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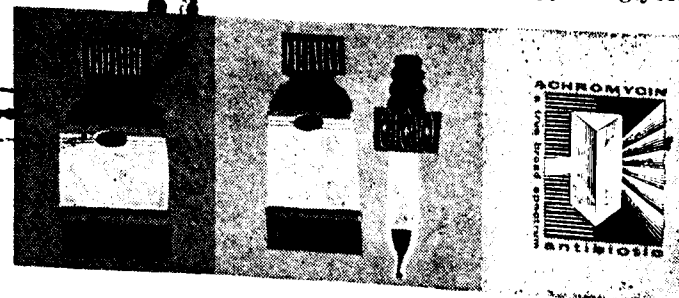
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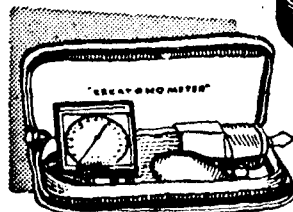
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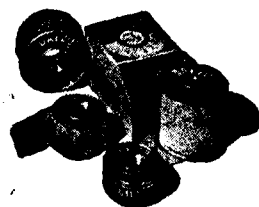
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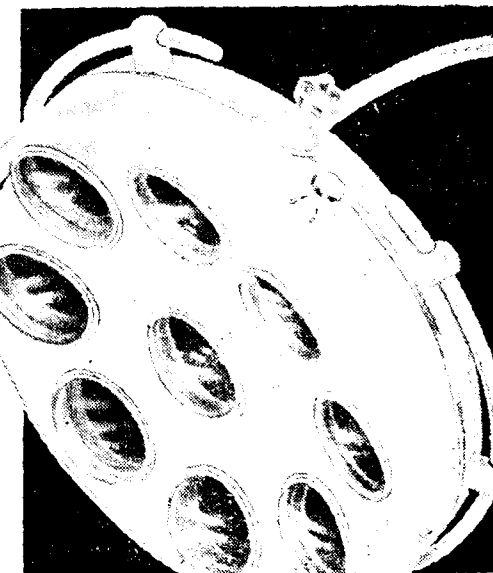
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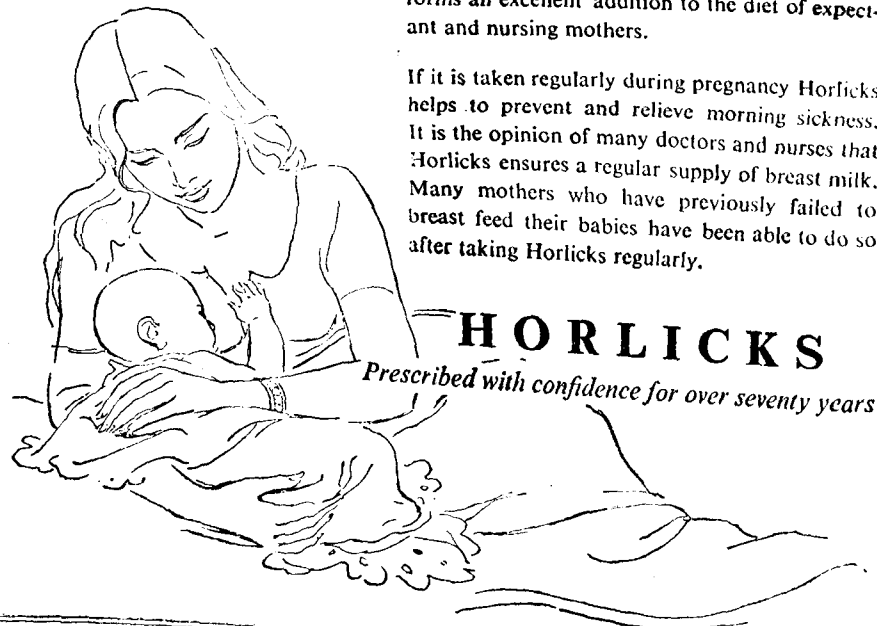
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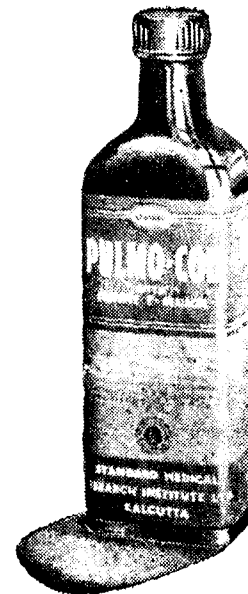
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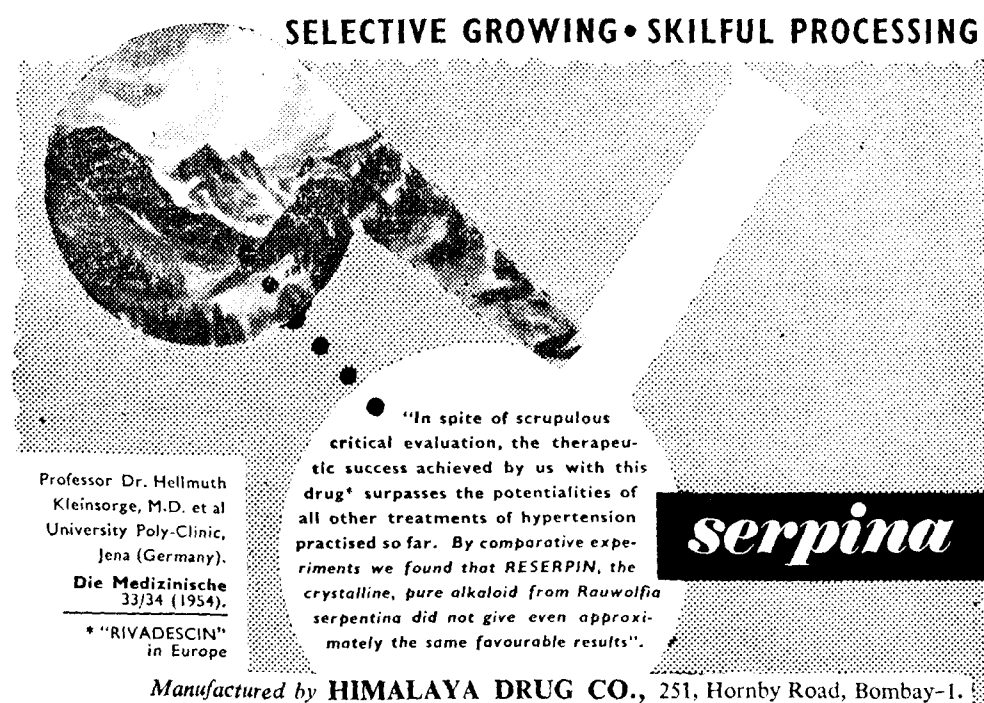
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Marmite has proved of specific value in India in the treatment of nutritional macrocytic anemia, and in the sprue-like syndromes common in the tropics. As the incidence of this type of anemia is high, especially in pregnancy, and accounts for many maternal deaths, Marmite is prescribed widely for its haemopoietic properties.

In cases where the B₂ vitamins are indicated, therapeutically or prophylactically, Marmite is often the product of choice. It is a vegetable foodstuff providing a full complement of the known B₂ components, and also possibly unknown factors of significance. The combined action of the various vitamins given together as they occur naturally in Marmite is usually considered particularly advantageous.

MARMITE
yeast extract

Contains—Riboflavin (Vitamin B₂) 1.5 mg. per cc. Niacin (nicotinic acid) 16.5 mg. per cc.
Manufactured in England by THE MARMITE FOOD EXTRACT CO. LTD.
Distributing Agents: J. L. Morrison, Son & Jones (India) Ltd., P. O. Box 6527, Bombay, 26

OPIL

FOLEX XII - OPIL

(Intramuscular)

Supplies all the anti-anaemic principles contained in the whole Liver Extract with added anti-anaemic factors Folic Acid and Vitamin B₁₂.

Each cc. contains:

Liver-Extract derived from	... 10 g. of liver.
Vitamin B ₁₂	... 50 mcg.
Folic Acid	... 5 mg.
Niacinamide	... 100 mg.
Betain HCl	... 50 mg.
Benzyl Alcohol	... 2.5%
Preservative Phenol	... 0.5%

ORIENTAL PHARMACEUTICAL INDUSTRIES LIMITED,
64-66, Tulsipipe Road, Mahim, BOMBAY-16

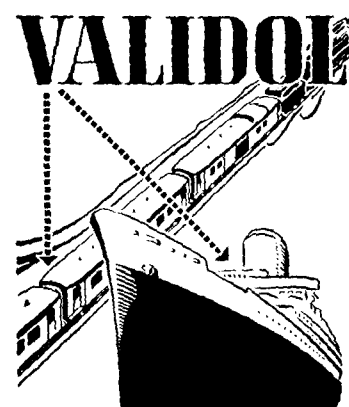
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ZIMMER & CO., G.m.b.H.
Mannheim-Waldhof (Germany)

Presents one of their
Outstanding Preparations:



Nervous irritation
and exhaustion,
Travel sickness,
Palpitation, spasms,
Cardiac and gastric
neuroses.

Prompt relief with



Sole Importers & Exclusive Distributors

PANNALAL BROS.,
44/45, Ezra St., CALCUTTA-1

Phone: 33-6527

Gram: 'PRONTOSIL'

*Instantaneous Relief and
Prolonged Freedom from
Attacks of Bronchial Asthma*

R

'Silbe' **ASTHMA** Tablets

A two-phase Asthma Therapy
provided by the combination of
Isopropyl-nor Adrenaline
Ephedrine & Theopylline

Administrations:

At the first sign of attack,
place a tablet beneath the
tongue for one minute and
then swallow the same with a
drink.

• • •

Re-asserting the therapeutics of
Cinchophenate of Hexamine

LEUCOTROPIN 'SILBE'

the essence of therapy

In the treatment of Gout, Urinary infections, Arthritic and Fibrositic conditions, a highly commended chemical anti-septic, made available for Intravenous, Intramuscular and Oral Use.

Manufactured by:

SILTEN LTD.,
Hatfield, Herts, England.

Sole Agents for India:

A. MANUEL & CO.,
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DIABINSOL

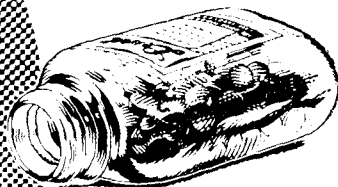
THE MODERN ANTI-DIABETIC
FOR ORAL TREATMENT OF
DIABETES MELLITUS

Ext. of Duodenal Mucosa, Ext. of Pancreas, Liver Ext.,
Vitamin B Complex Factors, Vitamin C, Phenyl-Dimethyl-
Isopyrazolon, Arrhenal (Organic Arsenic) and Uranium Salt.



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Phone: 4-930
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Leucol TABLETS



A stimulating general tonic which
improves the Uterine circulation
and relieves the symptoms of
Leucorrhoea.

A PRODUCT OF
THE HIMALAYA DRUG CO.
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MAKERS OF 'SERPINA'

Distributors for South India: **THE ORIENTAL MERCANTILE AGENCY**, 99-A, Armenian St. Madras-1.



expelling

the unwelcome visitor

a modern anthelmintic

in **Elixir** form

The treatment of threadworm infestation has always been tedious and troublesome with a very low rate of cures and a high incidence of re-infection.

The use of Helmezone Elixir greatly simplifies the treatment of threadworm infestation and eliminates the need for the use of enemas, suppositories, purging and starvation.

Helmezone Elixir is well tolerated even by young children. It is palatable, easy to administer and rapidly effective.



HELMEZONE Elixir

Each teaspoonful (4 c.c.) contains piperazine citrate equivalent to 500 mg. of piperazine. Bottles of 4 fluid ounces.

ALLEN & HANBURY LTD
(INCORPORATED IN ENGLAND)
CALCUTTA BOMBAY

Nutrition



- a decisive factor in
Convalescence

RECOVERY from the debilitating effects of errors in diet, or of weakening diseases such as fevers, is helped considerably by putting the patient on a course of 'Ovaltine'!

This highly nutritious beverage constitutes a powerful source of energy and assistance to tissue regeneration. It has been found to have a greater and more lasting value than chemical stimulants.

'Ovaltine' is prepared from some of the finest of natural food substances. It is a concentrated extraction of ripe barley malt, pure creamy cow's milk, specially prepared cocoa and other energy-giving foods, together with natural phosphatides and vitamins. It is further fortified with additional vitamins B and D. The nutritional and vitamin content of 'Ovaltine' is of special importance. There is nothing like 'Ovaltine'.

The delicious flavour of 'Ovaltine' makes it a most acceptable addition to invalid diet, and it is easily assimilated even in cases where the digestion is impaired. Moreover, a final cup given before the patient is settled for the night is of great assistance in bringing sound, restorative sleep, with resultant benefit to general health.

OVALTINE

the food beverage

produced by
A. WANDER LTD.,
42, Upper Grosvenor St., London, W.1.
Laboratories, Works and Farms:
King's Langley, Herts., England.

Distributors: *Grahams Trading Co. (India) Ltd.,
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M. 439

CLINITEST

TRADE MARK

urine-sugar analysis set

Distinct colours for reliable readings

DOCTORS AND PATIENTS CAN BE SURE OF THE RELIABILITY AND SIMPLICITY OF 'CLINITEST' (BRAND) SETS AND REAGENT TABLETS. THE MOST DISTINCT COLOUR SCALE, THE EASILY RECOGNISABLE COLOURS OF THE TEST, GIVE PATIENTS CONFIDENCE IN THEIR READINGS, SO REDUCING THE NUMBER OF UNNECESSARY VISITS TO DOCTORS. THIS ONE-MINUTE, NO HEATING, COPPER REDUCTION TABLET TEST CAN BE MADE EASILY EVEN UNDER TRAVELLING CONDITIONS.

A VALUABLE INSTRUMENT FOR THE PRACTITIONER FOR ROUTINE SUGAR ANALYSIS. 'CLINITEST' IS THE ACCEPTED TEST FOR THE DETECTION AND CONTROL OF GLYCOSURIA.

*Approved by the Medical Advisory Committee of the Diabetic Association in
England*

No. 2155 Complete Set, including 24 Foil-Wrapped Tablets.
No. 2157 Refill bottles (24 Foil-Wrapped Reagent Tablets).

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MARTIN & HARRIS LTD., CALCUTTA.

BRANCHES: BOMBAY, MADRAS & DELHI.

Manufactured by Miles Laboratories Ltd., Bridgend, South Wales, under licence from
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"I agree;— This is a case for
ELEDON, Nurse"



A wholly reliable buttermilk diet in powder form of stable composition and constant degree of acidity, ELEDON is not only an excellent specific for adults susceptible to intestinal disorders, but is highly successful in the treatment of infants and young children suffering from Diarrhoea ... Dysentery ... Pylorospasm ... and, especially Steatorrhoea and Malnutrition.



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ANTIMALARIALS COME & GO....

BUT

Qinarsol

CONTINUES....



WELL TRIED
RELIABLE TREATMENT
FOR

Malaria

AND NON-SPECIFIC FEVERS

ALSO USEFUL FOR FEVERS DUE TO

INFLUENZA, COLDS & CATARRH

LITERATURE & SAMPLE FREE ON REQUEST.

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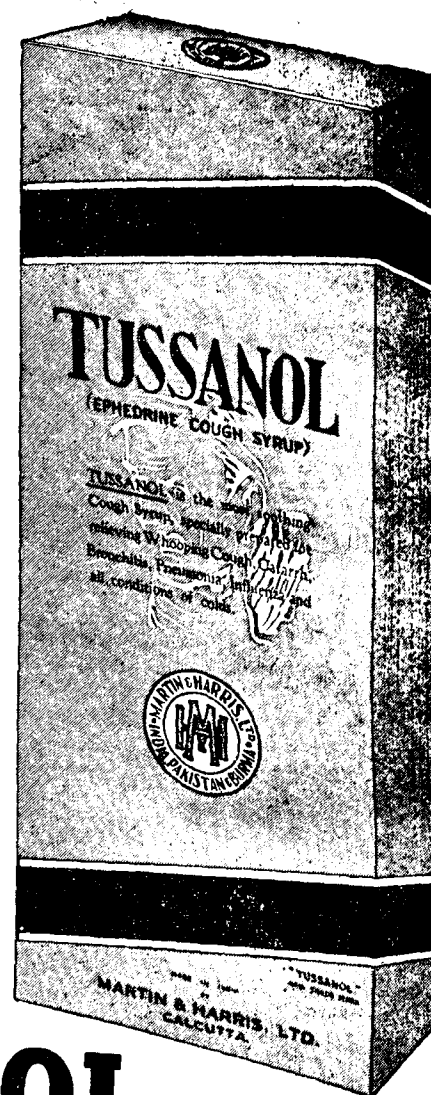
Cough!

when
diagnosis
demands a
cough remedy
a majority
of physicians
prescribe

TUSSANOL

(COUGH SYRUP)

THE SAFEST REMEDY FOR PATIENTS OF ALL AGES
A MARTIN & HARRIS PRODUCT

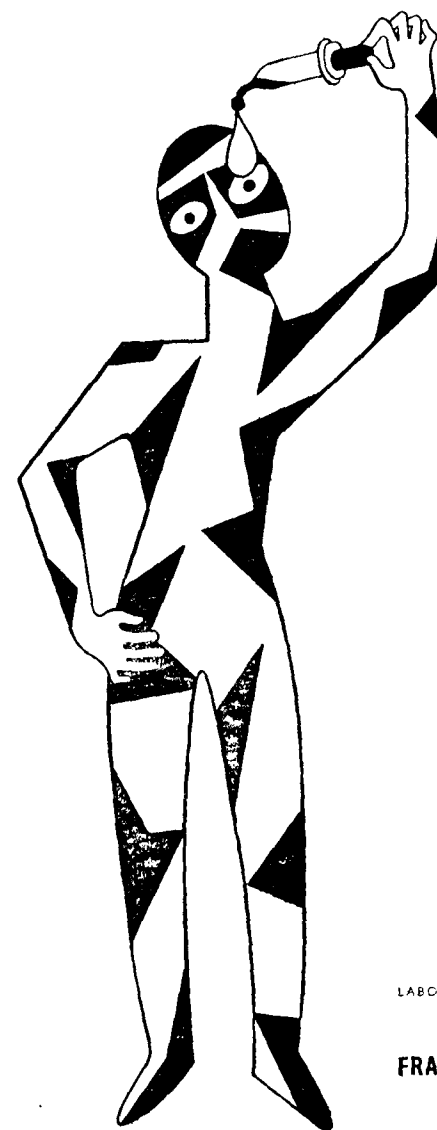


LOCAL CORTICOTHERAPY

OINTMENT

COLLYRIUM

HYDROCORTISONE ROUSSEL



in Ophthalmology
OCULAR INSTILLATION

Inflammatory and allergic
affections of the anterior
segment of the eye

DROPPER VIAL OF 3 cc. OF 1% SUSPENSION
OF HYDROCORTISONE ACETATE

in Dermatology
CUTANEOUS APPLICATION

Cutaneous Allergies
Exudative Dermatoses
Contact Dermatoses
Eczemas-Pruritus

TUBE OF 3 gms. OF OINTMENT OF 1% SUSPENSION
OF HYDROCORTISONE ACETATE

LABORATOIRES ROUSSEL
LABORATOIRES FRANCAIS DE CHIMIOThERAPIE, PARIS, FRANCE

PARTICULARS, LITERATURE, ETC., FROM
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"Bapnu Ghar," Hornby Vellard
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sleep

TO A TIMETABLE
WITH **BIDORMAL**

Bidormal, containing a rapid short-acting barbiturate, together with an intermediate-acting barbiturate that has a carefully timed delayed action, provides a unique means of maintaining calm uninterrupted sleep throughout a complete night of 8 hours.

Bidormal has a rapid action which promotes confidence in the therapy and overcomes fear of sleeplessness. The lack of residual hangover, drowsiness or "drugged" feeling enables the patient to set about his daily tasks with no diminution of mental acuity and no feeling of drug dependence.

1 Outer shell,
Pentobarbitone sodium
B.P. 90 mg.
Action rapid, duration
3 hours.

with

2 Enteric-coated
inner core,
Butobarbitone B.P.C. 60 mg.
Action begins after
2½ hours, duration
5 hours.

another new A&H product

BIDORMAL

In bottles of 25 Tablets

ALLEN & HANBURY LTD
(INCORPORATED IN ENGLAND)
CALCUTTA BOMBAY



where
PAIN
is a
symptom...

as in
HEADACHE
TOOTHACHE
MUSCLE PAIN
NEURALGIA
NEURITIS
DYSMENORRHOEA
INFLUENZA

Therapy of the underlying causal condition is no doubt the prime consideration. However, when treatment of the basic disease does not or cannot afford prompt relief, 'ANACIN' will often alleviate the distress of pain and impart a sense of well-being.

ANACIN is a non-toxic and clinically dependable preparation, specially formulated to provide a prolonged period of analgesia with a single dose of 1 or 2 tablets.

Composition

Quinine 1½ gr. Aspirin 3 gr.
Phenacetin 3 gr. Caffeine 1¼ gr

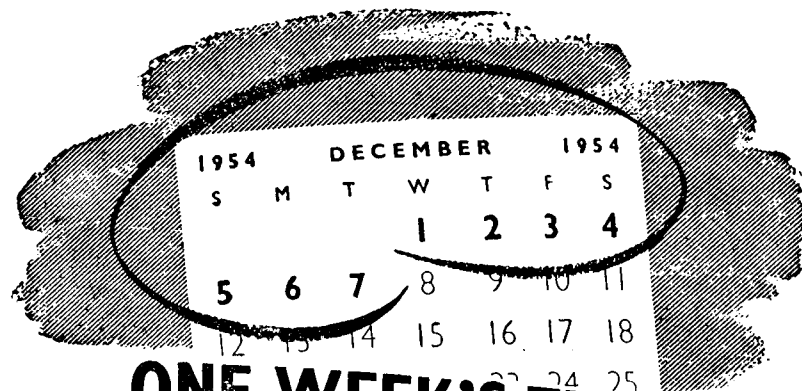
ANACIN

ANALGESIC TABLETS

* In piller-proof containers of 32 tablets and packets of 2 tablets each.

* Trade Mark

Manufactured and Distributed by:
GEOFFREY MANNERS & COMPANY LIMITED, BOMBAY
Trademark Proprietor.
WHITEHALL PHARMACAL COMPANY, NEW YORK, U.S.A.



ONE WEEK'S THERAPY for the peptic ULCER patient

	BREAKFAST followed in $\frac{1}{2}$ hr. to 1 hr. by	'ALUDROX' 2 teaspoonfuls
	MID-MORNING	'SEBELLA' 2 tablets
	LUNCH followed in 1 hour by	'ALUDROX' 2 teaspoonfuls
	MID-AFTERNOON	'SEBELLA' 2 tablets
	SUPPER followed in 1 hour by	'SEBELLA' 2 tablets
	BEDTIME	'ALUDROX' 4 teaspoonfuls

This dosage may be increased wherever necessary. After one week's combined 'Aludrox'/'Sebella' therapy, 1 'Sebella' Tablet t. i. d. will usually suffice.

'ALUDROX'* **'SEBELLA'***

AMPHOTERIC GEL
Available in bottles of 12 fl. oz.
'Aludrox' Tablets in bottles of 60.



TABLETS
Available in bottles
of 60 tablets

JOHN WYETH & BROTHER LIMITED, LONDON

India Branch: Magnet House, Dougall Road, Bombay 1
Distributors: GEOFFREY MANNERS & CO. LTD., Bombay
Calcutta Madras New Delhi

* TRADE MARK

"You know...

