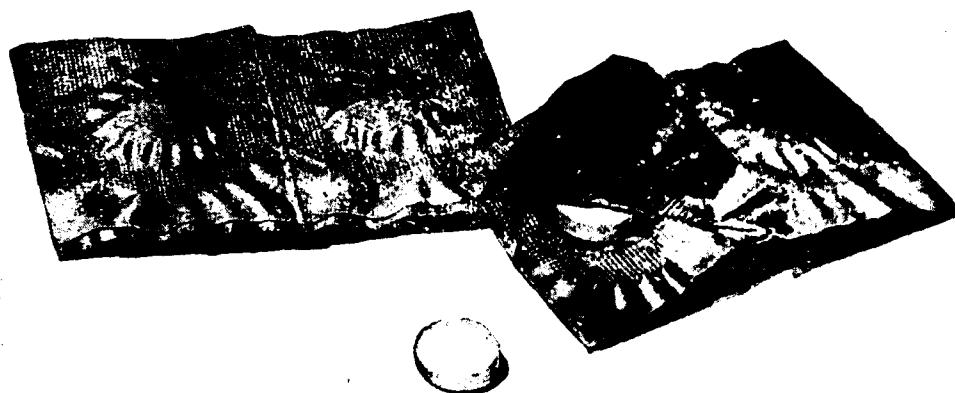
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1. Bunn, P. A. in *Conferences on Therapy*: New York State J. Med. 46: 27 March 1, 1946
2. György, P., Evans, K. W., Rose, E. K., Parlingiero, J. G., and Elias, W. *Pennsylvania M. J.* 49: 409 (Jan.) 1946.

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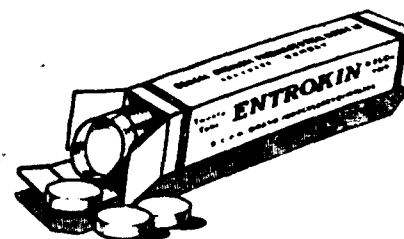
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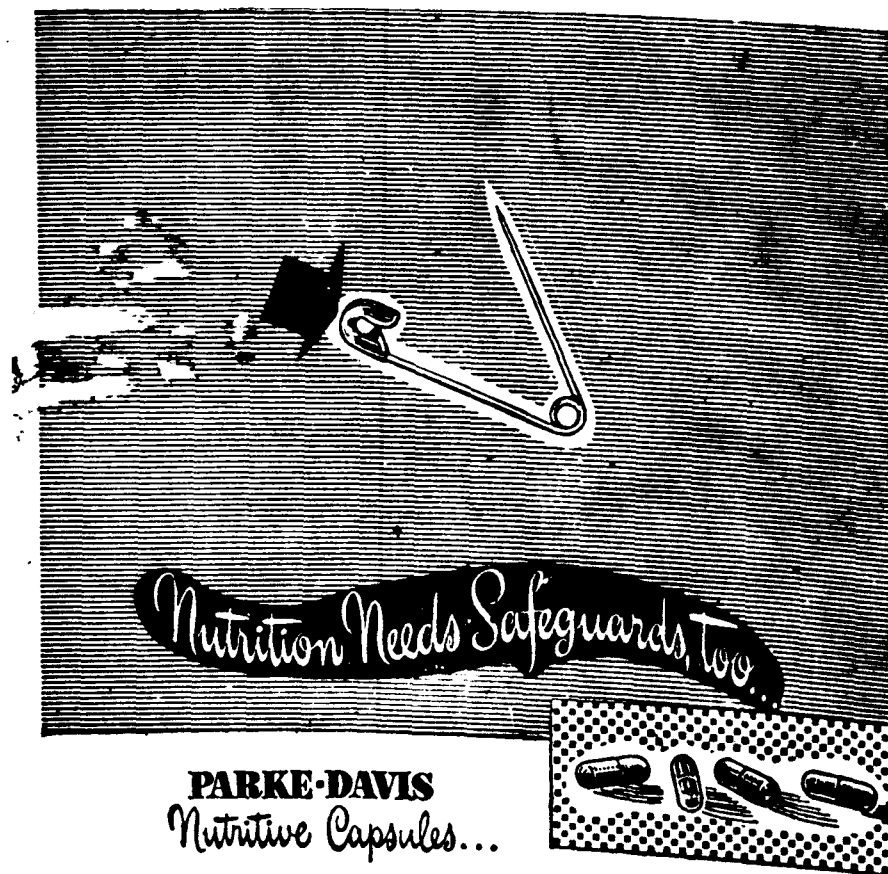
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