I've always found PERTUSSIN

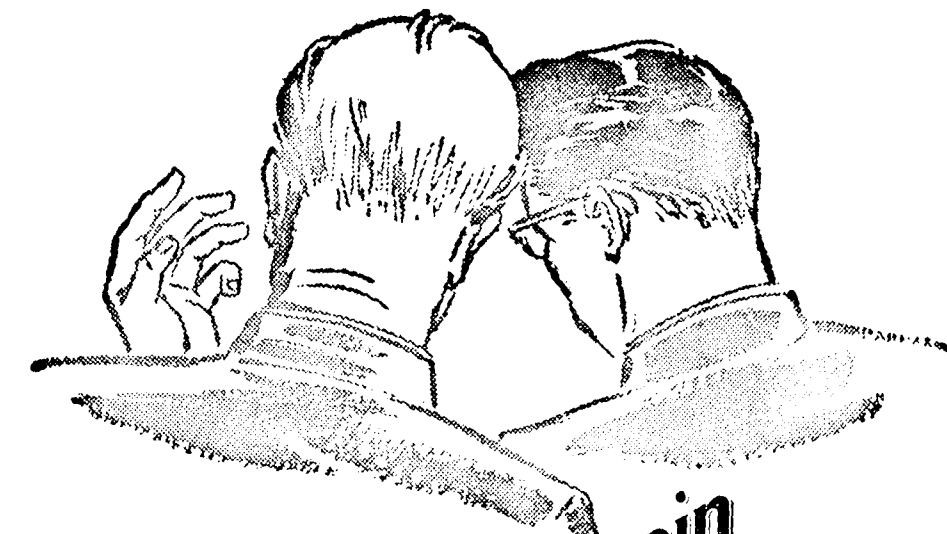
very effective

For over 60 years, PERTUSSIN has been prescribed with success for coughs of all kinds. It contains only therapeutically active constituents, and is completely free from narcotics, chloroform and creosote. The action of PERTUSSIN brings these affections under

control by soothing the irritation in the respiratory passages and promoting expectoration—it relieves, it does not suppress. You

in treating coughs "

can prescribe PERTUSSIN for the very old and the very young. They will find it pleasantly palatable and easy to assimilate.



For rapid results in the treatment of
Whooping and other Coughs
Bronchial Catarrh
Bronchial Asthma

Pertussin
„TAESCHNER“

Manufactured in India by **infa LTD.** (infa) P.O. Box 1041, BOMBAY-1

Under arrangement with **ETEPHA LTD.**, Schaan, Liechtenstein
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Lipotropic therapy.....

Methionine

Inositol

Choline

In the metabolism of fat and cholesterol, lipotropic substances play an important part. Mic Capsules present a synergistic combination of three main lipotropic agents - Methionine, Inositol and Choline.

These agents prevent deposition of

fat and cholesterol in the liver and arteries and remove such deposits if already formed. Mic Capsules are indicated in hepatic dysfunction, fatty infiltration and cirrhosis of the liver, hepatitis, coronary thrombosis, arteriosclerosis, hypertension, etc.

CAPSULES

**M
I
C**

COMPOSITION:

Each Mic Capsule contains:—

Methionine	250 mgms.
Inositol	50 "
Choline Di-hydrogen Citrate	200 "

Issued in bottles of 21 & 42 capsules.

Each fl. oz. (30 c.c. approx.) of Mic Liquid contains:—

Acetyl Methionine	1.56 gms.
Inositol	0.31 gm.
Choline Chloride	1.25 gm.

Issued in bottles of 4 fl. ozs.

Alembic

ALEMBIC CHEMICAL WORKS CO. LTD., BARODA-3.

THE DISTILLERS COMPANY (Biochemicals) Limited

WHEN, as with penicillin, the efficacy of a drug is universally accepted, its convenience and ease of administration then assume importance.

'Distaquaine' preparations present penicillin in the form of a prolonged acting, easily administered aqueous suspension, pre-eminently suitable for almost all those instances in which penicillin therapy is indicated.

'DISTAQUAINE' G

Dry procaine penicillin G and suspending agents for preparation of an aqueous suspension. Vials of 300,000, 900,000 and 3,000,000 units.

'DISTAQUAINE' Fortified

Dry procaine plus potassium penicillin G and suspending agents for preparation of an aqueous suspension.

Vials of 400,000 1,200,000 and 4,000,000 units.

Distributed by the associates and agents of:

ALLEN & HANBURY LTD.
BRITISH DRUG HOUSES LTD.
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EVANS MEDICAL SUPPLIES LTD.
IMPERIAL CHEMICAL
(PHARMACEUTICALS) LTD.
PHARMACEUTICAL SPECIALITIES
(MAY & BAKER) LTD.

Manufactured by

THE DISTILLERS COMPANY (BIOCHEMICALS) LIMITED
DEVONSHIRE HOUSE, PICCADILLY, LONDON, W.1

owners of the trademark 'Distaquaine'

7/54G

**TWICE
AS EFFECTIVE**

More nearly complete relief of symptoms associated with hay fever and other allergies can now be provided with Pulvules

'Hista-Clopane'

(Thenylpyramine and Cyclopentamine, Lilly)

- 'Hista-Clopane' combines 25mg. of the anti-histaminic 'Histadyl' (Thenylpyramine, Lilly) with 12.5mg. of the powerful sympathomimetic 'Clopane - Hydrochloride' (Cyclopentamine Hydrochloride, Lilly). Clinical observations have revealed that these two drugs are synergistic and their combination is at least twice and often three times as effective as that of 'Histadyl' administered alone.
- Ideal for daytime use, Pulvules 'Hista-Clopane' offer greater therapeutic effect with virtually no sedation or stimulation. The average adult dose of Pulvules 'Hista-Clopane' is one or two pulvules after each meal and at bedtime. When indicated, a fifth dose may be taken nocturnally.

Lilly QUALITY - RESEARCH - INTEGRITY

Eli Lilly and Company of India, Inc.

(Incorporated in the U.S.A., the liability of the members being limited)

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CHEMAPOL LTD

Sole Exporter of

**CZECHOSLOVAK
MEDICAMENTS.**

PELENTAN

Aethylum di-(oxycumarinyl)-aceticum 0.3 gm. per tablet.

warranting maximum efficiency and security in the dicumarol anticoagulation therapy of thrombosis, organic ailments of blood vessels, sclerosis multiplex and kindred ailments.

PSYCHOTON

Phenylisopropylamimum sulphuricum 0.01 gm. per tablet.

Indications:—Stimulant of the central nervous system, narcoleptic states, psychoneurosis, fatigue, apathy, obesity.

ALKIRON

4-methyl-2-thiouracil 0.05 gm. in tablet form

Indications:—Graves - Basedow disease, toxic adenomas, goitre, angina pectoris.

Representatives:

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For

SYNERGIC ACTION

CONVENIENCE

PERFECT TOLERANCE

DOUBLE ECONOMY

ISOPASCAL & CD

ISONIAZID, PAS ACID,
VIT. C, DI-CAL. PHOS.
and VIT. D.

THERAPEUTIC PHARMACEUTICALS

PRODUCT

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Transfusion Simplified



CROOKES (COMPLETE UNIT) TRANSFUSION

SIMPLICITY

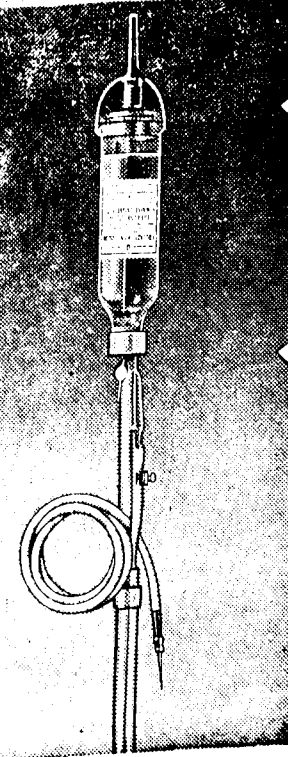
The unit comprises the 20 oz. (560 ml.) transfusion bottle and the sterilized Accessories Set—nothing else. The bottle is fitted with a specially designed bung and occlusive metal cap; the accessories include every item needed for operating the unit.

SPEED OF ASSEMBLY

Assembling consists of nine simple actions which can be performed in a few minutes once the sequence of events has been understood. The importance of this vital time-saving needs no stressing.

NEW TYPE BOTTLE

It will be noted that the new type bottle is a considerable improvement on the old swing stopper type which is now discontinued.



THE CROOKES LABORATORIES LTD

(Incorporated in England)

COURT HOUSE CARNAC RD. BOMBAY 2





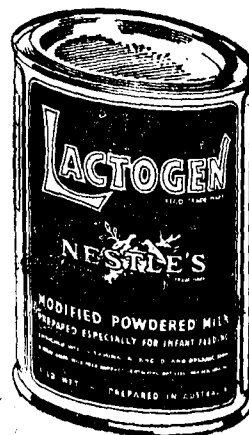
*Never a
moment's worry*

*although he
is not breast-fed*

For the child who cannot be breast fed, Lactogen has earned a world-wide reputation as a safe and reliable substitute. Prepared to resemble as closely as possible the formula of breast milk, it offers a well balanced and strictly uniform diet. By homogenization, the fat globules are made even smaller than those of human milk, facilitating digestion, while pasteurization has ensured the removal of pathogenic organisms. Lactogen is also suitably fortified to provide adequate (but not excessive) intake of essential Vitamins A & D & Iron, based on standards recommended by the National Research Council, Washington.

LACTOGEN

The better milk for babies



NESTLÉ'S PRODUCTS (INDIA) LTD.

P.O. Box 396 Calcutta, P.O. Box 315 Bombay, P.O. Box 180 Madras

In the treatment of diseases involving the anterior segment of the eye . . . Ophthalmic Preparations of

HydroCortone*

ACETATE

" . . . exhibited the ability to dissipate inflammatory and allergic reactions rapidly. It also possesses the power to impart ocular analgesia . . . "



Topical management of diseases involving the anterior segment of the eye:

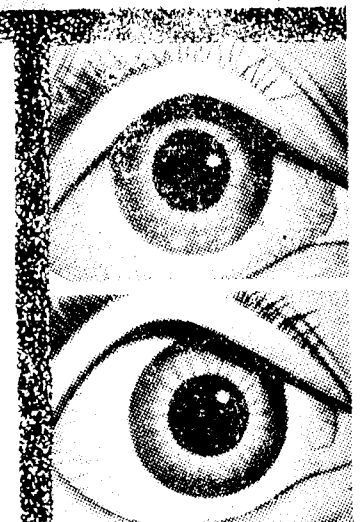
Nonspecific superficial keratitis
Deep keratitis
Acne rosacea keratitis
Phlyctenular keratoconjunctivitis
Mild, acute iritis
Chronic iritis
Ophthalmic herpes zoster
Allergic conjunctivitis
Corneal injuries, including chemical and thermal burns

In severe cases of the above indications, systemic therapy with HydroCortone Tablets may be employed concomitantly.

Highly effective in allergic and other inflammatory eye diseases, HYDROCORTONE Acetate is the steroid with the highest anti-inflammatory action. It reduces edema rapidly, and usually more effectively than do other topical hormonal preparations. In allergic eye disorders, the action of HYDROCORTONE Acetate often is strikingly superior.

L. Gordon, D. M., Am. J. Ophth., 37:533, April 1954.

SUPPLIED: Sterile Ophthalmic Suspensions of HYDROCORTONE Acetate, in two concentrations: 0.5% and 2.5%, 5 cc. dropper vials in either concentration. Ophthalmic Ointment of HYDROCORTONE Acetate: 1.5% in J.S.-G.W. tube.



MARTIN & HARRIS Ltd.

Distributor for MERCK & CO., Inc.

161, Avenue of the Americas, New York 13, N. Y., U. S. A.
Offices in CALCUTTA, BOMBAY, MADRAS, DELHI, RANGOON.

*HYDROCORTONE is the registered trade-mark of Merck & Co., Inc. This substance was first made available to the world by Merck & Co., Inc. research and production.



Babies brought up on Naunehal always sleep more restfully than others.

Naunehal

The RICHEST TONIC
for Babies



CAN BE USED IN
ALL SEASONS.

Hamdard DAWAKHANA (TRUST) DELHI

PRIZE COUPONS

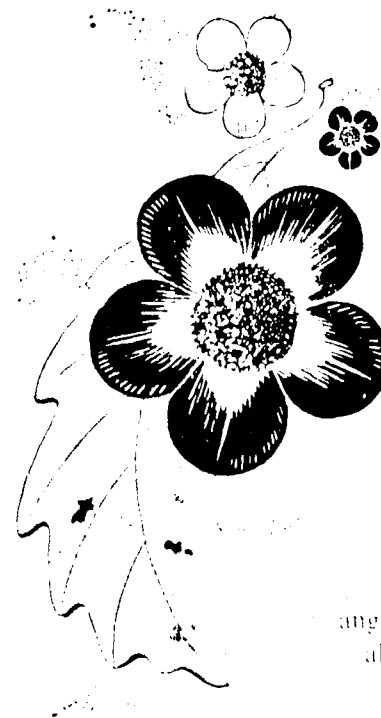
When you purchase Naunehal, open the Carton and see if there is a prize coupon inside. You can get a bottle of Naunehal Absolutely Free from any dealer against this coupon.

Note: Naunehal Baby Show will be celebrated in Feb. '56. Exact date will be announced later on.

FORMULA	
One Full Dose (4.50 cc) of NAUNEHAL CONTAINS -	
Vitamin B ₁	0.4 mg
Vitamin B ₂	0.6 mg
Niacinamide	5.0 mg
Ascorbic Acid	15.0 mg
Vitamin A	1000 I.U.
Vitamin D	500 I.U.
Dist. Ext. mint	5 Min.
Dist. Ext. Cumin	5 Min.
Aqua Menth	Min
Aqua Anisi	Min
Cal. Hypophosphis	grains
Sod. Bromidum	grain
Sucrose	64 grains

CAUTION

Always keep the phial intact inside the Carton after use.



In Allergic Conditions

'ANCOLAN'

THE B.D.H. ANTIHISTAMINIC

ADVANTAGES—Longer duration of action. Exceptionally well tolerated. Inexpensive.

INDICATIONS—Allergic asthma, urticaria, angioneurotic oedema, allergic dermatoses, pruritus, allergic conditions of the eye, travel sickness and hay fever.

DOSAGE—One or two tablets at night for one week followed by one tablet daily if required.

Scored tablets of 25 mg

Bottles of 25 and 100 tablets.



(Upjohn Laboratories, Kalamazoo, Michigan, U.S.A.)

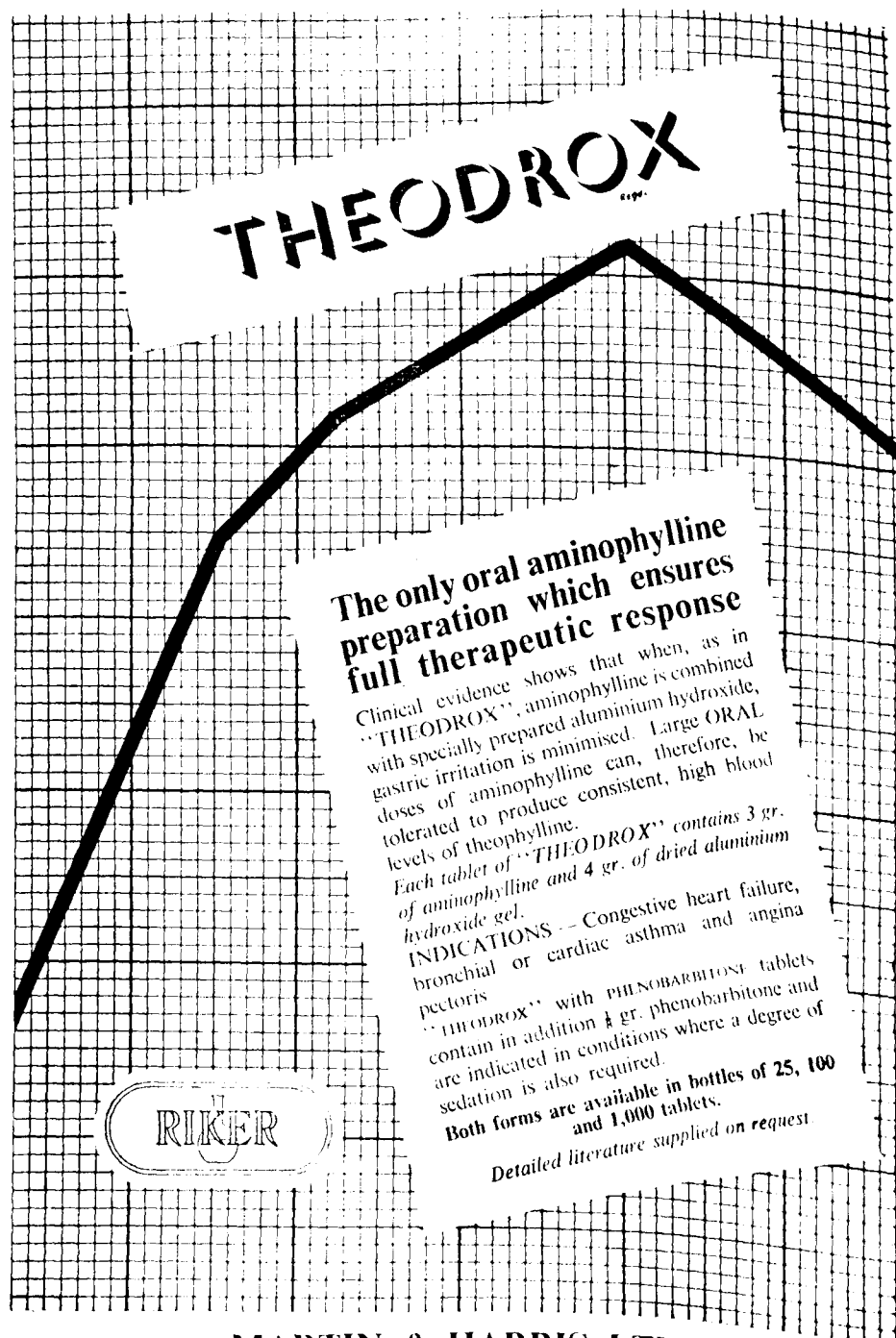


Distributed in India by:

BRITISH DRUG HOUSES INDIA LTD.

P.O. Box 1341, BOMBAY 1

Branches at CALCUTTA - DELHI - MADRAS



THEODROX

The only oral aminophylline preparation which ensures full therapeutic response

Clinical evidence shows that when, as in "THEODROX", aminophylline is combined with specially prepared aluminium hydroxide, gastric irritation is minimised. Large ORAL doses of aminophylline can, therefore, be tolerated to produce consistent, high blood levels of theophylline.

Each tablet of "THEODROX" contains 3 gr. of aminophylline and 4 gr. of dried aluminium hydroxide gel.

INDICATIONS -- Congestive heart failure, bronchial or cardiac asthma and angina pectoris.

"THEODROX" with PHENOBARBITONE tablets contain in addition ½ gr. phenobarbitone and are indicated in conditions where a degree of sedation is also required.

Both forms are available in bottles of 25, 100 and 1,000 tablets.

Detailed literature supplied on request

RIKER

MARTIN & HARRIS LTD.

Mercantile Buildings

Lall Bazar Street, Calcutta

RIKER LABORATORIES LTD · LOUGHBOROUGH · LEICS · ENGLAND



in the town...
in the village

single dose therapy

Whenever malaria threatens, quick and convenient treatment is of prime importance. Alleviation of the acute malarial attack within 24 hours is the rule with a single dose of four tablets of "Nivaquine" brand chloroquine sulphate.

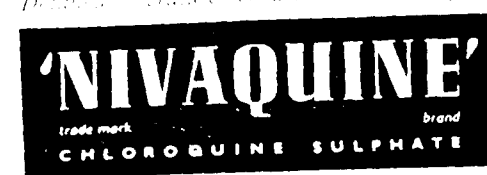
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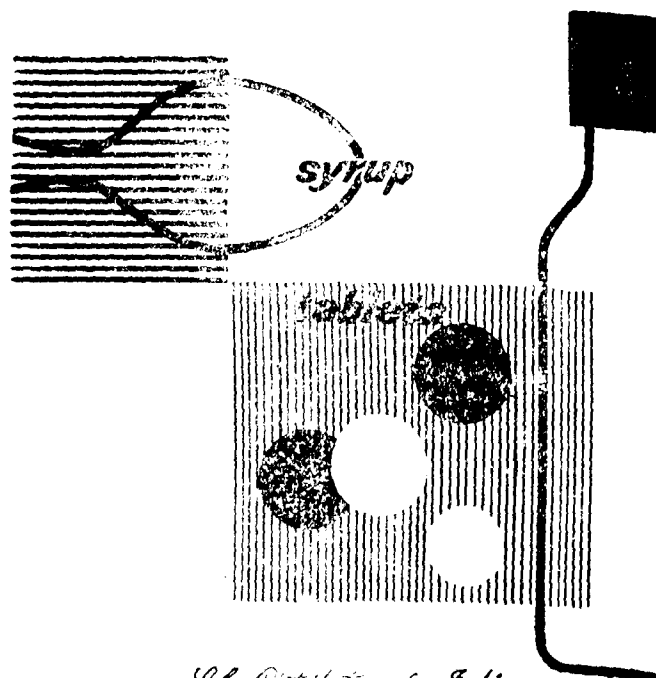
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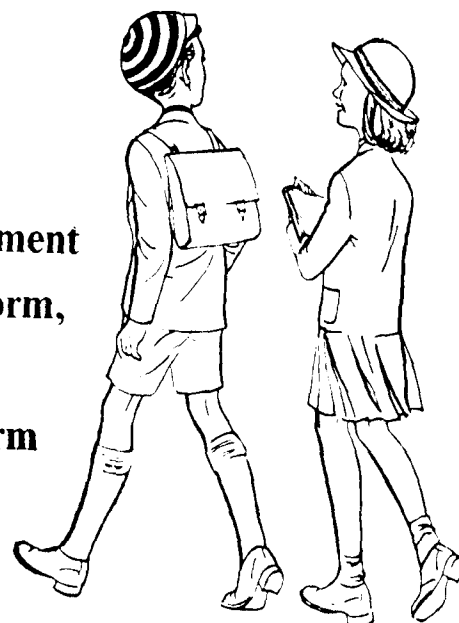
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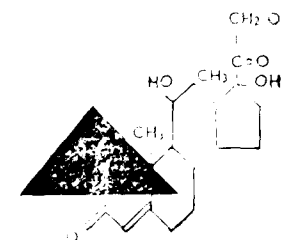
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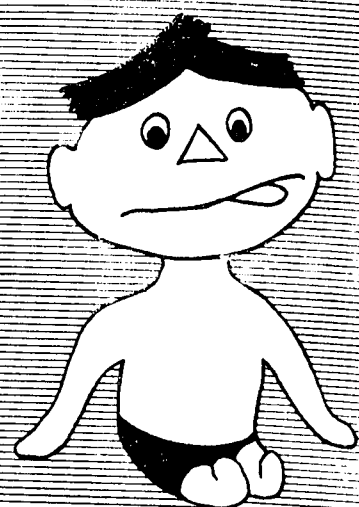
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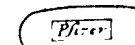
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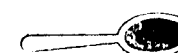
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Original Articles

THERAPEUTIC CONTROL OF THE CHIEF ALIMENTARY SYMPTOMS OF CHOLERA*

A PRELIMINARY STUDY

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CHOLERA is primarily a disease of the bowels, the most constant accompanying symptoms being copious rice-water stools and to a less extent vomiting. Very rare exceptions are the cases of cholera sicca, in which condition the typical evacuations are absent, although on post-mortem examination the intestines are full of the rice-water fluid. The above gastro-intestinal symptoms quickly result in a great loss of body-fluid and electrolytes and their drainage into the bowels (Rogers 1913, 1921, Lin *et al.*, 1953, Chatterjee and Sarker 1941, Bannerjee 1941, Chatterjee 1946, Saha and Das 1951, 1952), ultimately leading to the conditions of shock or uræmia or both, these being the commonest causes of death.

The present paper records the results of our recent attempts to control vomiting and choleraic diarrhoea, and to replace the loss of the body-fluid and the electrolytes in the mild or moderately severe cases in my wards, by the oral route alone or in association with the rectal route, during the two severe epidemics of 1952 and 1953 in Calcutta.

I. Vomiting.—During the 1953 epidemic, from 1st February to 1st July consisting of 1093 admissions, vomiting occurred in 437 or 40% of cases. This symptom may be present either from the onset or later on when the patient begins to recover from the stage of shock with the help of saline transfusions.

*Specially contributed to the ANTISEPTIC.

At first the contents of the stomach come out, later on the vomitus consists of only watery-fluid which may be copious. The vomiting is noisy and distressing, quickly leading to the condition of shock.

In the latter part of the 1952 epidemic, and during practically the whole of the 1953 epidemic, this symptom was treated in my ward by a tablet branded "Avomine." It is a 25 mg., white, uncoated tablet, containing 14 mg. of promethazine base and 11 mg. of 8-chlorotheophylline in chemical combination.

From the results observed, it has been a merciful surprise to find that vomiting can be completely controlled. In the mild cases, vomiting is often checked by a single tablet. When, however, the vomiting continues, the tablet is repeated. The maximum number of tablets found necessary was six in twenty-four hours (1 case). There has not been a single case in which vomiting has not been ultimately controlled by Avomine.

The distress caused by vomiting is well given in the classical description of Rogers (1921), partially quoted here:—

"In fact the vomiting of much watery fluid, when but little has been swallowed, is one of the pathognomonic features of cholera. When very copious it does much to exhaust the patient and may be an important factor in producing collapse. On account of the terrible thirst, the patient calls repeatedly for water, only too often to reject it almost at once, together with any medicine which may have been given. Nothing, however, is more cruel.....than to withhold water from those in the throes of cholera.

Indeed, in the acute stage of cholera, the physician is really on the horns of a dilemma. Even if he gives small quantities of water, the patient immediately throws it out—thirst and shock increasing in a vicious circle. At the same time, it is a most unenviable situation for the physician to withhold water from a patient with a parched, dry tongue crying distressfully in a soft, husky voice "just a little water." With the help of Avomine, not a single patient has been denied water, in any quantity desired.

Table I shows the number of tablets that were used to relieve vomiting in 100 carefully observed cases of cholera accompanied by vomiting, treated between 5-4-1953 and 25-6-1953—the period which coincided with the peak of the epidemic.

TABLE I

Number of cases.	No. of Avomine tablets used to stop vomiting completely					
	1	2	3	4	5	6
	41	30	18	7	3	1
	Total 100					

II. Diarrhoea.—Diarrhoea is the most important single sign of cholera. It is the constant nosological phenomenon of the cholera syndrome and is profuse both in quantity and number. The stage of premonitory diarrhoea described by Rogers (1913) has not been found in the cases observed during the last two epidemics in

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Calcutta. Instead, the onset has as a rule been sudden, usually starting in the early hours of the morning with a copious liquid motion, which is at first bile-stained. The subsequent one or two motions may be bile-stained, but soon the typical rice-water stools appear. The classical description of Rogers (1913, 1921) given below in part, cannot be improved upon.

"The essential feature of cholera stools is the entire absence of bile once the bowel has been cleared of its original contents. They consist of an opalescent, colourless fluid, with a faint but somewhat characteristic odour and are commonly described as rice-watery on account of the resemblance to water in which rice has been boiled (termed as "Marh" or "Phan" in the local vocabulary). In severe attacks, the fluid may be pink owing to the presence of blood."

The rationale of therapy in cholera should, therefore, be (i) to stop this copious diarrhoea thereby preventing the loss of fluid and electrolytes, and (ii) to eliminate or modify the cholera vibrios or their products, if any. The question of replacement of the body-fluid comes in at a later stage. Of the many remedies that have been tried from very ancient times to the present day for controlling this bowel symptom, the following may be mentioned:—

Opium, morphine and atropine.

Various ancient Chinese recipes, including ginger, cardamom and caraway seeds (reviewed by Wu Lien Teh *et al* 1934).

Permanganate pills (Rogers, 1921)

Essential oils (Tomb, 1924)

Acid sulphuric, camphor, Hydrargum creta, bismuth (particularly bismuth salicylate, Pilula plumbi cum opi, chlorodyne, salol (reviewed by Nandi 1926).

Astringent mixture (Manson Bahr, 1940).

Kaolin (Braadfladt, 1920).

Bacteriophage (d'Herelle and Malone, 1930, Asheshov *et al*, 1931 Taylor *et al*, 1930, Morrison *et al*, 1930).

Serum (Hahn and Birsch, 1927, Marsh, 1927, Ghosh, 1935, 1936).

Calomet in divided doses (Ganguly, 1927).

Emetine (Sen, 1935).

Products from certain vegetable barks (Lahiri, 1949 and Lahiri and Dutta, 1949).

It may now be definitely stated that none of the above remedies have sufficiently justified the original expectations and claims to warrant their continued therapeutic use in cholera.

Sulpha drugs were used extensively during and after the Second World War (Chopra *et al*, 1941, Carruthers 1942, Griffiths 1942, Sadusk and Oswald 1943, Lahiri 1945, Bhatnagar *et al* 1948) with varying results. Later work, however, has shown that there is no appreciable advantage with the therapeutic use of the sulpha drugs in cholera (Lahiri 1951, Roy Chaudhuri *et al* 1952 and Konar *et al* 1953). On the other hand, there is a somewhat greater tendency to produce the dreaded complication of uræmia, the percentage of death being much higher in the sulpha-treated cases than in those not so treated (Lahiri 1951). More recently, the 'broad-spectrum' antibiotics have received numerous trials. Gauld *et al* (1949) and Chaudhuri *et al* (1950) investigated the effects of

vomiting, and in the rest no noticeable results on the diarrhoea were observed.



FIG. 1

The dosage at present used by us is as follows:
1st dose—4 teaspoonfuls;
2nd dose—2 teaspoonfuls; and
3rd dose—2 teaspoonfuls at intervals of one hour on the day of admission.

If, after giving the above doses, the diarrhoea continues after eight hours, the doses are repeated in the evening.

The above doses are repeated on subsequent days, unless there is constipation, in which case the leaf-juice is discontinued.

The change in the character of the stools is interesting. The rice water at first changes into a bile-stained liquid in a few hours, then into semi-solid, greenish stools and finally into hard stools.

In our experience we found that the raw juice expressed from the leaves of *Coleus aromaticus* could substantially control the diarrhoea within 48 hours in 74% and within 72 hours in 92.5% of cases of cholera, in a series of 200 cases.

The criteria of improvement has been the appearance of semi-solid, bile-stained stools, not more than three in number in 24 hours. The diarrhoea in the remaining few, comprising 7.5% of our cases, may linger up to 10 days within which period it stops. But, we have not regarded these cases as "improved." The possible causes of this prolonged diarrhoea are being studied and will from the subject of another paper.



FIG. 2

Table II shows our observations on the effect of *Coleus aromaticus* in 200 cases admitted between 24th April 1953 and 1st July 1953, which coincided with the peak of the epidemic.

TABLE II

Showing the number and percentage of cases which improved with *Coleus aromaticus* (200 cases)

Period of administration of <i>Coleus aromaticus</i>	Number of cases improved	Percentage to total
24 hours	80	40
48 hours	68	34
72 hours	37	18.5
4 to 10 days	15	7.5
		74 } 92.5

Forty cases served as controls during the same period, which were not given the leaf-juice, the treatment of shock and other complications being however, the same as in those who received the juice. The control cases also received daily, four doses of a routine suspension containing Kaolin (30 grains) and bismuth carbonate (20 grains) per dose. Every 5 consecutive cases were treated with leaf juice, and every sixth case was treated as a control receiving Kaolin-bismuth; this cycle was repeated in the whole series.

TABLE III

Showing the number and percentage of cases improved amongst the 40 controls

Period after admission	Number of cases improved	Percentage to total
24 hours	2	5
48 hours	3	7.5
72 hours	7	17.5
4 to 10 days	28	70
well or not improved		12.5 } 30

The death-rate in the control series of 40 cases was 8 or 20%. While in the series treated with *Coleus aromaticus*, consisting of 200 cases, it was 17 or 8.5%.

The question arises as to whether the leaf-extract is of any use in the later stage of the disease. We have had the opportunity of observing 5 cases of moderate severity, which were given the usual, ordinary treatment, without the leaf-juice of *Coleus aromaticus*. As these cases markedly deteriorated, the administration of the *Coleus aromaticus* juice was started at a late stage of the disease. All the cases showed, however, gradual improvement into convalescence.

CASE REPORT:—S. B., male, Hindu, aged 35, admitted at 8 p.m. on 16.7.53; history of onset at 10 p.m. on 15.7.53; had purging 4 times; vomiting twice; and the last urination was at 6 A.M.

16.7.53:—Pulse—imperceptible; respiration—20; rectal temperature—96°F.; specific gravity of blood—1070; on admission, transfusion of hypertonic saline—2 pints, Roger's iso-alkaline—1 pint. Normal saline—1 pint.

Pulse perceptible but was soft with a tendency to sink "Plasmosan" 500 cc. was given by the intravenous drip. He passed rice-water stools five times.

Examination of stools:—Alkaline in reaction; microscopic examination revealed vibrios, epithelial cells and a few pus cells.

Culture:—showed smooth colonies of the Inaba type, after 24 hours.

17-7-'53 —Number of stools—6 and complete stoppage of urine.

As the pulse deteriorated, normal human plasma 250 cc. and "Plasmosan" 540 cc. with 1000 mg. of Vitamin C by the intravenous drip was started at 6 A.M.; but there was no urination till 6 P.M. One ampoule of "Phenergan" 50 mg. was given intramuscularly in each kidney region at 7 P.M.

Coleus aromaticus juice was started in the usual one-hourly doses, in the morning and repeated in the afternoon.

18-7-'53:—First urination at 2 P.M.; number of stools passed—10; Culture showed smooth colonies of cholera vibrios of the Inaba type on the subsequent day.

19-7-'53:—Number of stools—7; urine was passed with each stool, liquid, bile-stained. Culture showed mixed smooth and rough colonies of Inaba type on the next day.

20-7-'53:—Number of stools—3; semi solid; culture showed rough colonies of Inaba type.

23-7-'53:—The patient showed a febrile temperature of 104° F. which subsided with quinine.

24-7-'53:—The patient was afebrile and convalescent. Passed one semi-solid stool; and the culture showed rough Inaba colonies on the next day.

25-7-'53:—One semi-solid stool, which on culture showed Inaba strain rough colonies.

28-7-'53:—Patient took voluntary discharge.

Laboratory examinations.—Every case admitted in 1953 in my ward had the stool examined macroscopically, by litmus paper and with the microscope. As a safeguard against contamination, all the stool specimens were obtained by passing a boiled and cooled No. 10 Catheter high up into the rectum. In the convalescent cases, where there was constipation, about 10 cc. of sterile, normal saline were injected and the washing collected in a sterile, test-tube. Cultures were usually made within fifteen minutes of collection, in three separate petri dishes (10 cm. diameter) each containing the following different media, viz:—McConkey's agar; Taurocholate agar and; and D.E.C. Medium (Panja and Ghosh, 1943).

It was also possible to make day to day microscopic and cultural examinations for a fortnight, in twenty six cases, which were treated with *Coleus aromaticus*, and in thirty-six controls, all of whom showed cholera vibrios of the smooth type in their first stool culture. Sixty of these 62 cases, showed vibrios of the Inaba type and only two being of the Ogawa type.

It was found that the juice of *Coleus aromaticus* did not render the stools vibrio-negative up till to the 17th day of observation in one case.

After the administration of the juice extract, the second culture usually showed the appearance of rough colonies of the vibrio, the smooth colonies however, predominating. In the third culture,

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the smooth and rough colonies of the vibrios were about equal and this rate of change continued until, in the 5th or 6th culture, the plates showed that nearly all the colonies were of the rough type. The subsequent cultures practically showed the same, although an occasional culture would show one or two smooth colonies here and there.

In the control series, although rough colonies appeared in the 3rd or 4th culture, colonies of the smooth type preponderated and this preponderance was observed up to the 12th culture, during the peak period.

This parallelism between the clinical improvement in the diarrhoea as also in naked eye appearance of the stools and the appearance of rough colonies has been a somewhat remarkable phenomenon observed in the cases treated with the leaf-juice.

This is in marked contrast to the elimination of the vibrios after administration of the 'broad-spectrum' antibiotics without, however, any noticeable clinical improvement, as has been recorded by various other workers (Chaudhuri *et al* 1950, Das *et al* 1951, Konar and Sen Gupta 1951).

The variability of the cholera vibrios *in vitro* is a well-known phenomenon (Shousha 1923-24, Kabeshima 1918, Nobechi 1923, Kakihara 1925, Linton and Mitra 1934-35, Linton, Mitra and Seal 1936-37). This variability of the cholera vibrios has also been observed *in vivo* in the house fly by Lal, Ghosal and Mukherjee (1938-39) and by Lal and Seal (1938). Regarding the human intestines the observations of various workers have suggested that cholera vibrios can undergo mutations and have indicated the various factors operating as possible causes (Pandit, 1934, Ghosh and Mukherjee 1941, Gohar and Makkawi 1948, Krishnan 1950, Linton *et al* 1939, Seal 1951).

What part the raw-juice of *Coleus aromaticus* plays, in the clinical improvement of the choleraic diarrhoea as well as in the rapid appearance of the rough strains in the stools, is the subject of further study. Smooth cultures were inoculated into broth along with different quantities of the leaf extract and incubated for 24, 48, 72, and 96 hours, and the cultures then plated out. The colonies growing on the plates were still found to be of the smooth type!

III. Replacement of fluid by the oral and oral *cum* rectal routes.—Owing to the definite check to the loss of fluid by the control of vomiting with Avomine and to the diarrhoea by the raw leaf-juice of *Coleus aromaticus*, I have taken to the administration of water, glucose and electrolytes by the oral route *alone* in the early and mild cases. In the moderately severe cases, combined oral and rectal administration was tried.

48 hours; in 92.5% in 72 hours; while in 40 control cases, diarrhoea was checked by itself in 5% of cases in 24 hours; in 12.5% of cases in 48 hours; in 30% in 72 hours.

4. The mortality rate was 8.5% (17 cases out of 200) amongst the leaf-juice-treated cases; and 20% (8 cases out of 40) amongst the controls; the total mortality was 19.7% (215 cases out of 1093) amongst all cases admitted.

5. The oral administration of the leaf-juice was followed up by daily plate culture made directly from the stools collected by means of a boiled rectal catheter and plated within fifteen minutes in three different media. It was noticed that rough colonies of the cholera vibrio appeared comparatively early, viz., the second culture done after 24 hours of leaf-juice administration. The proportion of the rough to the smooth colonies continued to go up on successive days, so that, on the fifth or sixth culture, the smooth colonies were scanty or nil. In 36 control cases similarly plated smooth colonies were preponderating up to the 12th culture. *In vitro*, however, the leaf-juice did not convert the smooth type of vibrio into the rough type.

6. The oral administration of leaf-juice, however, did not make the stools of the treated cases vibrio-negative, as rough colonies were observed up to the seventeenth day of observation.

This is in somewhat marked contrast to the results obtained by various workers who used the 'broad spectrum' antibiotics, which are reported to have rendered the stools vibrio-free, without producing clinical improvement of cholera.

7. The therapeutic control of vomiting by Avomine and of diarrhoea by the juice of *Coleus aromaticus* enabled the patients with mild or moderately severe symptoms and with a blood-specific-gravity of 1064 or less to tide over them and get into convalescence without intravenous or parenteral transfusions. These comprised 17% of the cases.

I wish to take this opportunity for offering my heartfelt gratitude to the memory of the late Dr. Shyama Prasad Mookherjee, who was keenly interested in this work and whose untimely death has deprived us of a great friend and helper.

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CONTROL OF CHOLERA IN INDIA BY INOCULATION OF PILGRIMS

"During 1908 to 1920 the system of treatment of cholera by hypertonic and alkaline salines intravenously and permanganates orally, reduced the case mortality from 59% to 20.8% in 1,429 severe hospital cases treated during 1915-19 in Calcutta. Unfortunately, 85% of the vast population of India live in villages without protected water supplies or hospitals; so but little reduction in the average mortality of some 300,000 from cholera has been obtained by the improved hospital treatment, except in urban populations. A comprehensive study by me of the monthly cholera deaths in 100 divisions of India showed that 40 out of 41 major epidemics had ensued on deficient monsoon rains of the previous June to October in the particular areas of the outbreaks when huge fairs and festivals were held, which had a total attendance of 20,000,000. Approximately correct forecasts of the incidence of cholera were published by me before the cholera season.

"These laborious inquiries led me in 1927 boldly to declare that the only method by which high Indian cholera mortality should be reduced under present conditions was by the use of compulsory anti-cholera inoculation of all pilgrims travelling through infected insanitary villages before they reached the fairs. This was turned down in 1930 with the finding that the plan was "impracticable, inexpedient and even dangerous!" In 1936, however, when Bombay State was faced with a serious outbreak of Cholera following the annual July fair at Pandaripur. In this serious emergency the State Government ordered compulsory anti-cholera inoculations of all Pandaripur pilgrims before they were allowed to attend the fair and the spread of the disease (by the Pandaripur pilgrims) was thus averted. The same measure was followed by similar success in the ensuing five years, and in 1944 I demonstrated the beneficial results of the new measure by tabulating the Pandaripur cholera data of six years before and six years after the trial began. The Central Board of Health then recommended trials of this plan in every province in India, the results of which are now available in recent reports. "Compulsory anti-cholera inoculation is being increasingly enforced by the provinces before fairs and festivals and has proved highly successful in limiting the spread of cholera during the movements of pilgrims.

"In an informative paper in 1944 I included a table to show the average number of cholera deaths per thousand for all India, and for each province, for six decades from 1880 to 1939, together with the data for every year, rates above and below the average for each decade, in relation to high or low previous monsoon rains and the incidence of the dangerous 12-yearly specially of deficient antecedent monsoon rains in increasing, and of such good rains in decreasing cholera incidence, that the exceptionally low rates in nearly all the non-endemic areas of India in 1946 must have been mainly due to the very favourable preceding rains having provided exceptionally good drinking-water supplies over a large portion of India. A great increase in the yearly total anti-cholera inoculations in India, with the widespread adoption of compulsory inoculation of pilgrims may be illustrated by the following data.—In 1928-1933 the average total anti cholera inoculations in India numbered 2,700,000 and in 1934 they averaged 6,649,000 (Rogers, 1944). In 1946 the total figure for the eight provinces for which alone they were recorded was 19,858,000.

"A recent Madras State Health Report stated that "anti-cholera inoculation had to be resorted to as the sheet-anchor in the defence against cholera, as the environmental hygiene conditions of the villages were far from satisfactory. About 4,600,000 anti cholera inoculations were performed during the year." It is satisfactory to note that the Cauvery-Delta-main-endemic area of Southern Madras has been chosen by the WHO for the implementation of a cholera eradication demonstration, so a well-controlled trial of anti-cholera inoculations should soon be forthcoming.—(Sir Leonard Rogers, M.D., F.R.C.P., F.R.S., in a very information article in the *Brit. Med. Jour.*, 6-12-'52).

ANTISEPTICS*

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Introduction.—The term sepsis, is derived from the Greek, (*Sepo*—to rot) although it is used more specifically in medicine for blood poisoning by infectious agents. An antiseptic is a chemical used to remove or arrest the growth of microbes, by inhibiting their activity or by killing them. It is proposed to deal in this article with chemicals, used as germicides and for the disinfection of objects intimately associated with human hygiene.

The use of antiseptics in medicine is nearly always local. Surgical dressings, eyewashes, mouthwashes, gargles, douches and all disinfecting solutions belong to this group. Many inorganic disinfectants embody the principles embodied in organic antiseptics, although the latter usually offer a wider margin between germicidal efficiency and irritating or toxic properties.

I. Halogens and antiseptics depending on the liberation of Halogens.—**1. Chlorine and hypochlorites:**—Drinking water, swimming pools, sewage etc. having a high bacterial content are disinfected routinely by chlorination. This operation is carried out most cheaply by direct treatment with chlorine, or by the addition of substances which liberate "available chlorine" in the form of hypochlorite ions, etc.

Both chlorine and hypochlorites possess excellent bactericidal properties. The usefulness of hypochlorites is limited by the instability of their aqueous solutions. Some stabilization may be effected with boric acid or buffering with sodium bicarbonate; but even then dilute hypochlorite solutions do not retain their potency for long. Sodium hypochlorite (Dakin's solution, *Eau de Javel*) and calcium hypochlorite (both chlorinated lime, bleaching powder, $\text{CaCl}_2 + \text{Ca(OCl)}_2$, and the neutral salt, Ca(OCl)_2 , or HTH) are the popular disinfectants used in large scale sterilization, but the N-chloramines are coming to be used increasingly as they furnish chlorine in a reactive state.

Dilute solutions of sodium hypochlorite (modified Dakin's solution, Dakin-Carrel solution) are used to cleanse wounds, but as they can also dissolve necrotic tissue and blood clots, special precautions have to be taken in the technique of its application. Fungus infections (athlete's foot) may be treated prophylactically with hypochlorites.

2. N-Chloramines:—The chloramines are derivatives of amines containing the N-Cl group. They include N-chloramines (RR_2NCl), N-chlorimines ($\text{R}_2\text{C}=\text{NCl}$), N-chloramides (RCONHCl), N-chlorosulphonamides (RSO_2NHCl) and N-chlorimides (RCONCICOR). Several of these types are well-known intermediates in

* Specially contributed to the ANTISEPTIC

organic reactions, as for example, the N-chloramides in the Hofmann's reaction. They are highly reactive compounds which give up their halogen on hydrolysis or on contact with readily halogenated substances. This availability of active chlorine atoms has led to their use as antiseptics.

Because of the ease with which they are decomposed, few pure chloramines have been described. Their usefulness as biological chlorinating agents was first recognised by Dakin who introduced Chloramine-T as a medicinal chemical.

Some chloramines are bactericidal *per se* but most of them owe their biological activity to their hydrolytic decomposition resulting in the production of hypochlorite ions.

Chloramine T is germicidal when applied to wounds, as mouth washes and surgical disinfectants. It kills both the bacteria and protozoa found in drinking water and is harmless when taken orally. Parenteral administration, however, reveals its violently poisonous systemic properties.

Dichloramine-T, obtained by further chlorination of chloramine-T, decomposes with the liberation of chlorine in acid solution. It has been used in the antiseptic treatment of water, in dressings on the skin, and can be sprayed as a surgical disinfectant in ethyl chloride solution.

3 *Bromine*:—The use of bromine as an antiseptic in disinfecting swimming pools, etc., is stated to offer certain advantages over chlorine. Both the halogens are employed at dilutions of about 1×10^{-3} , and bromine is less irritating to mucous membranes in this concentration. Bromine-water is easy to prepare, and the required amounts of bromine can be added to large volumes of water without the expensive installations required for chlorination.

Compounds which liberate bromine in the tissues have been proposed as therapeutic agents on various occasions but none of them have so far been used.

4. *Iodine*:—(a) *Elementary iodine*:—Iodine has recently been recommended as an antiseptic for use in large volumes of water. It is a more potent bactericidal element than chlorine, in very high dilutions and its solutions are stable; the element is lost only very slowly by vaporization; and in dilutions which reduce the bacterial counts to figures that conform to public health regulations and requirements, iodine is less irritating and less toxic than chlorine. Since solutions of iodine in potassium iodide can be added directly to the water, the handling of this antiseptic is quite easy.

Tinctures of iodine containing 2.5 to 10% of iodine in potassium iodide-dilute ethanol solutions have long been the favourite topical antiseptics in households and in clinics. They are used widely for the disinfection of the surgical field, and in iodine is the preferred prophylactic antiseptic for application to minor cuts and injuries.

Occasional irritation or allergic reactions that occur have not detracted from its popularity. Its powerful fungistatic activity has not often been fully appreciated.

(b) *Iodine antiseptics*:—(i) *Iodoform*:—Iodoform has a very disagreeable odour, and irritating side-effects; and it is known to cause a definite toxicity syndrome in certain persons. In order to mask its odour, iodoform has been combined with hexamethylenetetramine (Iodoformin), with hexamethylenetetramine ethiodide (Iodoformal), and with tannin (Iodoformogen). The objectionable odour of iodoform, is absent from these pharmaceutical molecular mixtures; they however, decompose on contact with tissue fluids into their components, releasing the odour.

(ii) *Other aliphatic iodine derivatives*:—The acetone derivative of 1-iododihydroxypropane (Alival, $(\text{ICH}_2\text{CHCH}_2\text{O})$ is both a water $\text{O}-\text{C}(\text{C}_3\text{H}_7)_2$)

and liquid-soluble compound which liberates iodine in the manner indicated and has been used in the treatment of skin infections. However, this derivative and many others, iodinated alcohols, ketones, fatty acids etc., cause universally disagreeable side-effects and so have not found a place among useful antiseptics.

(iii) *Aromatic iodine compounds*:—Iodol (2,3,4,5-tetraiodopyrrole) liberates iodine on decaying tissue much in the same way as iodoform, and was at one time, the best successor to it.

5. *Chlorinated insecticides in medicine*:—(a) *Gammexan*:—Gammexan is one of the stereoisomeric forms of 1,2,3,4,5,6-hexachlorocyclohexane; it has been assigned the gamma-configuration which is believed to be a *meso* form. The molecule was singled out as a potential insecticide on the basis of the prediction that its structure and configuration should prove it to be a metabolite antagonist of mesoinositol which is known to be needed in the diet of insects, mites etc.

Following extensive entomological observations, Gammexan has become a widely used and potent insecticide. It is manufactured by actinic chlorination of benzene in the presence of small amounts of alkali at low temperatures. At least four stereoisomers of Gammexan have been isolated from the reaction products, but the whole mixture containing as much as 10 to 15 per cent of the gamma isomer is sometimes used commercially.

In addition to being an excellent insecticide, Gammexan has also proved its value as perhaps the best scabicide yet discovered. Scabies is a skin disease caused by the itch mite, *Sarcoptes scabiei*, which Gammexan kills readily. The proposed antagonism between Gammexan and inositol has not been proved adequately. It is uncertain whether this configurational similarity, or just the structure of Gammexan in general, is the cause of its antibiotic action. One of the other stereoisomers, designated as *delta*, has shown decided antitubercular activity *in vitro*.

(b) *DDT*:—The insecticide DDT, 1,1,1-trichloro-2,2-bis (*p*-chlorophenyl)-ethane has been used successfully as a pediculocide, for the eradication of the human body louse which acts as a vector for the causative organism of typhus. DDT is irritating to the skin and is usually administered together with a topical local anæsthetic to alleviate the itching caused by the insecticide.

This irritating side action has led to a search for less injurious pediculocides. Isobornyl thiocynoacetate which eradicates both the adult and oval forms of the insect, is now preferred.

II. Mercury compounds.—1. *Inorganic derivatives*:—Mercuric chloride (corrosive sublimate) is the most widely used and oldest inorganic mercurial antiseptic. It can be applied to unbroken skin surfaces on the scalp or the body but is too poisonous to be used in wounds whence it can enter the systemic circulation. Other mercury derivatives, both soluble salts and insoluble oxides, have been used for antiseptic purposes. The compounds having a low solubility are incorporated in ointments, and serve as topical antiseptics since they diffuse only slowly into anatomically adjacent tissues.

2. *Organic mercurials*:—Organic mercurials as they are used in medicine are mostly organo-mercuric hydroxides (RHgOH) or their salts (RHgX) or sulphides (RHgSR). In either case, they can ionize in solution, for example, $\text{RHgOH} \rightarrow \text{RHg}^+ + \text{OH}^-$, and the resulting organo-mercuric ions (RHg^+) are held by most investigators to be responsible for the antiseptic activity of the drugs. Yet, the establishment of RHg ions proceeds only slowly, and the often surprisingly high antibacterial activity of some of the least ionized derivatives does not permit a correlation of the rate of dissociation with biological activity. In addition, the commercially available mercurial antiseptics have a very low ionization constant but are nevertheless much more active than the soluble mercuric salts. The organic portion of the molecule must have a profound influence on the rate of absorption, distribution and excretion of the drugs, and these purely pharmacological considerations are probably of greater importance for the extent and magnitude of the biological activity than is the rate of ionization.

In spite of their wide use as topical antiseptics, the organic mercurials are rather ineffective as compared with other non-irritating agents. Their phenol co-efficient is low, often about 1.0. They act as slow bacteriostatics at first and when washed away from a treated pathogenic cell culture the latter regains its virulence. This property is shared even by mercuric chloride which does not kill anthrax bacilli in 24 hours, although Koch, the discoverer of mercury antiseptics claimed great success with this organism. It is now generally accepted that organic mercurials are inactive in the presence of serum.

Mercurochrome constitutes the best known representative of this class. In addition to mercurochrome (Merbromin), two other mercurial antiseptics sodium ethylmercurithiosalicylate and the anhydride of 3-oxymercuri-4-nitro-*o*-cresol have acquired some importance. These three mercurial antiseptics are relatively non-irritating and of moderate activity. They can be applied with some success to wounds, to mucous surfaces, the throat, ear, eye and genito-urinary tract. While it would be more logical to replace them with antibiotics as topical bacteriostatics, they have held their place because of the high incidence of resistance to topically applied antibiotics. Mercurochrome and Metaphen also inactivate the influenza and poliomyelitis viruses *in vitro* but Merthiolate does not.

III. Other metallic antiseptics.—1. *Silver*:—Colloidal suspensions of "molecular" silver protected from coagulation by proteins, are used as antiseptics on mucous membranes, especially in the treatment of coccus infections of the throat, eye, urethra, bladder and colon. Although they have been superseded largely by sulpha drugs and penicillin, they are still occasionally used in the local treatment of gonorrhœa. Among well-known preparations of this type may be mentioned Protargin, Protargol, Argyn, Cargentos, Silvol, Argyrol and Solargentum. Colloidal suspensions of silver chloride and silver iodide have also enjoyed some measure of popularity.

Soluble silver salts which depend on the ability of the silver-ion to precipitate proteins and thereby destroy micro-organisms, have been used as antiseptics in ophthalmology, in the prophylaxis of gonorrhœal eye infections in newborn infants and for other local purposes. Silver nitrate and lactate are representatives of this group. Silver picrate, a sparingly soluble silver salt, is used as an antiseptic powder in monilial, gonorrhœal and trichomonal infections.

2. *Zinc compounds*:—Zinc oxide is the active ingredient of many pharmaceutical household ointments and pastes and is often combined with salicylic acid or phenol. Zinc salts of the higher fatty acids like zinc oleate and stearate are put to similar use. Zinc peroxide and permanganate have been proposed as oxidising antiseptics which combine the germicidal effects of both their cations and anions.

IV. Acids.—1. *Inorganic and aliphatic acids*:—Some weak acids have been found to be excellent antiseptics, and their anions as well as their undissociated molecules must play a part in producing this effect. Most of them are organic acids, but sulphurous acid and its salts are used as food preservatives, and gaseous sulphur dioxide is extensively employed as a fumigant and disinfecting agent in orchards.

The use of acetic and lactic acids in disinfecting douches and dressings probably constitutes a compromise between reduced acidity and low toxicity. These acids are used specifically in vaginitis and *P. aeruginosa* infections. The spermicidal properties of lactic acid have led to its incorporation in contraceptives.

The salts or other aliphatic acids have found application as fungicides. Propionates which protect bread from molding, are used under the trade name of Mycoban in the baking industry. Cheeses and other dairy products also profit from the fungicidal properties of propionic acid. Propionates, caprylates and undecylenates have been recommended for the treatment of such fungus infections as dermatophytoses (athlete's foot), psoriasis, neurodermatitis and associated arthropathies. Undecylenic acid is notably nontoxic on oral administration.

Soaps act as cleansing agents and also as mild antiseptics, and many derivatives of fatty acids share this property. A typical example is presented by N, N-bis (hydroxyethyl)—stearamide, $(\text{HOCH}_2\text{CH}_2)_2\text{NCOC}_{17}\text{H}_{35}$, which can be used for dish washing bathing etc. It has been claimed that individuals allergic to soap tolerate this detergent-amide without ill-effects.

2. *Aromatic acids*:—Benzoic acid is used widely as a preservative in concentrated and canned foods. Both p-hydroxybenzoic acid and the ortho-isomer-salicylic acid, have germicidal properties. The alkyl esters of p-hydroxybenzoic acid have been used under various trade names (Tegosept, Nipasol, Nipagin, Nipabenzyl) in fungus infections of the skin and as preservatives in lotions, creams and infusions.

(i) *Salicylates*:—The main therapeutic use of salicylic acid, its salts or esters as antibacterial agents of true value is in the treatment of articular rheumatism. This disease is regarded as an allergic reaction to the toxic metabolic products of coccal infections. Antibiotics can cope with the causative organism but the beneficial effect of the salicylate-ions cannot be doubted.

Sodium salicylate is an ingredient of various topical fungicide solutions, mouthwashes and internal antiseptics to check gastric fermentation although its antiseptic activity is low. Even so, salicylic acid is superior to its position-isomers in this respect.

The usefulness of salicylic acid and its salts is limited by the symptoms of gastric irritation which the salicylate-ion produces. Phenolic esters of salicylic acid, (Aspirin, Novaspirin, Diaspirin, Diplosal, etc.) as well as methyl salicylate (oil of Wintergreen) and similar esters with other alcohols, are less irritating and have found occasional use as mild antiseptics.

More important as antiseptics are aryl esters of salicylic acid. The simplest one, salol or phenyl salicylate $(2\text{-HOC}_6\text{H}_4\text{COOC}_6\text{H}_5)$, is usually cited as the representative of these compounds. Although it must not be forgotten that even easily hydrolyzable esters may

exert a specific action *per se*, the hydrolytic cleavage products, salicylic acid and phenol, account mainly for the antiseptic activity of Salol. Nencki proved with this compound that the inherently irritating action of phenol and salicylic acid should be masked in the ester, and the slow hydrolytic liberation of the active components prevents the appearance of serious toxic symptoms. The "salol principle" has been extended to several phenolic esters of other aromatic hydroxy acids, but only salol. Naphtholsalol (β -naphthyl salicylate), and Vesipyrin (phenyl acetylsalicylate), need be mentioned here.

(b) *Mandelic acid*:—Mandelic acid, $\text{C}_6\text{H}_5\text{CHOHCOOH}$, has proved to be a rather efficient bactericidal agent in urinary infections. It exerts its great disinfecting power at a pH below 5.5 and therefore, the urine has to be kept acidic by the simultaneous administration of acids or acid salts. Mandelic acid is not conjugated biologically but is eliminated unchanged, when administered orally. The amide and several esters of mandelic acid have recently been preferred to the free acid.

V. *Alcohols and aldehydes*.—The germicidal activity of aliphatic alcohols increases with their molecular weight, as the influence of the hydroxyl group diminishes, and the alkyl groups gain in length and endow the compounds with more favourable distribution coefficients. The phenol coefficient rises from methanol (0.026) to octanol (21) but the activity drops sharply for the higher members.

1. *Ethanol*:—Only ethanol is used in practice as an effective surface antiseptic. A 70% solution of ethanol in water is widely employed for this purpose. Isopropyl alcohol is used occasionally in place of ethanol although, by and large the germicidal activity of secondary alcohols is lower than that of the primary ones. Ethanol aids also in the granulation of tissues.

2. *Formaldehyde*:—In the group of aldehydes, formaldehyde holds a time-honoured place as a gaseous fumigant for the disinfection of rooms. It owes its cytotoxic properties to its ability to denature and precipitate proteins, perhaps by chemical combination with free amino-groups in the cell. By the same token, it produces a rash on the skin and cannot be used as a medical antiseptic.

3. *Methenamine*:—The condensation of formaldehyde with ammonia produces hexamethylenetetramine which has been used widely as a urinary antiseptic under the names of Urotropin, Hexamine or Methenamine. The drug owes its activity to the slow release of formaldehyde in acid-urine by a reversal of the equation for its formation.

Methenamine is a moderately effective urinary antiseptic and is still prescribed, although the sulpha drugs, mandelic acid and mandelamide have largely replaced it. Some resistant urinary infections respond well, particularly those due to *E. coli*.

4. *Furacin*:—The semicarbazone of 5-nitrofurfural has been introduced as a virtually non toxic and non-irritant topical bacteriostatic and bactericidal agent for a variety of gram-positive and gram-negative pathogens. It is useful in the treatment of ulcers and does not interfere with granulation and other regenerative processes in tissues. This is not the only semicarbazone which exhibits such biological properties. 4-Acetamidobenzalthiosemicarbazone has become a much-used tuberculostatic drug, and many related compounds have a similar effect on infections due to acid fast organisms.

VI. Phenolic antiseptics.—1. *Phenol* which was introduced by Lister in 1865 as a bactericidal agent under the then common name of carbolic acid, soon became the most important organic antiseptic of its day. Today, it has largely the historical significance of having been the first effective clinical anti-bacterial agent which ushered in modern methods of disinfection and surgical asepsis. On phenol is based the phenol co-efficient, the most widely used standard of evaluating bactericidal activity.

2. *Coal-tar disinfectants*:—(a) *The cresols*:—Economic considerations have been the main cause for the utilization of coal-tar fractions for the large-scale disinfection of inanimate objects. The smoky, tarry-smelling liquids ("carbulated petrolatum") are relatively non-toxic, non-irritating and non corrosive, and do not coagulate proteins at useful dilutions.

Coal tar contains a mixture ("tricrosol") of the three isomeric cresols in the approximate proportion of 40% *meta*-, 35% *ortho*- and 25% *para*-cresol. It owes its disinfectant properties to phenol, to these cresols, and to higher boiling phenolic fractions, the tar-acids. The latter have phenol coefficients ranging from ten to twenty-five.

Creosote is a mixture of higher phenols, cresols and guaiacol. The cresols are considerably less toxic to mammals than phenol, cause less necrosis of tissue, and are approximately 2.5 times as bactericidal. The position of the methyl group has no decisive effect on the bactericidal activity of the cresols and in practice a mixture of the three isomers is used. The cresols are less soluble in water than phenol but they dissolve well in soap solutions or in sulphated castor oil as a vehicle. An additional advantage of these solutions is that they cleanse as they disinfectant. The so-called resinous soaps (rosin soaps) are alkali salts of resin acids, especially abietic acid, and have considerable antibacterial activity of their own.

(b) *Thymol and carvacrol*:—Two naturally occurring alkyl-phenols deserve mention since they can be extracted inexpensively from their natural sources, and are also readily synthesized.

Carvacrol is more effective against *Staph. aureus* than thymol, but the reverse is true in the anthelmintic action of the isomers.

Thymol exhibits relatively low toxicity and has become a fairly widely used drug for gastro-intestinal infections, of bacterial, fungal and helminthic origin. It is one of the few drugs of value in actinomycosis, even if this infection has settled in the chest cavity. Other internal fungus infections, as well as ringworm and athlete's foot also respond to thymol.

(c) *Polyphenolic compounds*:—The polyhydroxybenzenes, catechol, resorcinol, hydroquinone and phloroglucinol have been tested as antiseptics but are not used in practice. Hydroquinone shows abnormally high killing power for *Bacillus pestis* but is ineffective against other organisms. Pyrogallol (1,2,3-trihydroxybenzene) is incorporated in ointments for the treatment of fungus infections. Ringworm, psoriasis and lupus erythematosus respond to this compound.

Alkylresorcinols:—The most widely used medicinal drug of all phenolic antiseptics is 4-n-hexylresorcinol which possesses the highest bactericidal potency among alkylresorcinol derivatives, and the most favourable chemotherapeutic index of a long series of alkylpolyphenols studied. In comparison with other phenolics, its bactericidal power is not high, but the ease of its preparation as well as its low toxicity have assured hexyl-resorcinol a permanent place in antiseptics. It has also proved to be a valuable anthelmintic.

(d) *Halogenophenols and alkylhalogenophenols*:—Nuclear halogenation generally increases bactericidal potency, and any increase attained by an alkyl-group is still further accentuated by nuclear halogen. Optimum conditions are attained if the halogen in *para* rather than *ortho* to the phenolic-hydroxyl. Bromo-derivatives are often more potent than the corresponding chloro-compounds, and iodo-phenols are more active than bromo-derivatives; this latter relation has, however, not been studied adequately.

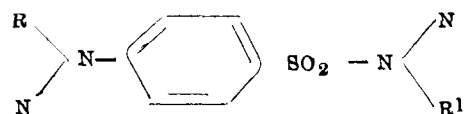
Chloro-m-cresol is the active ingredient of many commercial antiseptics. It is used in 70% alcohol or in soap solutions, and can be taken internally. The compound is relatively non-toxic and kills a variety of organisms even in a 0.25% solution.

A few halogenated naphthol derivatives have been recommended as practically non-toxic and odourless antiseptics, 1,3,6-tribromo-2-naphthol used to be applied externally in dermatology and as a wound disinfectant, but is no longer prescribed. Other derivatives of naphthol are under study in this laboratory some of which may prove to be useful.

VII. The Sulphonamides.—The compound p-aminobenzene-sulphonamide, now known as sulphanilamide, was first synthesized in 1908; but many years however elapsed before its therapeutic value was discovered. In 1932 a German firm prepared a red dye, 4-(4-sulphanilphenylazo) m-phenylenediamine and in 1935 Domagk reported remarkable curative effects with this compound and named

it Prontosil. In the same year, a group of French investigators (Trefouel *et al*) found that the bactericidal properties of the drug resided in the p-aminobenzenesulphonamide portion of the molecule. In 1937 Ervins and Phillips of England synthesized sulphapyridine which was the first sulphonamide used with great success in combating pneumonia. Then followed sulphathiazole, sulphadiazine and a number of other sulphonamides. Over 3300 sulphonamides have since been prepared, but only a few have been accepted and are in medicinal use.

All the official and generally all the therapeutically useful sulphonamides are characterized by the following structure.



R may be a hydrogen, an acyl or anyl group, and R' hydrogen or a cyclic group. In sulphonamide both R and R' are hydrogen, in sulphathiazole R' is 2 Thiazolyl and in succinylsulphathiazole R is the so-called succinyl.

The choice of the sulphonamide compound which is to be used in the control of known infections should not be based on caprice or chance but on bacteriological diagnosis, experience dictated by the knowledge of the experimental therapeutic background of these drugs, their pharmacological properties in man, their clinical efficacy in man and finally the variety, frequency, and severity of the toxic reactions which may be produced by the particular drug.

Sulphonamide mixtures, for equal total dose of a sulphonamide, are much less toxic to the kidneys than are the individual components of the mixture. The systemic uses of a sulphonamide mixture are the same as those of individual components. Various mixture are now on the market.

VIII. Nitrogen containing compounds.—1. *Quinoline derivative*:—Considerable importance attaches to 8-hydroxy-quinoline which is the active component in many non-irritating external antiseptics. When used in glycerol solution in conjunction with hydrogen peroxide, 8-hydroxyquinoline is bactericidal to many gram-positive and gram-negative organisms. Its halogen and sulpho-derivatives play an important role in the treatment of amoebic infections. Three of them 7-iodo-8-hydroxyquinoline-5 sulfonic acid (Chiniofon, Yatren, Loretin, etc.) 5-chloro-7-iodo-8-hydroxy-quinoline (Vioform) and 6,7-diiodo-8-hydroxyquinoline (Diidoquin) are in common use.

2. *Acridine derivatives*:—The discovery of the antibacterial properties of acridines arose indirectly from the research for trypanocides. Early in the present century, Ehrlich found that trypanocidal properties of tryparson (a triphenylmethane dye,

similar to fuchsin) disappeared when it was fully purified. The activity of the crude preparation was traced to be due to the presence of acridines. Hence all the available acridines were examined. Acridine yellow, acridine orange, benzoflavine and chrysani-line were discarded because of their unfavourable therapeutic indices, but a quaternary compound (2 : 8-diamino - dimethyl - N-methyl acridinium chloride) proved to be still more active. Later on, acriflavine was found to be still more active. During the First World War, acriflavine and proflavine became quite valuable as the drugs of choice for the prevention and treatment of sepsis in war wounds. The true composition of Acriflavine B.P. was not known till 1934. It is a mixture of the acid hydrochloride of proflavine and proflavine - 10-methylchloride. The high acidity of both these salts was not recognised until 1943. The recognition of the toxic nature of acriflavine, the use of proflavine in a neutral form (proflavine hemisulphate B.P. 1948) and especially the introduction of 5-aminoacridine hydrochloride (Aminacrine hydrochloride B.P.) which is found to be nonstaining and to be well tolerated by tissues, all came about during the Second World War.

Compared with penicillin and sulphonamide, acridines are active against all the gram-positive and gram-negative organisms commonly found in wounds (with the exception of *Ps. pyocyaneus*) and their solutions can be autoclaved; they can deal satisfactorily with a large inoculum, they are not antagonized by P-aminobenzoic acid and they seldom cause drug-sensitivity. On the other hand, penicillin is definitely more active against gram-positive infections and both penicillin and sulphonamides can be used in gross excess without risk of causing necrosis. Fortunately, drug resistance to the best of acridines (*e.g.*, aminacrine) is quite unknown, nor would it be a vital issue if it were to occur, because these drugs are not used systemically. Sometimes these antibacterials have been combined by using penicillin or sulphonamide systemically or locally in combination with acridines applied locally.

(c) *Quaternary Ammonium compounds*:—Quaternary salts of hexamethylenetetramine were studied in 1916 during a systematic investigation of derivatives of this well-known urinary antiseptic. Twelve years later, β -diethylaminoethyl oleamide, $\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{CONHCH}_2\text{CH}_2\text{N}(\text{C}_2\text{H}_5)_2$, was introduced under the name of Sapamin. The compound was designated as an "acidic soap" since it retained its detergent character even in strongly acid solution, in contrast to the standard soaps, the alkali salts of fatty acids. Sapamin and similar amides and urethane behave as typical detergents and wetting agents. When treated with benzyl chloride or dimethyl sulfate, the corresponding quaternary salts ($\text{RCONHCH}_2\text{CH}_2\text{N}^+\text{R}'\text{X}^-$) were obtained, and these proved to be toxic to micro-organisms and to have hemolytic properties similar to those of the saponins. Their antiseptic activity

indicated that they might be useful as disinfectant soaps in conjunction with cresol and other phenolic products. Their use as water-miscible ointment bases was also recommended.

The fundamental discovery of the germicidal properties of quaternary ammonium salts as we know them now, was made by Domagk who found that all compounds of this group ($R'R'R'R'N+X^-$) could kill bacteria provided at least one radical was a long-chain aliphatic group with eight to eighteen carbon atoms. The intimate structure of this large alkyl group appeared to be immaterial. It could be branched or unbranched, and bulk, rather than the steric shape of the group seemed to be decisive. The other three valences of the ammonium-nitrogen could be occupied by like or different, usually smaller, groups of various sizes, or they could converge upon cyclic nitrogen atoms ($-N=$ or $-NR$) as they occur in the heterocyclic bases, pyridine, isoquinoline, or piperidine. The nature of the anion seemed unimportant.

The usefulness of the quaternary ammonium disinfectants was established when it was found that the substances are usually not toxic to higher animals at their bactericidal concentrations. Rarely are any cases on record in which germicidal quaternary ammonium compounds have been used systemically but they have proved their value as surface antiseptics and in the lavage of internal mucous surfaces, so long as they are not brought into the circulation.

CHEMICAL CONTROL OF ADULT FLIES

The most widely used insecticides at the present time are those of the chlorinated hydrocarbon group, but the progressive development of resistance is rendering them less effective in many parts of the world. Where it can be used, however, a 5% DDT dust or spray is known to be effective. Where it can be used a crude 4% BHC dust and a BHC spray containing 0.35% "gamma" isomer in light oil. Toxaphene and chlordane have not yet been employed to any extent in England although they have been used extensively abroad. Their mammalian toxicity is of the same order as that of DDT and both appear to have good residual properties.

Pyrethrum has long been known for its rapid paralysing effect on insects and it is still held in high esteem because its ability to cause paralysis within a few minutes has not been approached by any other insecticide. It is, therefore, often formulated with other insecticides with the object of producing a rapid 'knockdown.' The amount included is generally 0.1% pyrethrins in a kerosene or oil-base spray.

Recently several organo-phosphorus chemicals have shown promise in the control of resistant flies. They have the advantage of possessing ovicidal and larvicidal toxicity as well as a lethal effect. Their median lethal doses to insects are lower than those of most contemporary insecticides, but the toxic hazards to warm-blooded animals are correspondingly higher. The three substances which seem to be worth further investigation are parathion, malathion and diazinon.—(*Rev. San. Inst. Jour.*, July 1955).

SOCIAL IMPACT OF MEDICINE*

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THE evolution of medical art is a most fascinating chapter in the history of mankind. It is said that disease is as old as mankind and man must have always been in search of means for the alleviation of pain and of the ills which his flesh is heir to. Whether disease was treated by magic, religious rituals, herbs or physical agencies, the underlying idea has always been the same. The fundamental aim of primitive religion and of primitive medicine was to safeguard the life of the individual and the steps taken to effect this were strictly rational, although many were based on false premises. From earliest times religion and medicine have had a similar objective—medicine endeavouring to control natural processes by natural means and religion trying to control the same phenomena directly by appeal to a higher power. To combat disease certain rites and procedures were used, the efficacy being inherent in the rites themselves or in the user: this constituted magic. Medicine, religion and magic therefore, have thus pulled together over a long time for the alleviation of human suffering.

Through the ages, medicine had a chequered history but has been able to record phenomenal success during the last fifty years. Pasteur opened up the great field of pure as well as applied bacteriology. Lister, realizing the significance of Pasteur's researches on fermentation and of the biological process involved in wound infections, introduced antiseptic methods in surgery which were soon followed by aseptic measures, with the help of both of which surgeons are now able to operate in perfect safety. Microbiology brought to light the hidden agents causing infectious disease and the discovery of viruses (ultra-microscopic forms) enabled medicine to postulate the causative factors of smallpox, infantile paralysis, epidemic influenza and yellow fever. In the field of investigation of diseases associated with nutrition, the last fifty years have seen enormous developments in our knowledge, pertaining to vitamin deficiency. Endocrinology, has also made significant advances in the diagnosis of many diseases, the causative agents of which were hitherto shrouded in mystery.

In the realm of chemotherapeutics, Ehrlich's researches paved the way for new chemicals. Prontosil, the first of the sulphonamide drugs, was introduced in 1935 and was found to be a powerful weapon in the cure of diseases caused by the streptococcus, e.g., puerperal sepsis and scarlet fever. Prontosil gave a fillip to synthetic research which led to the production of the sulphonamides that were found effective against other bacteria. During

the Second World War, another valuable chemical, sulphaguanidine was tried and found very effective in the treatment of dysentery.

A chance observation has frequently set in motion a train of thought and action. Sir Alexander Fleming's discovery of penicillin proved to be the precursor of the many and varied antibiotics which have since come into being and revolutionized the fields of medicine and surgery.

The importance given in modern times to preventive medicine has opened up an altogether new vista in medicine; it has enabled the medical profession to turn its attention from the individual to the community and made them look for the cause of disease not only in the individual but also in the environment (physical, social and psychological) in which the individual resides and derives his sustenance. There is thus a quantitative as well as a qualitative change in the relation of medicine to society.

Right from antiquity, medicine has had a two-fold purpose: the alleviation of pain and the cure of diseases. Time was when the inexorable forces of nature were taking their toll of human lives but in proportion medicine was able to delve into the causes of disease and apply remedies to the extent that it could attempt to save life. But the phenomenal success of modern methods and techniques in preventive and curative medicine, particularly the use of antibiotics, in saving a large number of lives, has created fresh problems both social and psychological which were not even dreamt of by the early pioneers of medical science.

It might look paradoxical but it is a fact borne out by experience that while solving one problem and providing means for technological advances, research creates important new problems, which are not necessarily scientific, but are often social and economic. Pharmaceutical and medical researches, are no exceptions. There can be no doubt that modern researches in medicine have advanced the nation's health and added years to man's life, as evidenced by vital statistics and other relevant data. But it is not sufficiently realised that in accomplishing this, complex socio-economic problems are confronting humanity; concern is expressed in official circles as well as among the public, over the potential effects of the devastating physical forces that man has learned to release but only partially to control; and this great concern has obscured the other important but perhaps less dramatic problem, that has arisen from man's learning to control the insidious forces of nature that reveal themselves as infectious diseases.

In an industrially backward country like ours, it is evident that in proportion to the preventive and ameliorative measures that are applied to improve the standard of the people's health, there is an increase in population which directly creates social and economic problems that baffle all thinking people.

It is an admitted fact that in industrially advanced countries a curious demographic trend is discernible. The control of disease by new remedies has made a shift in the structure of population towards an increase in the number of people in the upper age groups. This is largely due to improved health and sanitation, both of which are the results of fundamental biological research. This change was proceeding very slowly until recently, and at the expense of the industrially backward countries the forward countries could partially adjust to these changes in the population structure. But in the last decade this problem has become accentuated and on good authority this accentuation is attributed to the therapeutic use of antibiotics. Let us now see how this change in the structure of population affects the social and economic balance. An increase in the old age-group in a given population means two things:—(1) a decreasing population of industrially active and productive age-groups; and (2) this decreasing group is required to support the increasing population of elderly people, who, for no fault of theirs are denied the privilege of working and who, industrially speaking, are non-productive. Whether they are supported on an individual basis or by social security arrangements like old age pensions etc. is immaterial, for the fact remains that a smaller proportion of the productive age-group is required to support this increasing segment. This is an economic impact of modern medicine.

But over and above the economic problems arising from a rapid change in the populations structure, there are serious medical and social problems which may be even more important. Prominent among these are matters of physical and mental health. Man is essentially active in his habits and wishes to be busy. Modern medicine has enabled him even in his advanced age to be physically fit and mentally alert. In America many business concerns are loath to hire new workers over 40 or 45 years of age. In the absence of employment, who will provide them with the necessities of life? 'Social security' will furnish the answer to this predicament. How far society whose productive age-group is diminishing will be able to foot the bill is a serious problem. But even admitting its limited possibilities it will be desirable to probe into the psychological climate of these old men. One can imagine how depressing it would be to the morals and spirit of a man or woman in good physical condition to be retired from business just because of age! These men of flesh and soul who have acquired skill and experience are still in a position to make notable contributions to society. They may consider themselves useful or even necessary to the society. When useful occupation is denied to them, a mental let-down resulting in premature senescence is bound to be created in them and that again is a major problem which faces the medico-social workers and psychiatrists of today. Research has

given these men and women more years to live but the problem of giving life to those years remains to be solved.

This impact of medicine referred to above may not be applicable to our Indian society just yet but as stated above we have other problems created by the application of preventive and curative medicine. Dr. K. C. K. E. Raja, in his instructive address before the 3rd International Conference on Planned Parenthood states: 'The result of a successful programme to deal with any of the major diseases of India will be to give a considerable impetus to the growth of population. It has been estimated that a million deaths a year in India are directly due to malaria and that it indirectly helps to produce another million deaths through intercurrent diseases.' If, of these two million deaths, about 60 per cent are prevented by anti-malarial operations, an increase of 1.2 million will be made to the annual rise in population. He further stated, 'Preventive health measures in other directions can, on a conservative estimate, help to save another million or a million and a half.' If child-welfare and maternity-care and other life-saving activities of modern medicine are taken into consideration, the net addition that these measures will be contributing to the total net surviving population may be easily imagined. All these factors have their impact on the social and economic structure and balance of our society.

The effects of modern medical research and its application are summarised very beautifully by Dr. J. C. Hawksley, M.D., Ph.D., F.R.C.P., in his illuminating article contributed to the *"Symposium of Scientific Thought in the 20th Century"* wherein he says:—
 "(1) Fewer people die in infancy and youth, more live to old age; (2) more people, therefore, suffer and die from diseases common to old age; some of them from degeneration due to old age; (3) more people therefore, require care and treatment for diseases of old age; (4) more care is taken of sick members of the community; (5) the community has become more health-conscious and more disease-conscious; (6) the torch of medical progress and more bright in backward and disease-ridden communities and this has led to the cure and prevention of disease and to making unhealthy tracts of country habitable. It is also enabling population to increase at a rate incompatible with the necessary food production; (7) two furious wars have acted as an enormous stimulus to applied medical research; (8) the complexity of medical science is requiring more organisation, more investigation and more legislation and may be producing more psychoneurosis; (9) it has yet to be shown that those who, as the result of all this progress, live longer lives, live happier lives, or consciously endeavour to remain healthy, keep the community happy."

This resume might evoke conflicting emotions in the minds of medical men. To the individual patient and his family

modern medicine has without doubt, brought relief and thousands of mothers and fathers have heaved a sigh of relief, as their children have been saved from illness which 50 years ago would have killed them. This certainly is a great benefit in terms of emotion. But at the same time, it cannot be denied that medical research has created other grave problems which in their turn have given rise to an imbalance in the fabric of our social organization. That is a paradox and a dilemma which medical science has to face and face squarely. Prof. A. V. Hill drew attention to this ethical dilemma when he touched upon some of the vital, ethical, social and international problems arising primarily from advances in modern science and technology. Prof. Hill was not speaking to the medical profession alone, as the dilemma which he posed before those attending that session of the British Association for the Advancement of Science was faced equally by modern medicine.

Medical science in its isolation may be amoral but medical men who practise medicine as an art and as a profession cannot divest themselves of moral and philosophical problems. The dilemma in which modern medicine has landed us will have to be faced and a solution found which must of course be consistent with the spirit and tradition which have inspired medical men for ages. Humanitarian ideal forms the basis of all medical art and our actions therefore, must never cross-grain that ideal. Medical science cannot abdicate from the task of saving a single soul which it can save.

In the beginning of its evolutionary career medicine was associated with magic and religion. In this era of knowledge and scientific advance both magic and religion have lost their sanctity and reverence, as medicine has long ago severed those umbilical cords which had bound it with magic and religion. Return to that pristine order of things is no longer possible nor desirable. If medical science is to be of increasing benefit to mankind at large, the dilemma must be solved. A solution may be found by considering the social dynamics of the present-day society and medicine will have to align itself with other branches of the social sciences, if it is to avoid possible frustrations.

SOCIAL IMPACT OF GERIATRICS

Nearly everyone recognizes that the population of this country (U.S.A) (and of the whole world) is increasing markedly and that the most remarkable increase is in the number of persons surviving past 65 years of age.

This increase is not due to any appreciable acceleration of the birth rate but rather it is due to increased survival rate after birth. Greater numbers of persons are surviving more of the hazards of life and live to a greater age than ever before. As a result, life expectancy has increased greatly during the past 50 years. So naturally there is an actual increase in the number of persons over 65 in our population, which is estimated at the present time to be 14,000,000.

A gradual social evolution is taking place, apparently, or we seem to be changing from an older society. What is the social impact of the large number of persons now living past 65 years of age in the U.S.? The healthy person who has been forced to retire at the age of 65 faces a problem, which presents one of the most far-reaching psychological effects of the aging process, especially to those who have worked hard during the major part of their lives. Forced retirement often imposes a great hardship on a man or woman accustomed to work.

Too many persons are retired simply because they have reached the chronological age of 65 years, when as a matter of fact a large percentage of them are mentally and physically quite capable of continuing in some productive capacity for an indefinite period.

Retirement is rejection, and rejection is devastating both psychologically and sociologically. It decreases one's stature, deflates one's ego and takes away the incentive for that morning shower, shave and shoe-time, that makes one feel so good and dispels depression. To be 'put on the shelf' intimates uselessness, and of endeavour in which one has been associated for a long time and with the friendship of fellow-workers in that field is to take away one of the great pleasures of life.

Retirement is not the rosy *Nirvana* that some hard working persons envisaged it to be. After a few weeks or a few months, it becomes a dreary existence that gradually becomes more and more detached from the rest of the work-a-day world.

Forced retirement at the age of 65 seems arbitrary and unreasonable. Employed persons are much happier than idle ones and they continue to live longer. It is doubtful if the American economy can withstand indefinitely the impact of having all persons over 65 cease work and expect to receive pensions, no matter where the money comes from. It is a most tragic waste to the national economic community to permit persons with long training in the various skills to become unproductive. Experience and wisdom are valuable assets not to be discarded lightly.

If retirement is mandatory on a basis of age alone, it is better to retire to another activity than to retire from all activities. Those who do the latter become patients with problems that are not amenable to ordinary medical treatment. Physical and mental deterioration begins to take place. Dissolution sets in. Senescence becomes a reality.

Reports on mental disease indicate an alarming increase in the incidence of aberrations of the mind ranging all the way from simple unjustified fears to overt mania. Apparently the ratio of mentally ill to total population is considerably higher than it has been heretofore and the increase is real.

Among the numerous contributory causes for increased mental illness may be mentioned several devastating wars; economic depressions; great fluctuations in purchasing power; great wealth and great poverty in the same precinct; spreading of false alarms by way of newspapers, radio and television; too much publicity to unhealthy literature and hired pressure groups disseminating fallacious economic theories.

Danger is said to assail us from many quarters and some of these hazards have been real enough to make the strongest man quail. Fear, frustration and feelings of insecurity develop beyond proper proportions. Stress, apprehension, hostility and aggression are the natural psychological reactions to such a conditioning process. All this is reflected in the rising burden of mental illness that is becoming a modern national problem.—(*The Jour. Mich. State Med. Soc.*, May '55).

STAMMERING*

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A CHILD may be considered to stammer or stutter, if, from time to time, he is forced to interrupt his natural flow of speech by the repetition of any sound or by a total blocking.

There are hesitations, irregular contractions of the muscles of speech, spasms and spasticity in the mechanism of speech of such a child.

The causes of the condition, apart from those arising from any lesions or disease of the muscles and nerves concerned in the speech mechanism, are still uncertain. Indeed the ætiology of the condition is still unknown as also its treatment.

It is doubtful if heredity plays an important part in its occurrence though the defect often runs in families. This may be explained by two factors:—impressions on the mind of a young child and mimicry—both belonging to the realm of psychology.

Children of all communities go through a period of language-learning during which their speech is normally quite hesitant, repetitious and non-fluent. In all communities where a high premium is placed on fluent speech, older children and adults who suffer from speech-defects of any kind are liable to be ridiculed at or to experience some form of "social stigma." The best example of this is today of course among the "Civilized."

Under these conditions, parents of language-learning children are likely to be extremely anxious, lest their normal hesitation and repetitions develop into the speech-habit we call stammering. As a result, these parents often patiently and firmly focus the child's attention on his own speech saying "speak slowly" "say that again," "take a deep breath" or even finishing his sentence for him—making him try much harder to speak faster or slower. In this way, the anxiety of the parent is generalised in the child who attaches it to his own speech.

There is probably a high correlation among the educated classes between the incidence of stammering and the degree to which the early non-fluency of the children is stigmatised, particularly by parents. Constant corrections and continual linguistic demands made upon the child surely form one of the factors which very often lead to the fixing up of the habitual repetitions and hesitations which constitute stammering. If the child is left alone and his defects of speech entirely ignored, the tendency may disappear.

It is known that the incidence of stammering is not common in some of the primitive "cultures" and there are others who do not

* (Read at the Annual General Meeting of the Assam Branch of the British Medical Association held at Jorhat on the 12th February 1954).

stammer at all. Their language or dialect even lacks altogether a word for the affliction. The incidence is influenced by (1) the importance of speech-fluency in the culture; (2) the social attitude towards defects; and (3) the parent's attitude towards the speech of their language-learning children.

In communities where little or no attention is paid to the importance of speech-fluency and where no stigma is attached to defects of speech, the incidence of stammering is very rare.

A very good field for investigation and enquiry into the incidence of stammering found among different cultures and communities is perhaps to be found among the labour and other populations of the Tea Gardens of Assam where there are diverse kinds of people drawn from different areas. Yet living in the state of Assam for two or more generations, many communities have avoided getting 'mixed up' by intermarriages with other communities.

Among the tea-garden labourers are many communities or castes who originally came from other parts of India widely separated from each other. They are mostly descendants of the aboriginal tribes who originally inhabited the country before the Aryan or Mongolian encroachments. These folk have still clung to their own "cultures" and have not really got absorbed into the other races and tribes inhabiting Assam.

Most of these tea-garden labourers have retained their own dialects and have no written script, their vocabulary being very limited, hardly any of them are literate, especially among the older generations. I have not come across a single case of stammering among these labourers and their children. I was not able to find a word for stammering or stuttering in any of their dialects. Hardly any of these labourers know the Bengali or Assamese word for it. Turning to the other inhabitants of Assam, workers among the different tribes of Nagas, Mikirs, Mishmis, Abors etc., I have also noticed the absence of stammerers.

As regards the Hindus, Muslims, Ahoms and others in Assam, the incidence of stammering is fairly common among the literate in these communities whilst among their non-literates the stammerer is a *rara avis*. I have yet to come across one amongst them. The same remarks apply to other parts of India.

As the language-learning children among the non-literates do not develop any significant hesitations or even if they did to a slight extent, I believe it is not taken any notice of, by the parents. They have a totally negative attitude towards speech-fluency and they do not ridicule or expose speech-defects as a social fault. In fact the occasion to exercise a positive attitude has been absent so far.

To summarise, it is noticeable that the incidence of stammering is as frequent among the literate population of Assam as in any other country but is remarkably absent among the non-literate communities in the population.

LOFFLER'S SYNDROME*

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THIS is a syndrome characterised by a symptomatic transient pulmonary infiltration, benign course and eosinophilia. This was the original description by Löffler in 1932.

Many cases however have been found to present symptoms and the similarity to tropical eosinophilia or Weingarten's syndrome has been noted.

Aetiology.—Helminthiasis has been suggested as a cause. This was also the original finding of Löffler, but many cases have been reported where parasites could not be found. In the symptomatic cases the following have been noticed:—(a) bronchospasm; (b) cough without or with little expectoration; (c) loss of weight; (d) fever and (e) eosinophilia.

The percentage of eosinophiles varies from 8 to 64%. Most of the cases cleared spontaneously and the eosinophiles dropped to 1%; otherwise the blood count was fairly normal.

X-ray findings:—Patchy shadows were seen.

Table I showing differential diagnosis

Tropical eosinophilia (Pulmonary eosinophilosis)	Löffler's	Asthmoid bronchitis
(a) Marked leucocytosis	(1) Moderate leucocytosis	No leucocytosis
(b) Marked eosinophilia	(2) Moderate eosinophilia	Slight eosinophilia
(c) Disseminated mottling in the lungs	(3) Transient infiltration	No pulmonary infiltration

TREATMENT:—For many years there was no known treatment. The condition was believed to be allergic in character and many anti-histamines and other anti-allergic measures were tried with little or no effect. Cortisone and ACTH have been found to produce good response, the dose being 100 mg. every 4 hours for 3 days. Cortisone was given (100 mg. twice daily) until the lesion cleared. Before the advent of Cortisone, blood transfusions were used with excellent results.

It is sometimes difficult to place properly a case of eosinophilia with pulmonary infiltration, whether it is the tropical eosinophilia or Löffler's. Greig regards the two to be identical. Apple and Grant suggest the fresh 'eosinophilic pneumonopathy syndrome' to

* Specially contributed to the ANTISEPTIC

describe the various conditions with combinations of eosinophilia and pulmonary lesions. In this term they include Löffler's syndrome, tropical eosinophilia, bronchial asthma and some intestinal infestations. Löffler's syndrome is described as a mild self-limiting disease with few symptoms. (Dr. Louis Mark has recently described cases of definite symptomatic types in the *Journal of Diseases of the Chest*). In contrast to tropical eosinophilia there is less leucocytosis and less eosinophilia. The pulmonary lesions change rapidly.

The typical picture of tropical eosinophilia consists of pronounced eosinophilic leucocytosis, fever, asthmatic bronchitis with diffuse mottling and nodulation in both lungs. Some observers have noted splenomegaly in a high percentage of cases. It is a chronic disease that occurs only in damp tropical climates. Confirmation of the diagnosis is made by the response to arsenic treatment.

Until the ætiology of the conditions is established or a clearer clinical picture can be differentiated, it would be reasonable to include all cases, presenting eosinophilia, infiltration under the general heading "eosinophilic pulmonary pneumonopathy syndrome."

The syndrome can be divided into three major categories:—
 1. *Unknown ætiology*:—Löffler's syndrome and tropical eosinophilia.
 2. *Known ætiology*:—Parasitic infestations and plant pollens.
 3. *Associated with other diseases*:—Eosinophilic leukæmia, sarcoidosis and pulmonary tuberculosis.

PULMONARY EOSINOPHILIA

Crofton *et al* have described a group of diseases in which, at one time or another, infiltrations are observed radiologically which are accompanied by a blood eosinophilia. Löffler's syndrome includes only a section of this group. They consider all the conditions they observed in pulmonary eosinophilia are probably diseases of adaptation. ACTH has been successfully used in asthma and a case of Löffler's syndrome is said to have responded well; the details of the case suggest that it should be classified as pulmonary eosinophilia with asthma. These authors have cited the records of 16 cases and suggest that the syndrome of pulmonary eosinophilia represents a peculiar reaction of the body to various stimuli; this reaction is probably one of hypersensitivity. When the hypersensitive reaction is brief and involves only the alveoli, the manifestation is a simple pulmonary eosinophilia. When the bronchi are also involved the condition becomes 'pulmonary eosinophilia with asthma' or possibly when the precipitating factor is a bronchial infestation, 'tropical eosinophilia.' If there are, in addition, gross lesions of the blood vessels, there will probably be lesions of other organs and the condition may go on to the full picture of polyarteritis nodosa. Thus both clinically and pathologically there is a continuum from the simple abnormalities of Löffler's syndrome to the severe and often fatal polyarteritis nodosa. (*Thorax*, 7: 1, via *Med. Ann.*).

HEPATOLENTICULAR DEGENERATION*

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Definition.—"A progressive disease of early life which is frequently familial and is characterised pathologically by degeneration of certain regions of the brain, especially the corpus striatum, and cirrhosis of the liver, and clinically by increasing muscular rigidity and tremor." Tetanoid chorea and pseudosclerosis and some examples of torsion spasm do come under hepatolenticular degeneration.

A degeneration of ganglion cells with neuroglial overgrowth conspicuous in lenticular nucleus, and a multilobular hepatic cirrhosis often with associated splenomegaly constitute the pathological picture.

A preceding hepatitis is not to be blamed. A disturbance of copper metabolism is suggested. That this condition may be familial and even hereditary has been suggested with insufficient proof, but it occurs usually between 10 and 25 years.

Tremors gaining the status of tetanoid spasms; flexor rigidity and mask-like facies as in Parkinsonism; impairment of articulation and deglutition; involuntary laughing and crying and mild dementia are all present. Corneal pigment (Kayser and Fleischer), when present, is diagnostic, and symptoms of hepatic cirrhosis may precede the nervous manifestations.

DIAGNOSIS:—Tremor and rigidity, corneal pigmentation, and hepatic cirrhosis occurring in early adolescence mean hepatolenticular degeneration; but corneal pigmentation and hepatitis may not always be present. The condition is generally familial and fatal.

Double athetosis-Hallervorden-Spatz disease (no liver damage) and progressive pallidal degeneration are conditions to be eliminated.

Illustrative Case Reports:

CASE 1.—A girl, aged 9 years was admitted for jaundice and dysphagia of one week's duration. She was in a state of moderate nutrition with congenitally absent eyes. Conjunctiva and skin yellow. Apyrexial. Knock knee present. Cries and laughs, and swings from side to side while seated. Tremors of hands present. Abdomen is tumid. Liver and spleen are felt and one inch below the costal margin. Heart and lungs showed *nil* particular. Nervous system:—Emotionally unstable. Patient is dirty and naughty in behaviour with unprovoked laughter and cries. Tendon jerks and plantar responses are normally present. No sensory changes. Urine contained no sugar and no albumen. Bile pigments were present. *Blood test*: Kahn negative. X-rays of skull: vault bones appear thickened. Anterior fontanelle area appears thinner. (*Figs. 1 and 1-a, see p. 686*).

CASE 2.—A boy, 12 years old, was admitted for dysphagia of 16 days' duration. *Family history*:—Patient is the only male out of five children. Parents

* Specially contributed to the ANTISEPTIC.

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RESERPINE IN THE TREATMENT OF HUNTINGTON'S CHOREA

George Huntington (1872) in his new classic essay on hereditary chorea noted its hereditary nature, its tendency to lead to insanity and suicide, and its manifestations as a grave disease only in adult life:

"Its most marked and characteristic feature is a clonic spasm affecting the voluntary muscles. There is no loss of sense or of volition attending these contractions: the will is there but its power to perform is deficient..... but there seems to exist some hidden power, something that is playing tricks upon the will and in a measure thwarting and perverting its designs; and after the will has ceased to exert its power.....taking things into its own hands and keeping the victim in a continual fidget as long as he remains awake."

There is no known effective therapeutic measure for halting the un-remitting progression of this disorder. Home or institutional management of patients with chorea is difficult. Goldman in 1952, reported the successful use of oral procaine amide. In 1954, De Myer was unable to confirm the usefulness of this medication.

Dr. Chandler of Michigan since studied the effect of Reserpine on the involuntary movements seen in patients with Huntington's chorea. The mode of action of this drug is obscure. Findings indicate that the alkaloid demonstrates a basically new principle of pharmacologic action: it probably reduces sympathetic activity by centrally blocking afferent stimuli. The central effects of Reserpine may be even more general; it may influence transmission of impulses, depending on dosage level, both in the autonomic and somatic nervous systems.

There are no accurate objective methods of measuring choreic movements but motion picture analysis is the nearest approach to quantitative evaluation, offering the opportunity of repeated study and visual comparison. In the present study, motion pictures were taken of the patient sitting with the back unsupported. Protrusion of tongue, finger-to-nose test, knee-jerk reflexes, and gait were photographed. Dr. Chandler's patients were two half-sisters with Huntington's chorea. Thorough neurologic examination and motion picture records were made before treatment with Reserpine was begun. The patients lived at home and returned at monthly intervals for follow-up examinations and motion pictures; observations made by the patient's family were recorded at each visit. Reserpine was administered initially in a dose of 0.25 mg. by mouth three times a day, and increased by the end of the first month to 0.5 mg. four times a day. Both patients were normotensive. In this pilot study of Huntington's chorea. Reserpine appears to have diminished the involuntary movements in two patients. One patient exhibited a reduction in emotional lability. The second patient had a long history of depression, and had attempted to commit suicide one year before treatment. She was ecstatic during the first six weeks of Reserpine Therapy, but became very depressed. Reserpine was discontinued after three months, when the patient attempted to commit suicide; seven days later involuntary movements returned, and the depression persisted.—(Univ. Michigan Med. Bull., 21: 4, April 1955).



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I. Fat soluble vitamins are:—(1) Vitamin A. (2) Vitamin D (3) Vitamin E and (4) Vitamin K.

1. *Vitamin A*:—It is an unsaturated alcohol present chiefly in liver, fatty fish, milk, eggs and cod liver oil. Its main precursors are *alpha* and *beta* carotenes which occur as yellow pigments in plants like carrots, spinach, turnips etc. It is stored in the liver. A deficiency of Vitamin A has been shown to affect the integrity of the epithelial cells at certain places. Lesions are also produced in eyes, bone, teeth and the nervous system. No relationship has yet been found between the distribution of Vitamin A and the occurrence of the various changes. Wolbach has explained the pathogenesis of the epithelial lesions as "atrophy of the epithelium concerned, reparative proliferation of the basal cells and growth and differentiation of new products into a stratified keratinizing epithelium."

In the digestive system, parotid, submaxillary, sublingual, and all the accessory glands of the tongue, buccal cavity and pharynx, and the ducts of the pancreas etc. may be involved. This may interfere with digestion and absorption of food and a state of inanition may result. In the respiratory system, keratinising metaplasia is seen in the nares, sinuses, larynx, trachea and bronchi. In the trachea, the condition starts as focal areas of atrophy of the columnar epithelium which spread so that the entire trachea may come to be lined by the metaplastic epithelium. Keratinisation results in the lumen of the trachea being occupied by debris of keratinised material. Due to the abolition of the streaming of the surface material towards the pharynx a protective mechanism of the host thus gets eliminated. Therefore, pulmonary infections like bronchitis and bronchopneumonia are common. Bronchiectasis may also occur.

In the urinary tract, the renal pelvis, ureter, bladder, urethra etc. may be affected. Keratinised debris may form a nucleus for stone formation in any of these sites. In the genital or reproductive tract, the epididymis, prostate, seminal vesicles, uterus, glands of the vulva and vagina may be affected. In the male, germinal epithelium may atrophy and aspermatorrhœa with sterility may result. In the female, death of the foetus occurs *in utero*. Mason thinks this is due to an alteration in the lining at the junction of the foetus and maternal tissues, resulting in localised areas of infection and necrosis which interfere with the nutrition of the embryo.

Significant manifestations in the ocular apparatus also occur. There is drying up of the cornea (xerophthalmia) and metaplasia of the corneal epithelium (keratomalacia). Xerosis is perhaps due to the diminution of the secretion of the ocular glands because of obstruction in their ducts by the of keratinising metaplasia. The cornea may get ulcerated (keratomalacia) and

infected. Mellanby suggests that the corneal lesion may be due to loss of the neurotrophic control of the cornea by the ophthalmic division of the trigeminal nerve, for degeneration of the myelin sheath of that nerve develops at the same time as the corneal degeneration. In the retina, Vitamin A combines with protein to form visual purple, a substance in the rods of the retina and which is concerned with dark adaptation. Thus Vitamin A deficiency leads to night blindness or nyctalopia. Bitot's spots—another manifestation of Vitamin A deficiency—are seen as small yellowish areas in the conjunctiva.

In the skeletal system, growth is retarded and in the nervous system (in animals), degenerative lesions in the posterior and lateral columns of the spinal cord may be seen. Teeth also suffer. Odontogenic epithelium is affected and dentine is formed irregularly. There is great reduction in the deposition of enamel. Thus pyorrhœa alveolaris may develop.

2. *Vitamin D*:—It is present in butter, milk, egg-yolk, cod-liver oil etc. It appears to be an isomer of ergosterol, being formed from it as the result of the action of the ultra-violet light (calciferol). This vitamin can be developed in human tissues from the sterols of subcutaneous fat by ultra-violet irradiation, thus affording a natural substitute mechanism in the event of inadequate dietary intake, *only* if there is sufficient exposure to sunlight. Vitamin D controls calcium metabolism and has two distinct functions *viz.*: (1) to increase the absorption of calcium from the gastrointestinal tract; and (2) to increase the excretion of phosphorus in the urine. The effects of Vitamin D deficiency are manifested in the bones and teeth. Rickets develop in the skeletal system of infants and osteomalacia in adults. In rickets which is a deficiency disease, the lack of calcium, phosphorus and light, besides Vitamin D, have also to be taken into consideration. The essential rachitic lesion is an abundant formation of osteoid tissue which fails to get calcified. The epiphyseal line is markedly irregular and is widened not only in depth also laterally, thus accounting for the nodular swellings of the ribs and at the ends of long bones. It affects infants before the sixth month of life and rarely remains active beyond two years although the deformities may become permanent. The final outcome of the various pathological changes is a variety of skeletal deformities *e.g.*, genu varum, genu valgum, enlargement of the ends of the long bones, kyphosis, deformity of the pelvis and deformity of the thorax. The latter may be severe enough to lead to respiratory embarrassment. Osteomalacia, the adult counterpart of rickets is seen almost always in women who have been depleted of their calcium through multiple pregnancies and in whom calcium cannot be laid down in the bones due to the deficiency of Vitamin D. Generalised osseous decalcification with softening of the bones results. The condition resembles osteitis

fibrosa but in the latter, the calcium is removed from the bones due to parathyroid hyperactivity.

Teeth in Vitamin D deficiency are uneven, poorly calcified, dull and discoloured and much predisposed to caries.

3. *Vitamin E*:—It is also called the "anti-sterility vitamin," and is found chiefly in wheat germ oil but also in green leaves, cereals and nuts. An alcohol called tocopherol which was identified from wheat germ oil by Evans, Emmerson and Emmerson has strong Vitamin E activity. The active principle has strong anti-oxidant properties and it has been suggested that *alpha* tocopherol "acts as a break on the oxidative mechanism primarily of skeletal muscle and in its absence these oxidative processes in muscle run riot." Its main functions are three:—(a) in helping the development of the embryo; (b) in maintaining the integrity of the germinal epithelium; and (c) in the maintenance of the metabolism of the striated muscle *in vitro* and structure *in vivo*. In the female, Vitamin E deficiency leads to death of the foetus in rats by the thirteenth day. Examination of the placenta reveals a marked retardation and an underdevelopment of the vascular invasion by the foetal vessels. In the male, the germinal epithelium of the testis undergoes irreversible injury even before it can be detected morphologically. Sterility results. This is quite different from what occurs in Vitamin A deficiency and inanition where repair is always possible. In the muscles, deficiency leads to swelling and hyalinisation of the muscle fibres which then become necrotic. There is leucocytic infiltration and proliferation of the sarcolemma nuclei. Many of the necrotic muscle fibres are infiltrated with calcium salts. All these changes are reversible upon the administration of *alpha*-tocopherol. Mason and Emmel have studied a curious pigmentation occurring in Vitamin E deficient animals. Small globules of pigment are formed in the uterine muscle fibres, interstitial cells of the testes, lymph nodes, spleen, fat, macrophages of liver, bone marrow, lung, kidney, voluntary and cardiac muscle. The pigment is acid-fast and is taken up by macrophages which are, however, incapable of digesting it.

4. *Vitamin K*:—This was shown by Dam and Schonheyder (1934) to be fat-soluble. It is present in spinach, carrot tops, alfalfa, cabbage and soya-bean oil. Its function is related to the formation of prothrombin which is formed in the liver. In hepatectomized dogs, large amounts of Vitamin K fail to affect the plasma prothrombin level. Vitamin K deficiency is evidenced by a reduction in the blood-prothrombin level which leads to hæmorrhages in various parts of the body. Clinically, hypoprothrombinæmia resulting in hæmorrhagic manifestations is observed in conditions like obstructive jaundice, sprue etc. and in diseases of the liver e.g. cirrhosis, amyloidosis etc. Vitamin K has also been shown to affect materially the prothrombin levels and bleeding tendencies in new-born infants.

II. Water-soluble vitamins.—This group comprises:—(1) Vitamin B complex; (2) Vitamin C; and (3) Vitamin P.

1. *Vitamin B complex*:—Identified by Eijkman first in 1890 from rice polishings, this vitamin is present in the germ of seeds and in many vegetables and other foods. Eleven substances contained in the Vitamin B complex have so far been isolated, viz., (a) Aneurine or thiamine; (b) Riboflavin or lactoflavin or Vitamin B₂; (c) Nicotinic acid; (d) Pyridoxine or Vitamin B₆; (e) Folic acid; (f) Pantothenic acid; (g) Biotin; (h) Choline; (i) Para-amino-benzoic acid; (j) Inositol; and (k) Vitamin B₁₂. Aneurin and other B group vitamins are synthesized by the bacteria of the intestine and this endogenous supply may make good a deficient intake of these vitamins in the diet.

(a) *Thiamine*:—Aneurine pyrophosphate acts as a coenzyme to the enzyme carboxylase essential for proper cellular metabolism. Thiamine deficiency leads to a clinical condition called beri-beri which may be dry or wet. In the dry variety, the neuromuscular system is affected. There is degeneration of the peripheral nerves, nerve roots and certain tracts of the spinal cord resulting in paresthesias, anæsthesias, disturbed reflexes, muscle tenderness and weakness. Both the sensory and motor nerves are affected and undergo a non-inflammatory atrophic degeneration. In the wet variety (also called cardiac beri-beri), there is increase in the weight of the heart (partly due to dilatation and partly due to hypertrophy), elevation of venous pressure, cardiac failure and œdema. Electrocardiographic changes are also prominent. Wernicke's encephalopathy, a syndrome characterised by oculo-motor palsies, ataxia, and mental changes associated with gastro-intestinal disturbances, is often improved by the administration of aneurine. It is, however, unlikely that uncomplicated thiamine deficiency ever occurs in man under natural conditions.

(b) *Riboflavin*:—This is the coloring matter present in skimmed milk. It is phosphorylated in the intestines and the resulting riboflavin phosphate combines with a protein to form the yellow respiratory co-enzyme which Warburg has shown to constitute a portion of the normal oxidative mechanism of the living cells. In conjunction with aneurine and nicotinamide it probably functions in carbohydrate oxidation. Its deficiency was studied in a group of women by Sebrell and Butler by giving them an experimental diet. After a variable period changes appeared around the mouth and nasolabial folds. There was cheilosis-fissuring or maceration of the angles of the mouth, reddening of the lips and thinning of the mucosa. The naso-labial folds showed a scaling greasy dermatitis. There was in addition, vascularisation of the cornea and glossitis. In experimental animals cataract, nervous manifestations and congenital abnormalities have also been noted.

(c) *Nicotinic acid*:—It is present in meat and liver. In 1926, Goldberger demonstrated its presence in yeast also. Its deficiency occurs in the poorly nourished or those whose staple diet is maize; it leads to a clinical entity called *pellagra*, which is usually characterised by changes in the skin, tongue, buccal cavity, œsophagus, colon and nervous system. In addition there may or may not be anæmia of the macrocytic or microcytic type. There is interference with the normal metabolism of the skin with resulting hyperkeratosis and parakeratosis. Sebaceous glands may become atrophic. Heat and sunlight seem to favour the distribution of the lesions. In the buccal cavity and over the tongue, the lining epithelium may atrophy with the formation of necrotic ulcers. There is extensive dilatation of vessels and glossitis. Atrophic disturbances are also met with in the epithelium of the colon with ulceration and gastro-enteritis. In the nervous system, chromatolysis of the ganglion cells may occur.

(d) *Pyridoxine*:—In 1926, Goldberger and Lillæ described a "pellagra like" condition in rats. However, Gyorgy and his associates showed that pyridoxine is necessary to cure the pellagra-like dermatitis in rats. Spies *et al* observed in a group of human patients a syndrome characterised by extreme nervousness, insomnia, irritability, abdominal pain, weakness and difficulty in walking; its role lies in the maintenance of proper nutrition and functioning of the nervous system. Certain cases of cheilosis are also believed to be cured by this vitamin therapy.

(e) *Folic acid*:—or the lactobacillis-casei-factor is present in a combined or conjugate form in the liver, yeast, milk and green vegetables. Deficiency may arise either from diminished intake of the foodstuffs containing the conjugated vitamin or from failure to break down or utilise the conjugate. It has been proved to be of great value in the treatment of macrocytic anæmias like pernicious anæmia. It converts a megaloblastic bone-marrow into normoblastic. The mechanism of this action is not clear and no relationship has so far been shown between folic acid and the intrinsic or the extrinsic factors of Castle or the erythrocyte maturation factor of the liver. Its effect on the nervous manifestations accompanying the various macrocytic anæmias is also not very clear.

(f) *Pantothenic acid*:—Its significance in man is not yet sufficiently known. In rats, mice, pigs etc., its deficiency causes various pathological effects *e.g.*, scaly and erythematous dermatitis and alopecia, also diarrhœa and impairment of the gait which goes on deteriorating till the animal is totally unable to walk. There is also "hæmorrhagic necrosis" of the adrenal glands in rats. The exact pathogenesis of these lesions is, however, not clear.

(g) *Biotin*:—In 1927, Boas postulated that egg-white contains a toxic substance which was later crystallized and called avidin

and which is rendered innocuous by biotin. Its deficiency in man has been studied on experimental subjects who were fed on 200 g. of egg-white daily. After 3 to 4 weeks there was a fine non-pruritic scaling of the skin which disappeared after some time and also a peculiar greyish colour of the skin with atrophy of the lingual papillæ. Anorexia, extreme lassitude, sleeplessness and muscle pain were also present. Biotin is synthesised by the intestinal flora and is absorbed in large enough quantities. Spontaneous biotin deficiency in man, therefore, is extremely unlikely.

(h) *Choline*:—This is the active principle of lecithin—a phospholipid and its metabolism is closely related to the sulphur containing amino-acid—methionine. When choline is absent or present in inadequate amounts in the diet, it can be formed *in vivo* from methionine. Ingested choline is utilised in the synthesis of certain substances which are necessary for fat transport. A deficiency will cause excessive accumulation of fat in the liver resulting in necrosis and cirrhosis. Hence it is also called "lipotropic factor." Recent studies by Copeland and Salmon further suggest that the incidence of malignant neoplasms in certain types of experimental cancer may be significantly increased in the presence of choline deficiency.

(i) *Para-amino-benzoic-acid*:—It is a part of the folic acid molecule and was postulated as an essential nutrient by Ausbacher in 1941. In many respects it seems to parallel pantothenic acid in its distribution and behaviour. In rats, its deficiency causes greying of hair.

(j) *Inositol*:—Its function is similar to choline in preventing fatty infiltration of the liver. Beef heart is a rich source of inositol. In mice and rats its deficiency is associated with the development of alopecia and the appearance of "spectacle eye."

(k) *Vitamin B₁₂*:—It is a factor essential for the growth of the microorganism *lactobacillus lactis* (Dormer) and stimulates growth in rats and pigs. Injected intramuscularly in patients with pernicious anæmia it produces a characteristic reticulocyte response and remission of the disease similar to that which follows the administration of liver extract.

2. *Vitamin C*:—This is a strong reducing agent and plays a part in cellular oxidation-reduction reactions. Its chemical nature was established by King and Waugh in 1932. The pathological effects of ascorbic acid deficiency are found in the mesenchymal tissues. In the absence of this vitamin intercellular substances such as collagen, osteoid and dentine fail to be deposited in a normal fashion by their respective cells fibroblasts, osteoblasts and odontoblasts, leading to a clinical syndrome called scurvy. Thus, due to the failure to form collagen, clots do not organise properly and incised wounds do not readily heal. Due to the deficient intercellular matrix of the vessel walls, there is increased capillary permeability leading to wide-spread hæmorrhagic lesions such as

purplish spongy bleeding gums, often secondarily infected, hæmorrhages into the skin and other mucous membranes and under the periosteum of long bones and into the joint cavities. In the bones, there is a failure to form osteoid (by the osteoblasts) which is the organic matrix of bone and like collagen and dentine is an inter-cellular substance. Thus the stresses and strains resulting from muscle pull and motion lead to separation and various deformities of the cartilage-shaft junction. Even fractures may occur. In the teeth there is deficient and disordered formation of dentine. In the infant, the basic lesion of scurvy is the cessation of osteogenesis at the epiphyseal line.

3. *Vitamin P* (Citrin):—In 1936, Szent-Gyorgyi *et al* showed that an extract prepared from Hungarian red pepper was effective in controlling petechial hæmorrhages. The substance was named Vitamin P. In its absence, capillary resistance is decreased.

PELLAGRA

"Dermatitis, Diarrhoea and Dementia" are the usual symptoms associated with pellagra. A slight burning of the tongue may be the first symptom of pellagra. Characteristically this is followed by a glossitis and stomatitis. The tip and sides of the tongue become painful, tender and red. At this stage the larger papillæ are swollen. Later the finer, filiform papillæ are involved and the tongue becomes scarlet, oedematous and smooth. Salivation is excessive. To a lesser extent, all the mucous membranes of the gastrointestinal tract and the genito-urinary tract are susceptible.

It is not clear whether diarrhoea follows gastrointestinal changes, or whether a nonspecific diarrhoea precipitates clinical pellagra when the nutritional balance is precarious. Both factors operate, and the latter may help to explain the seasonal variation especially in youngsters. Children may present with abdominal distention, pain and nervous irritability.

A sense of burning is a harbinger of skin changes. The dermatitis is symmetric, and often confined to areas exposed to sunlight *e.g.*, the neckline and the wrists. Pressure points also show changes. The initial sun-burnt appearance gives way to brown patches, scaling and, occasionally, vesicles and bullæ. Dementia is more severe in alcoholics; manifestations vary from headache to delirium and stupor.

Niacin and niacinamide, the pellagra-preventive factor, is essential to cellular respiration and metabolism. Brewer's yeast is an excellent source. It also occurs in lean meat, fish, leafy greens, tomatoes, grains, peanuts and other foods. Cooking does not destroy niacin, but it is often discarded with the cooking water. Tryptophane the amino-acid precursor of niacin must be supplied by dietary protein.

An inadequate diet is not the only cause of pellagra. By interfering with absorption or speeding passage through the gut, any gastrointestinal disorder can be caused. There is an association with hypermetabolism such as occurs in pregnancy and lactation. Of great interest is the recently reported relationship to X-ray, antibiotics, isoniazid and other agents.

Bed-rest alone may reverse the acute changes (the tongue may improve in 24 hours). It is best to give the acute adult pellagrin upto 500 mg. of niacinamide daily for the first week, and to maintain him on a diet rich in protein, niacin, riboflavin and thiamine. Vitamins are no substitute for diet, nor are supplements needed if maintenance-diet is adequate.—(G.P., April 1955).

NUTRITIONAL ANAEMIA*

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THE last fifty years have witnessed phenomenal changes in the concept and treatment of anæmias. Minot and Murphy (1926) made the discovery that raw liver had curative properties in pernicious anæmia. Wilson *et al* (1942) found that folic acid corrected nutritional neutropænia in monkeys and Angier *et al* (1945) first synthesized folic acid. Lester Smith (1948) and Rickes *et al* (1948) almost simultaneously discovered that vitamin B₁₂ was very effective in pernicious anæmia. Saccharated oxide of iron containing about 3% of iron in sucrose solution was found useful in the treatment of microcytic anæmias by Slack and Wilkinson (1949) and Nissim and Robson (1949). During the last fifty years, many vitamins were isolated and their relation to anæmias established, *e.g.*, scurvy and anæmia, anæmia of pellagra, and the hypochromic anæmia of beri-beri, etc. The Second World War focused attention on nutritional anæmias; and demonstrated the necessity for giving adequate proteins of high biological value in the treatment of anæmia; it also gave a fillip to the organisation of blood-banks and blood-transfusion has become safer for anæmic patients. Much knowledge has been gained in the physiology of blood-cell production, iron metabolism, etc. In our own country the last fifty years has seen a steady expansion of medical education and medical services; and today modern medical treatment is generally available to the urban population, though the problem of rural medical relief remains still unsolved.

It is the purpose of this paper to present a review by 147 cases of anæmias, admitted into one medical unit of the Osmania General Hospital during a period of 3½ years. Anæmias associated secondarily with main diseases like leukæmia, purpura, cirrhosis of the liver etc. have not been included in this review. Children below 10 years admitted under the pædiatric physician are not included either; it deals only with adult patients. The anæmic patients were admitted all through the year, and there were no seasonal variations. Out of 147 cases, 82 were males and 65 were females.

Table I
Showing the age incidence in these 147 cases:

Age-group	5-10	11-20	21-30	31-40	41-50	51-60	61-70
Females	1	8	25	18	9	2	2
Males	1	22	13	15	17	10	2

*Specially contributed to the ANTISEPTIC.

It will be seen that the largest incidence in females was from 15 to 40 years (51 out of 65). This is because child-bearing during this period throws an additional strain on the females. The incidence in the males is more even throughout. There were 95 Hindus, 46 Muslims and 3 Christians.

Geographical distribution.—Divided according to the locality the cities of Hyderabad and Secunderabad furnished 97 cases; the Telangana Districts 38; the Marathwada Districts 6 the Kannadiga Districts 5 while only one case came from outside the State.

The cities of Hyderabad and Secunderabad are situated within the Telangana area. Allowance must be made, in studying the above figures for two limiting factors: (i) those that came from the Districts may have given their temporary city-addresses and not their own home addresses; and (ii) the disparity in the populations of the three areas (Telangana comprising 7½ districts; Marathwada 5 districts; and Kannadiga 2½ districts). Even so patients from the Telangana area formed an overwhelming majority of the patients.

Table II
Showing the types of anaemias with results of treatment:

Type of anaemia	No. of cases	Cured or greatly improved	Stationary	Discharged against advice	Died
A. Pernicious anaemia	1	1	—	—	—
B. Sprue syndrome	2	2	—	—	—
C. Nutritional anaemia	103	85	2	16	—
D. Microcytic anaemia	33	27	1	5	8

A. **PERNICIOUS ANAEMIA**:—Pernicious anaemia is indeed rare. There was only one case.

Case Report:—M., male, 45 years was admitted on 26.6.1953 for the treatment of increasing weakness of 3 years' duration. He was anæmic; spleen just palpable. *Blood picture*: Hæmoglobin 21%; RBC. 1.0 million per cmm., WBC. 4,200. Colour-index 1.24. Packed cell volume 14%. Mean corpuscular volume 140 μ ; Mean corpuscular hæmoglobin 36 γ ; Volume index 1.66; Mean corpuscular hæmoglobin content 25.7% Vander Bergh: negative; Icterus index: 5; Wassermann reaction negative; F.T.M.: Free acid is absent in all specimens on Hestamine test meal. Barium meal examination of stomach and duodenum: no abnormality detected; Responded well to liver therapy.

B. **SPRUE SYNDROME**:—While diarrhoea is fairly common in nutritional anaemia, the sprue syndrome is rather rare. There were only two cases in this series. A diagnosis has to be made without waiting for all classical text-book—symptoms to develop and the treatment given.

Case Report:—A.B., female, aged 45 years, was admitted on 22.8.1952 for stomatitis, diarrhoea and loss of weight of 1½ years' duration. On examination, the tongue was raw all over its surface and the conjunctive pale. She passed every day 3 to 4 whitish motions. *Blood picture*: Hb 55%; RBC 2.32 millions per cmm. Macrocytic type of anaemia. F.T.M.: Free acid absent in all the specimens.

Fat estimation of faeces could not be done. She improved with (1) Milk diet; (2) Acid hydrochloric dil: by mouth; and (3) Liver extract plus Vitamin B complex injections.

C. **NUTRITIONAL ANÆMIA**:—Nutritional anaemias are the end results of many factors, operating singly or together on an individual and can be defined as a megaloblastic, dimorphic or microcytic anaemia occurring in economically backward countries due to a dietary deficiency; it is aggravated by co-existing conditions like amoebiasis, helminthic infections etc.; is often accompanied by hypoproteinaemia; it can be cured by appropriate treatment of the anaemia, the co-existing conditions, and the hypoproteinaemia.

Table showing conditions co-existing with nutritional anaemia

Diarrhoea	.. 11	Chronic bronchitis	... 4
Dysentery	... 8	Congestive heart failure	... 4
Colitis	... 2	Bleeding piles	... 3
Amoebiasis	... 3	Epistaxis	... 1
Stomatitis	... 13	Hæmatemesis	... 1
Ankylostomiasis	... 1	Menorrhagia	... 1
Giardiasis	... 1	Hæmorrhagic diathesis	... 1
Cancer stomach	... 1*	Recent delivery	... 8
Cancer cervix	... 1*	Cervical erosion	... 1
Round worm infection	— 1	WSR positive	... 10
T.B. abdomen	... 2*	Albuminuria	... 1
Palpable spleen	... 12	Jaundice	... 1
Palpable liver	... 12	Dryness of skin	... 1
Malarial fever	... 14	Pellagrous skin	... 2
Hyperchlorhydria	... 2	Tender calf muscles	... 1
General anasarca	... 41	Peripheral neuritis	... 2
Ascitis	... 10	Spinal degeneration	... 1

*These cases are included because these patients suffered from anaemia first for a long time, before the diseases developed.

The variety of manifestations and clinical pictures that a case of nutritional anaemia can exhibit is manifest in the above statement. It is therefore, necessary to diagnose the co-existing conditions and the causes that led to the anaemia.

It has been stated that nutritional anaemias are widely prevalent in the Telugu-speaking districts. The average inhabitant of Telangana lives mainly on rice with no ghee or milk; and consumes more of chillies and condiments. But the lack of a balanced diet is not the only cause. The whole family will be taking the same diet; but only one member may suffer from nutritional anaemia. Besides malnutrition, he will suffer from diseases like diarrhoea, dysentery, malaria, blood loss due to piles, ankylostomiasis, etc. which adversely affect the balance resulting in nutritional anaemia.

Koeningsfold (1948) thought that a distinction should not be made between pernicious anaemia and nutritional macrocytic anaemia. The medical histories of his cases showed a high percentage

of ascariasis. His observations were one-sided. Only one case out of the 103 cases showed infection with ascariasis and it had nothing to do with nutritional anaemia. Histamine-fast achlorhydria is an exception in nutritional anaemia. Trowell (1948) reported dual deficiency of the iron and liver principles giving rise to dimorphic anaemias. Such an anaemia, in his view, can often be determined from the blood picture in a thin film. With a dual deficiency the film presents neither the picture of hypochromic cells with a little anisocytosis as seen with pure iron deficiency nor that of evenly stained flattened cells with much anisocytosis, characteristic of a pure deficiency of the liver principle. In fact one can pick up fields on the same slide characteristic of iron-deficiency, as well as of liver-principle-deficiency anaemia. This was true in the majority of cases under this heading.

Henry Fox, Athena Kondi and Hargreaves (1951) reported a case of megaloblastic anaemia of pregnancy that responded to crystalline penicillin. The 8 cases of post-puerperal anaemia in this series are all cases of pregnancy-anaemias admitted into the maternity section first, where they received penicillin, without any effect on the anaemia. Lucy Wills (1948) discussed pernicious anaemia, nutritional macrocytic anaemia and tropical sprue and concluded that the changes in the cells of the blood and bone marrow were identical in all the three diseases. In endemic nutritional macrocytic anaemia, the food deficiency was in his opinion, a factor other than the liver-principle; possibly a co-enzyme present in or associated with good biological protein and Vitamin B complex.

Clinically cases of nutritional anaemias can be divided roughly into those: (1) who suffer from anaemia alone and (2) who suffer in addition from hypoproteinemia.

In those who suffer from nutritional anaemia alone, the predominant picture is that of anaemia,—lowering of Hb and RBC with macrocytic type of blood-picture though a dimorphic picture is also often seen. Other signs of malnutrition like angular stomatitis, skin changes etc. may also be seen. These types of cases respond to (a) the hospital mixed diet—containing rice, wheat and dhal, plus an extra 16 oz. of milk and 2 eggs a day; (b) liver extract parenterally; and (c) multi-vitamin tablets and iron by mouth.

In a few cases the response to treatment is poor—often slow and tedious; those with a previous history of malaria and with enlarged spleens respond slowly. There is always a haemolytic factor in these cases. Napier (1936) thought that malaria and allied conditions induce hyperplasia of the reticulo-endothelial system causing excessive haemolysis. Heck (1952) summarises the causes of anaemia not responding to treatment:—(1) anaemias associated with malignant lesions; (2) diseases of the

reticulo-endothelial system, e.g., leukaemia and aplastic anaemia; (3) toxæmias or interference with Hb. metabolism, as in nephritis or in infections; and (4) rheumatic arthritis. As far as the present series of cases is concerned, the common conditions that impeded the improvement were: (a) malaria; (b) Wassermann reaction positive and (c) toxæmia and focal sepsis. The relative value of Vitamin B₁₂, liver extract and folic acid are difficult to assess in these cases; but cases which had a raw tongue did well on folic acid.

Case Report:—CASE 1.—Nutritional anaemia showing rapid response to therapy.—M.S., male, aged 30 years, was admitted on 17.10.52 with a history of progressive weakness and oedema of the legs off and on for one year. On examination, he was anæmic; and suffered from breathlessness on walking. Blood picture: Hb 20%; RBC 0.41 millions per cmm. Macrocytic type of anaemia. F.T.M.: Free acid present in all the specimens. Wassermann reaction: negative. (1) Mixed diet plus milk and 2 eggs; (2) liver extract 2 cc. every day; and (3) iron and multi-vitamin tablets by mouth. To start with, a blood transfusion of 300 cc. was given. The improvement was rapid. On 29.4.53 Hb. 65 per cent; R.B.C. 2.65 and on 12.5.53 Hb. 80 per cent; R.B.C. 3.7 million per cmm.

CASE 2.—Nutritional anaemia with very slow response to therapy.—F.B., female, aged 25 years, was admitted on 26.9.1952 with history of progressive weakness of 3 months' duration. The patient was anæmic with pale conjunctivæ and nails. Blood picture: Hb 45 per cent. R.B.C. 0.7 millions per cmm. Macrocytic type of blood picture. Wassermann reaction negative. She was put on (1) mixed diet with milk and 2 eggs; (2) liver extract parenterally every day for 8 days and on alternate days thereafter; and (3) iron and multi vitamin tablets by mouth. Her response to treatment was slow. On 12.10.52: Hb. was 55%; R.B.C. 1.66 and on 24.10.52: Hb. was 65 per cent, R.B.C. 2.96.

In treating nutritional anaemias, one should search for other conditions like amœbiasis, ankylostomiasis, piles, etc. which should also receive appropriate treatment. In every case of anaemia, the heart suffers from anoxæmia; and in severe cases, i.e. if Hb. is below 40%, the heart always shows signs of dilatation and hæmic murmurs can be heard most markedly in the pulmonary area. But congestive heart failure as such is very rare. The following case is of interest in that nutritional anaemia provoked congestive heart failure; and as the anaemia improved, the heart-failure disappeared. The follow-up after 1 year revealed that he was doing well.

Case Report:—M., aged 55 years, was admitted on 16.8.52 with a history of epistaxis one month back, increasing weakness for the last 1 year, orthopnoea for the last 15 days. On examination he had a cardiac type of oedema, orthopnoea, fullness of the veins of the neck. Heart was dilated and systolic murmur was heard all over the præcordium. Liver was just palpable and tender. He was anæmic. Blood picture: Hb 35 per cent; R.B.C. 1.19 million per cmm. Macrocytic type of blood-picture. Wassermann reaction: negative F.T.M.: free acid present in all the specimens. Stools: No abnormality detected. E.P. 120/80. A slow blood transfusion of 300 cc. was given to start with. He was put on (1) mixed diet with extra milk and eggs; (2) liver extract parenterally every day for the first 8 days and on alternate days thereafter; (3) iron and multi-vitamin tablets by mouth; (4) Digoxin 1 tablet thrice a day. His progress was steady. On 18.9.52: Hb. was 45 per cent. R.B.C. 3.0; 24.9.52: Hb. 60 per cent; R.B.C. 3.8. The signs of heart failure had disappeared completely. The murmurs had

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disappeared and he was discharged on 25-9-'52 to continue treatment as an outpatient. On 1-7-'53 when re-examined he was quite normal.

Nutritional anaemia with hypoproteinaemia:—There were 41 cases of nutritional anaemia with general anasarca; out of these 10 had ascitis also in addition. All the cases under this heading were more advanced cases of nutritional anaemia. Estimations of blood proteins were done; and the total proteins in severe cases ranged from 2 gm. % to 5 gm. %. In mild cases, readings of 5 gm. to 6.5 gm. % was obtained. As it was necessary to raise the blood-proteins also in these cases, hydroproteins—BI 50 cc. diluted with 100 cc. of saline was given intravenously every day for a period of 20 days. The response of the patients with hypoproteinaemia is usually very slow.

Case Report:—A.H., male, 45 years, was admitted on 18-7-1953, with general anasarca. He gave history of oedema of the feet of ten months' duration; general anasarca supervened 15 days prior to admission. Ascitis was present. *Blood picture*: Hb 60 per cent.; R.B.C. 2.5 million per cmm. Macrocytic type of blood picture. Wassermann reaction: negative. F.T.M.: Free acid absent in all specimens. (Histamine test meal not done) Blood proteins 2.5 gm per cent. The patient was put on (1) mixed diet with 16 oz. of milk and 2 eggs; (2) liver extract 2 cc. parenterally on alternate days; (3) multi-vitamin tablets and iron by mouth; (4) hydroprotein 50 cc. every day for 20 days (1000 cc.). On 2-9-'53 blood-proteins had gone up to 3.25 gm. per cent. *Blood picture*: Hb. 65 per cent; R.B.C. 4.19; the ascitis and general anasarca had disappeared completely and the patient was discharged on request.

All cases of hypoproteinaemia do not respond to treatment so easily. Das Gupta and Chatterjee (1947) suggested the term "Malignant hypoproteinaemia," it was perhaps the same entity which Trowell and Mucrazo (1945) called "Malignant malnutrition." The following two cases, may perhaps, come under this heading:

CASE 1. Nutritional anaemia with hypoproteinaemia.—R.B., female, aged 35 years, was admitted on 19-3-'52 with general anasarca of 5 months' duration. The patient's general condition was poor with anaemia, general anasarca and ascitis. *Blood picture*: Hb 50 per cent.; R.B.C. 2.11; macrocytic type of blood picture. Total proteins 2.75 gm per cent. Wassermann reaction negative. A blood transfusion was given and treatment started. The patient died on 24-3-52.

CASE 2. Nutritional anaemia with hypoproteinaemia-stationary despite treatment.—J.H., male 40 years, was admitted on 4-4-'53 with generalised oedema all over the body. *Blood picture*: Hb 45 per cent; R.B.C. 1.4; dimorphic type of blood picture. Wassermann reaction negative. F.T.M.: free acid present in all the specimens. Despite treatment and one blood transfusion, the blood picture did not show any change for the better. Then on 12-5-'53 it was Hb 55 per cent.; R.B.C. 1.41; and he was discharged against advice on 15-5-53, his condition being stationary.

Liver damage in nutritional anaemias:—Nutritional factors in liver injury have been reviewed by Himswoth (1950). He concludes: "All that can be said is that, in chronically malnourished races, agents which normally produce only a mild and recoverable hepatitis, tend to produce a severe and fatal necrosis.

As far as the evidence goes at present, the role of dietary deficiency in relation to this type of liver lesion is to be sought atleast in the vast majority of cases, in aggravation, rather than an initiation of disease." Again "diffuse hepatic fibrosis in the tropics is correlated with poverty and through that, with malnutrition." Hypoproteinaemia in cases of nutritional anaemias may well be due to damage to the liver also. Gopal Rao (1946) working on ascitis in Hyderabad found that in 15% of patients seeking admission for ascitis, malnutrition was the cause. The following case of nutritional anaemia with general anasarca where a liver biopsy was done before and after treatment will be of interest:—

Case Report.—M., aged 55 years, was admitted on 4-4-'53 with swelling of the feet and ascitis of 2 months' duration. *Blood picture*: Hb. 45 per cent; R.B.C. 1.5 million per cmm.; macrocytic type of anaemia. Wassermann reaction; weak positive. Blood proteins 5.5 gm. per cent. He was tapped; liver was just palpable and spleen was palpable 2 fingers below the costal margin. Liver biopsy showed areas of necrosis in the lobules of the liver. He was put on (1) salt-free mixed diet with extra eggs and milk; (2) liver extract parenterally on alternate days; (3) multi-vitamin tablets and iron by mouth; and (4) hydroprotein 50 cc. every day for 20 days (1000 cc.). He had to be tapped a second time. But afterwards, he slowly improved, ascitis disappeared completely and he gained in weight. Liver biopsy done again after 3 months showed liver section to be normal. Total blood-proteins 6.75 g. per cent.; Hb. 65 per cent; R.B.C. 3.9. He was discharged on 13-7-'53.

No conclusions of value can be drawn from a single case; more cases must be studied. But it looks as though continued malnutrition can damage the liver. Patients who come with the clinical appearances suggestive of cirrhosis of liver can be cured by suitable treatment.

*Nervous symptoms in nutritional anaemias**:—Whitby and Britton quoting Wills, Clutterbuck and Evans (1951) state that "nervous system symptoms have not yet been described. The study revealed: (1) two cases of peripheral neuritis with objective and subjective signs; and (2) one case showing involvement of pyramidal and posterior column tracts of the cord.

Deaths:—There were 8 deaths; two died soon after admission before anything could be done to them. Two died of intercurrent disease, complications of coronary thrombosis and pneumonia. Two died of diseases which were probably the cause of anaemia, i.e., one of carcinoma of stomach and the other of profuse haematemesis. The remaining two died inspite of suitable treatment.

D. MICROCYTIC ANAEMIAS:—Josephs (1953) has recently reviewed iron metabolism. There were 33 cases of microcytic anaemia, 5 of which were due to ankylostomiasis. A history of malaria was obtained in 7 cases; bleeding piles in 2; dysentery in 2; recent delivery in one and recent abortion in another. In the

*This formed the subject of a separate communication to the Medical and Veterinary Section of the All India Science Congress, held in January 1954.

rest of the cases no cause was found; and the microcytic anaemia was of nutritional origin.

The clinical picture of microcytic anaemia differs from that of the macrocytic type in that the patient is more pale, the puffiness of the face is more evident, the tongue is pale and flabby; but there is no stomatitis and the heart shows signs of more severe anoxaemia by dilatation and the presence of haemic murmurs. Nails often show *koilonychia*. Four cases had no free acid on F.T.M. If two cases of macrocytic and microcytic anaemias of 40% Hb. each are compared, the microcytic patient will show more breathlessness, only small but contain less of Hb. and the tissues suffer from severe anoxaemia; whereas in the patient with macrocytic anaemia, the R.B.Cs. will be big, fully haemoglobinised and hence even though the number of cells are fewer, oxygenation will be effectively done by cells with greater surface and containing more haemoglobin.

The treatment in these cases is to supply iron; and if possible to treat the cause i.e. to arrest blood-loss. Most of the cases under review received Ferri et ammon citras 60 grains a day with dilute hydrochloric acid by mouth. Intravenous Iviron was given to three cases, who could tolerate iron by mouth but for some reason—perhaps defective absorption—Hb. was stationary and was not going up. Severe cases with less than 30% Hb. were given an initial blood-transfusion of 300 cc. Some typical cases will be described below:—

Case Reports.—1. Microcytic hypochromic anaemia—*aetiology*: Malaria.—S., female, aged 20 years, was admitted on 24-5-'52 with increasing weakness of 3 months' duration. History of fever with rigors. On examination patient had anaemia, pale conjunctivae and nails, tongue pale and flabby. Heart was dilated with a haemic murmur in the pulmonary area. Spleen just palpable. Blood picture: Hb 45 per cent. R.B.C. 2.0 million per c.mm.; Microcytic hypochromic type of blood picture. She was put on Ferri et ammon citras grs. 60 a day. Clinical malaria was treated with Paludrine. By 16-6-'52 Hb. 45 per cent. Clinical 29-6-'52: Hb. 50 per cent; R.B.C. 3.0 and by 9-7-'52: Hb. 70 per cent; R.B.C. 3.7 and she was discharged cured on 14-7-'52.

2. Microcytic hypochromic anaemia—*aetiology*: Ankylostomiasis.—R., female, 30 years, was admitted on 21-8-'53 with a history of having delivered 20 days prior to admission with profuse haemorrhage. Patient was pale and anaemic. Tongue was pale and flabby. Blood picture: Hb. 35 per cent. R.B.C. 1.8 million per c.mm.; blood proteins 4 gm. per cent. Wassermann reaction: negative; stools: Ankylo ova present; F.T.M.: Acid present in all the specimens. She was put on. (1) mixed diet with eggs and milk; (2) Ferri et ammon. citras grains 60 a day. She improved rapidly. On 3-9-'53 Hb. 45 per cent. R.B.C. 1.8 and on 20-9-'53 Hb. 65 per cent; R.B.C. 3.5 millions per c.mm. She was discharged on 21-9-'53 greatly improved. She received three treatments for Ankylostomiasis at intervals of a week.

Microcytic hypochromic anaemia—Nutritional.—B., male, 36, years, was admitted on 42-9-1952 with weakness of 2 months' duration. On examination the patient was pale and flabby. Heart was dilated with haemic murmurs in mitral and pulmonary areas. Nails showed well-marked *koilonychia*. Liver just

palpable. Blood picture: Hb. 60 per cent. RBC 2.86 million per cmm. Microcytic hypochromic type of anaemia. Stools: No abnormality detected. FTM: Free acid absent in all the specimens (Histamine test meal not done). He was put on (1) mixed diet with milk and eggs and (2) Ferri et ammon citras grs. 60 a day. He improved slowly. On 15-9-'52 Hb. 60 per cent; RBC 2.86 million per cmm. and on 23-9-'52 Hb. 70 per cent; RBC 3.8 million per cmm. He was discharged greatly improved on 25-9-'52.

Role of blood transfusion in the treatment of anaemias.—It is quite a common experience to find that some patients with 40% of Hb. or even less are able to come walking and to get on fairly well with their limited activities, while a few others with the same 40% Hb. are very ill and restless. This is due to the fact that in addition to the anaemia they are having a co-existing toxæmia due to malaria, dysentery etc. The more restless the patient, the greater is the urgency for blood-transfusion. In the first category of patients, blood-transfusion may be desirable, but not essential. But blood-transfusions must be given to patients in the latter category even in mofussil stations. Type-grouping is not necessary; careful cross-matching is quite sufficient to give a blood transfusion.

Difficulties in the diagnosis of anaemias.—Pallor is usually mistaken for anaemia. The simplest method is to prick the patient's finger, and to estimate haemoglobin at the patient's bed-side by the Talliquist scale. It is desirable that the physician carries an Hb scale in his bag, just as he would a thermometer and syringe. A complete laboratory examination for all the indices is not necessary in the majority of cases to diagnose the type of anaemia. A well-stained thin blood-film examination will furnish all the information that the indices are likely to give. It indicates the type of anaemia—microcytic hypochromic, macrocytic hyperchromic or dimorphic types etc. Sternal puncture is not necessary in every case, though it may be so occasionally, as when a case of a leukæmic leukæmia and anaemia has to be diagnosed at the bedside.

Criteria for diagnosis of nutritional anaemia.—(1) The presence of macrocytic, dimorphic or microcytic anaemia; (2) obvious dietary deficiency due to: (a) low economic level, (b) dietary habits, or (c) gastro-enteric upsets; (3) the presence of HCl on F.T.M. (a point of differentiation from pernicious anaemia); (4) the absence of positive aetiological agent other than nutritional e.g., ankylostomiasis or bleeding piles in microcytic anaemia; a differentiation between the aetiological agent or an aggravating agent is not always easy; and (5) the presence of other signs of malnutrition like hypoproteinæmic angular stomatitis, pellagra of skin etc.

Nutritional anaemias and society.—The incidence of nutritional anaemias in a community is an index of the state of its nutrition and general health. For every case of anaemia that seeks treatment there must be many more undetected mild cases in the locality. Low economic status is an important cause. The

maximum incidence occurs in the Telangana area. The common man of Marathwada is no richer than his compeer in Telangana. The raising of the economic level is very difficult and may take several years. The people in Telangana, must be advised to change their dietetic habits from a predominantly carbohydrate diet, poor in proteins and fats and rich in condiments and chillies, to a mixed diet of wheat and rice, with more protein and less of condiments. This alone would go a long way to prevent nutritional anæmia.

Summary.—147 cases of anæmias have been analysed and studied. Out of these, one was pernicious anæmia, two were of the sprue syndrome, 103 were nutritional and 33 were microcytic anæmias.

INDICATIONS FOR BLOOD TRANSFUSION IN ANÆMIAS

Two broad categories of anæmia require transfusion therapy. The first includes: (1) anæmia due to severe hæmorrhage; (2) specific anæmias (such as pernicious anæmia) too severe to warrant conservative replacement therapy; (3) anæmia which may aggravate heart disease; (4) anæmia prior to surgery; and (5) severe anæmia in pregnancy near term.

The second category includes chronic cases: severe anæmia associated with cancer, uræmia, or sepsis; aplastic, hypoplastic, myelophthisic, myelofibrotic and similar refractory anæmias; and certain hæmolytic anæmias.

Patients with severe depletions of total circulating hæmoglobin often have compensation in plasma volume increases so that their total blood volume is approximately normal. Such patients may respond poorly to transfusions of whole blood by developing acute congestive failure. In such instances it is wise to administer slowly small transfusions of not more than 250 cc. of packed cells at a time with the patient in the sitting position in bed. The patient should be carefully observed during the entire procedure for signs of circulatory overload. In rare instances it may be necessary to bleed 'low cells' from a donor in another vein, while simultaneously replacing 'packed

The lack of a definite indication is a specific contraindication to hæmo-therapy. Blood should not be used for anæmias which will respond to specific medication unless the anæmia is too severe to warrant withholding transfusion. Severe anæmia may aggravate or precipitate congestive heart failure. Cardiac output, however, does not usually rise significantly until hæmoglobin values drop below 8 gm. per cent. Vitamin B₁₂, iron and thyroid as indicated are cheaper and safer than transfusion.

It is more important to keep patients comfortable than to keep the laboratory value for hæmoglobin normal in certain chronic anæmias. Most patients with sickle cell anæmia go through life with an average hæmoglobin of 6 or 7 gm. per cent. It is neither desirable nor wise to resort to transfusion for such patients.

It is not generally appreciated that transfusion may depress spontaneous erythropoiesis in normal recipients and in certain chronic diseases. Depressed spontaneous erythropoiesis by transfusion in pernicious anæmia was demonstrated decades ago. Erythropoietic shut down may occur in many chronic anæmias in which the marrow has been functioning in a barely minimal level prior to transfusion.

Blood should be used as sparingly as possible in acquired hæmolytic anæmias to avoid increasing the rate of hæmolysis. Transfusion of whole blood is generally not justified for nutritional purposes.—(N.Y. State J. Med., May 15, 1955).

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Cases and Comments

SOME CLINICAL OBSERVATIONS ON THE USE OF ANCOLAN (A New Antihistaminic in Varying Itching Dermatoses)

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AND

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'ANCOLAN' is an odourless, tasteless crystalline white powder very slightly soluble in water. For our experimental studies, it was made available as 25 mg. grooved tablets to facilitate halving of the dose when needed.

Ninetyseven cases with varying dermatoses exhibiting itching as the predominant symptom were treated; most cases were selected from the urticarial and allergic dermatitis groups. In the latter type of cases every effort was made to discover the causative factor which was however a difficult matter in the majority of cases. Some of them were of an eczematoid type with constant and regular exacerbations at various seasons of the year; these patients were satisfied when the itching was controlled. Most of the cases of pruritus were of the senile type; a routine examination of urine to eliminate diabetes, was made in all these cases.

DOSAGE:—(1) Adults with moderate itching received one tablet (25 mg.) daily at bed time; those with severe itching had one tablet twice a day; and (2) children received proportionately smaller doses.

RESULTS:—The itching was relieved in a fair percentage of cases within 24 hours and with continued treatment for a few days the itching was practically controlled. Simultaneously with Ancolan tablets, the patients were also given suitable therapy for the various dermatoses. Thus, cases of arsenical dermatitis were given a course of BAL injections and a few other types of allergic dermatitis were put on cortisone or ACTH; other auxiliary measures were also instituted, like injection of vitamins, particularly B complex, C and K, the local application of mild emollients and the use of antibiotics in some, especially the infected weeping-types. In urticarial cases, a strict vigilance was kept on the diet and all septic foci were eliminated.

It is however, well known that any inflamed skin condition heals uneventfully, if it is not irritated or inflamed or infected by constant scratching with or without the knowledge of the patient. By controlling the itching Ancolan reduced this tendency to keep up the inflammation by scratching. Further, Ancolan played a major part directly or indirectly in the recovery of most of the

97 cases treated in the Dermatology Outpatient Department of the Government Stanley Hospital.

TABLE I
Showing the results of Ancolan therapy in 97 cases
treated between July and October, 1954

Diseases	No. of cases	Excellent results	Fair results	Indifferent
I. Allergic dermatitis ...	51	31	14	6
1. Due to sulphonamides ...	6	5	1	—
2. " arsenic ...	2	2	—	—
3. " procaine ...	1	1	—	—
4. " aureomycin ...	1	—	1	—
5. " A.T.S. injection ...	2	—	2	—
6. " causes unknown ...	39	23	10	6
II. Pruritus ...	9	3	2	4
III. Urticaria ...	27	14	6	7
* IV. Seborrhoeic dermatitis ...	4	2	1	1
* V. Tinea cruris ...	5	2	2	1
* VI. Psoriasis ...	1	—	1	—
Total	97	52	26	19

* The last three groups IV to VI were treated with Ancolan just to reduce the itching.

It will be seen that 53.6 percent of the cases showed excellent response, and fair results were obtained in 26.8% while only 19% of the cases treated, showed poor response.

Summary.—'Ancolan' was found to be superior to many anti-histaminics in that it was very much less toxic and produced minimum side-effects, like giddiness and vomiting. Moreover, patients undergoing Ancolan therapy enjoyed restful sleep and woke up fresh without any hangover-feeling. The anti-histaminic action was achieved with comparatively smaller doses of Ancolan, 25 mg. per day being found sufficient in the majority of cases.

We are grateful to the Dean of the Government Stanley Hospital, Madras, for permitting us to publish this report.

THE RELATION OF PSORIASIS TO ATTITUDE AND TO VASCULAR REACTIONS OF THE HUMAN SKIN

This is an attempt to demonstrate the prevalence in psoriasis of a specific emotional 'attitude' and possibly also of specific cutaneous vascular reactions.

The hue of the skin and its temperature depend on the arteriolar supply. When the arterioles relax the temperature rises and the tint brightens. The saturation or chroma, as opposed to the hue itself, depends more on the state of the capillaries and venules; but since colour is not so easily determined or defined, the tone of the capillaries is assayed on the threshold duration of compression required to evoke reactionary dilation. In the average normal subject at ordinary room temperatures the threshold time is 25 seconds. In psoriasis, the capillary tone is higher and can be made to rise by emotional stimuli. The attitude of the psoriatic was expressed by many patients in the following terms: "I have a boring (gnawing, pawing, grinding, binding, whining) spouse (child, mother-in-law, employer, suitor) and I cannot do anything about it and indeed I just damn well have to put up with it".—(*J. Invest. Derm.*, 22: 379, via *Br. J. Derm.*, July 55).

SULPHONE TREATMENT OF LEPROSY

A Preliminary Report on Trials with D.J.51*

Dr. A. T. ROY, M.O.,

Purulia Leprosy Home and Hospital, Purulia, Bihar

A TRIAL of sulphone D.J.51 was started here in March, 1954. Twenty-two cases were selected, of which 11 were L₁, 6 were L₂, 1 was L₃, 3 were tuberculoid and 1 neuromacular case. The cases were selected as they were admitted and had no previous anti-leprosy treatment. On admission the cases were thoroughly checked up for other diseases H.W. etc. Haemoglobin (Sahli) estimations were done. Bacteriological indices were noted after taking an average of findings (6 to 12) of five smears from the most positive sites.

Doses and reactions.—Tablets were given orally 1 to 5 tablets (50 to 250 mg.) daily according to tolerance. Out of 22 cases, 15 tolerated 250 mg. daily without developing any reaction. 7 cases showed reactions—3 cases once, 3 cases thrice and 1 case four times, for 16, 24.6 and 64 days on an average respectively. Case No. 3 suffered most and was once bed-ridden for 40 days. All received the maximum dose 5 tablets (250 mg.) except case No. 3, who could tolerate only 200 mg. daily.

Haemoglobin.—Case No. 1 at the start of the treatment suffered from deterioration of haemoglobin p.c. but ultimately recovered and went higher than the initial haemoglobin p.c. Case No. 3 suffered most from low haemoglobin p.c. resulting from repeated reactions. The others were not affected.

Weight.—All improved in weight except No. 3 who lost only 4 lbs. Some gained as much as 14 lbs. without any special diet etc.

Bacteriological index was recorded on the basis of the results of examining 5 smears. Each smear was selected from the most infected site and given 6 to 12 points according to the positivity of findings. Such 5 findings of 5 smears were added and averaged. Out of 18 lepromatous cases No. 7 left before an assessment of progress could be made. Of the remaining 17, nine were much improved; 3 improved; 2 were stationary and 2 became worse. All the tuberculoid and neuromacular cases also improved.

Discussion.—Though the period of observation was only 9 months, the reactions were fewer as compared with the reactions usually met with in DDS treatment. The relative improvement as judged by the bacteriological findings is significant. No untoward symptoms developed and there was no effect on haemoglobin and weight.

* Sulphone D.J.51 was kindly supplied for this clinical trial by M/s. Laboratories Grimaud Ltd.

Extended trials to cover a larger number of cases over a long period are necessary to ascertain the time factor required to render cases bacilli-negative, for sulphones take long to produce this result.

TABLE 1
Showing particulars of the cases and results of treatment

Case No.	Name	INITIAL PRESENCE			HÆMO-GLOBIN		WEIGHT		L.R.	Remarks
		Type	B.I.	B.I.	Before	after	Before	after		
					Treatment	Treatment	Treatment	Treatment		
1.	Pabon	L ₃	5 2/5	5 3/5	46	70	8-5	8-10	20 days	Stationary
2.	Kuber	Tbc	2/5	Neg.	74	78	7-7	8-2	—	Improved
3.	Phulu	L ₃	3 4/5	2 3/5	56	32	6-0	5-12	64 days	Much improved
4.	Jala	L ₃	3 1/5	4	64	60	5-12	6-4	—	Worse
5.	Janoki	Nm ₂	Neg.	Neg.	72	72	4-11	4-11	—	Improved
6.	Flatman	L ₁	1 1/5	2/5	82	74	12-0	12-6	—	Much improved
7.	Subramaniam	L ₃	5		76	78	6-6	6-8	19 days	Left 9-12-'54
8.	Jogeswar	L ₂	4 3/5	2 4/5	54	60	6-2	6-2	—	Much improved
9.	Ismail	L ₃	5	4 2/5	54	54	7-0	8-0	—	Improved
10.	Hori	L ₂	2 1/5	1 4/5	54	64	7-4	8-4	31 days	Improved
11.	Kartik	L ₂	3 4/5	2 3/5	58	72	6-8	6-7	15 days	Much improved
12.	Kalus	L ₂	3 1/5	2 1/5	68	70	6-8	6-12	—	Much improved
13.	Victor	L ₃	3 2/5	4 2/5	78	76	7-0	7-4	—	Worse
14.	Brajo	L ₂	3 1/5	1 4/5	74	66	7-4	7-12	24 days	Much improved
15.	Jagananth	Tbc.	a few	Neg.	66	68	7-0	7-2	—	Improved
16.	Sonaton	L ₃	5 2/5	4 4/5	58	68	5-12	6-0	—	Improved
17.	Saligram	L ₂	3 3/5	3 3/5	56	64	4-12	4-10	13 days	Stationary
18.	Budhu	L ₃	5 3/5	5	58	54	6-10	6-10	—	Improved
19.	Radhagobinda	L ₃	6	4 2/5	54	62	5-4	5-1	—	Much improved
20.	Pacho	L ₂₋₃	4 4/5	2	64	60	5-12	6-4	—	Much improved
21.	Motilal	Tbc.	Neg.	Neg.	70	60	3-10	4-0	—	Improved
22.	Lohobot	L ₃	4	2 1/5	56	48	8-2	8-5	—	Much improved

CHOICE OF DRUG IN LEPROSY

It is necessary that the drug must be cheap, non-toxic and easily administrable. Of all drugs, DDS seems to be the drug of choice for routine use, while Thiosemicarbazone should be reserved for those who either do not tolerate sulphones or have reached a static stage of improvement. In some cases, the combined use of INH and DDS may be necessary.—(*Leprosy in India*, 27: 2, p. 162, 1955).

VALUE OF DIAZIL IN ACUTE CONJUNCTIVITIS AND TRACHOMA

PROF. S. P. GUPTA, F.R.C.S., D.O.M.S., (Lond.),
Professor and Head of the Department of Ophthalmology,
G.M. and Associated Hospitals, Lucknow

THIS study was undertaken to test the effect of Diazil* in the treatment of acute conjunctivitis and trachoma. 100 cases admitted in Hospital and outdoor were treated and studied.

(1) Our hospital records show that trachoma constituted 31% of the total eye cases, males predominating (71%) and the disease being more common amongst the Hindus (70.3%). The frequency in indoor patients was highest in the 21 to 40 years age-group. The disease is more prevalent in the rural areas, the incidence being highest in poor people (55.4) chiefly in those who live and work in crowded surroundings e.g., labourers (20.3%), students (14%), farmers (13.2%).

(2) *Conjunctival scrapings* :—The results were positive in 80.9% cases. (3) *Family history* : was positive in 64.4% cases.

(4) *Symptoms* :—The disease may start insidiously or suddenly. The former type of onset is more common, 59.7%; grittiness is common, being present in 69.2% of cases moderate discomfort was also felt when some conjunctivitis was present 14.87%. In 17.1% there was sharp severe pain associated with corneal lesions or follicles. Sense of irritation in the lid region 7% indicates sequel, as Entropion or Trichiasis was present. In 95.2% some degree of discharge or lacrimation was usually present Diminution of vision was noted in 54%.

(5) *Signs* :—Follicles on fornix and palpebral conjunctiva were present in 80.4%. Papillae seen in 15.6%; when the disease had advanced characteristic scars appeared in 52.8%. Pannus was present in 79.6% cases.

(6) *Smear examination* :—Polys lymphoblasts, plasma cells, gram-positive and gram-negative cocci and gram-negative bacilli were seen. (7) *Course* :—On the basis of Mac-Callen's classification, stage I was 3.9%, stage II 39.83%, stage III 56.2%.

(8) *Complications and sequelæ* :—Corneal ulcer was present in 17.1% cases, Entropion in 7.03%, corneal opacity in 53.18%, Xerosis in 0.78%, Symblepharon in 0.78% in these series of cases.

Conjunctival smear examination in the above cases revealed the following incidence of various organisms :—Diplobacillus 20; Koch-Weeks bacillus 50; staphylococcus 8; streptococcus 8; pneumococcus 7; gonococcus 3; and negative or uncertain findings 4.

Acute catarrhal conjunctivitis is quite common in the summer months chiefly from March to September, more common in poor

The Diazil tablets and ointment used in this study were supplied free by M/s. Cilag Hind.

people, particularly in children living in unhygienic surroundings much exposed to dust and dirt. They form quite a large part of cases in summer months, 40-50% seen in out-door, and not uncommonly get complicated with corneal ulcer as these cases are neglected in the early stages.

In these cases we gave a trial to Diazil Eye Ointment and in the majority of these cases also gave Diazil tablets locally the dose varying with the age, weight and condition of the eyes. In adults we usually gave one tablet t.d.s. for 3 to 4 days or longer depending upon the severity. The ointment was applied four times a day at regular intervals after cleaning the eye with boric lotion or normal saline. In our previous work we had found Sulphacetamide ointment to be superior to other sulpha drugs. Diazil eye ointment is equally efficacious if not more in these cases.

Uncommonly cases of Trachoma had superadded acute conjunctivitis and in these cases Diazil tablets and ointment gave very encouraging results. The superadded infections in the majority of cases cleaned up in 24 to 48 hours depending upon the majority of the infection and the application of the drug at regular intervals. The patients did not complain of any toxic symptoms following the administration of Diazil tablets locally.

As regards the value of Diazil in trachoma our records show that it is a very useful drug in controlling the condition and is of greater value in cases with superadded acute conjunctivitis. It is useful also in trachoma being as good as sulphacetamide. It is use of antibiotics like chloromycetin and aureomycin or terramycin has convinced us that they are more useful in trachoma. But cases with superadded acute conjunctivitis respond better to Diazil. I confidently recommend it in cases of acute catarrhal or prurulent conjunctivitis.

INFECTED URACHAL CYST

T. BALAKRISHNAN, M.B., B.S.,
Asoka Hospital, Koshikode

RECENT surgical literature has contained a number of articles about urachal cysts and their complications, with case reports. Thus, the *American Journal of Surgery* had at least three articles on this subject in 1952. Apparently the condition is more common than it is generally believed to be.

Clinically important findings are: a persistent discharge from, and a mass near the umbilicus. Superficial inflammation of the umbilicus, and omphalo-mesenteric duct remnants are two conditions which give similar manifestations.

In the adult the urachus extends as a fibrous cord from the bladder to the umbilicus. The cysts are caused by incomplete

obliteration, and depending upon the site and degree, different clinical pictures may be produced. From the published reports it would seem that investigations such as cystoscopy and injection of the dye into the bladder are not of much help in diagnosis.

The treatment advocated is surgical excision.

Case report.—C., a male, aged 20 years, first came under observation on 1-2-55 for a fluctuating swelling on the lower left side of the umbilicus. The swelling was just under the skin. There was no sign of a discharging sinus. The abscess was incised and drained, and healed well in a few days.

He however, developed another abscess after about two weeks. Again incision and drainage were carried out. Methylene blue injected into the bladder was not seen in the discharge. This time also the healing was quick and satisfactory. But after about two weeks, he again came back with a swelling, and was treated with penicillin injections. The condition gradually, cleared up.

On 1-4-'55, under low spinal anaesthesia, a midline incision was made from the umbilicus to the pubes. The recti were separated, but the urachus, which was situated anterior to the peritoneum, did not declare itself immediately.

The extra-peritoneal fat was then swept off the bladder, and its fundus carefully cleared. The urachus arising from the fundus was then easily seen. At its site of attachment, the fundus was hard.

The urachus itself was fleshy at its origin, but rapidly thinned into a fibrous cord, and expanded again somewhat near the umbilicus. On either side of it, the obliterated hypogastric arteries were clearly seen as two thick white cords.

The umbilicus were cut into, and everted with strong Allis forceps, and the urachus was detached from just behind the umbilicus, thus preserving the structure. It was then excised from the bladder along with the indurated part of the bladder musculature, about one inch in diameter. A self-retaining catheter was inserted, and fixed by firmly suturing the defect in the bladder musculature around it the bladder was fixed to the recti.

The peritoneum which was opened during the course of the dissection, was now closed and the abdominal wound sutured, with the catheter coming out at the lower end.

Convalescence was uneventful. The catheter was removed on the 4th day, and the patient voided urine on the next day. He has remained free from any recurrent attacks of sepsis.

QUINIDINE

Some patients with ventricular tachycardia are very sensitive and others exceedingly resistant to the action of quinidine.—(*Am. J. Med.*, Sep. 1954; p. 396).

ANTIBIOTICS IN CONGENITAL DACROCYSTITIS

KEWALRAM B. ISRANI, L.C.P. & S., R.M.P.,
Agra (U.P.)

ALL ophthalmic surgeons should be receiving in their practice a few cases of congenital dacrocystitis.

The average ophthalmic surgeon is not enthusiastic when he has to treat cases of congenital dacrocystitis, for he scents failure ahead.

All medicinal treatments like gutta and fomentations are useless. The surgeon avoids operation, as he has to do it *under chloroform* in a bloody field, and the complete removal of the sac becomes guess work; the movements of the baby after operation may tear open the sutures, making the wound septic. If the surgeon makes up his mind to operate, the relatives invariably object to the procedure and the patient is taken from doctor to surgeon, till some surgeon advises the relatives to wait till the baby grows up. This advice is offered simply to get rid of the patient.

I have treated with success half a dozen cases of this condition in babies whose ages varied between 15 days and three months. I always started with.

℞ Penicillin Sodium (Pfizer) ... ½ lac
Streptomycin dihydro. . . ¼ gm
Aqua dil. ... ½ oz
gutta 2 drops in diseased eye every hour during day time and
Terramycin eye ointment at night. 50 per cent of cases
responded successfully within three days.

In six other cases of congenital dacrocystitis, where I did not obtain good results, with the above treatment, I adopted the following method with significant success.

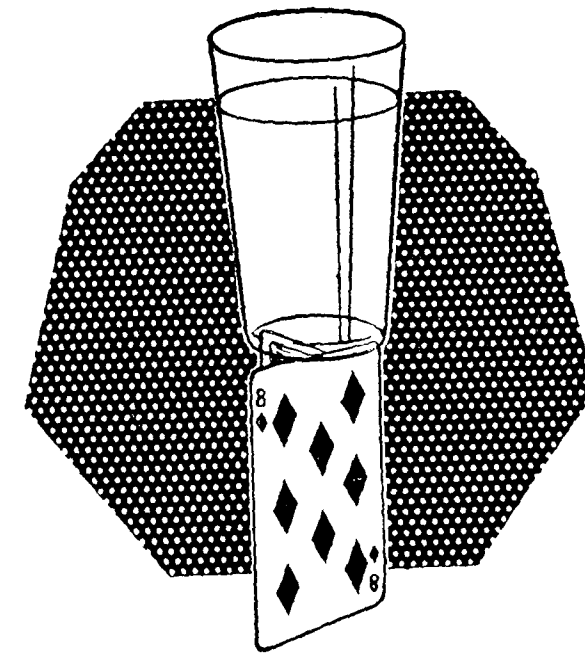
℞ Penicillin Sodium (Pfizer) ... 1 lac
Dihydrostreptomycin (Pfizer) ... ¼ gm
Aqua dil. ... 5 cc.

Take 2 cc. of the solution in an all-glass syringe with a 20 gauge needle properly sterilized. Inject this solution in the sac through the skin by the side of the nose. Accumulated pus and mucus regurgitate out from the punkta, the sac gets washed, and at the same time due to pressure on the duct, some solution gets in on second or third sitting. Repeat this treatment every alternate day half a dozen times; and you find that the diseased mucous membrane of the sac and duct get physiologically all right and function well.

NOTE:—Sterilize the skin of the cyst with 2% picric acid solution, and dry it thoroughly before injecting. Do not injure any vein, otherwise your repeated sittings will have to be suspended or delayed. Apply Terramycin eye ointment twice a day.

Conclusions.—Excisions of cyst with all risks of failure have been obviated by the successful medicinal treatment; the patient can be treated as outdoor patient.

8273, Bari Hakimian Galli,
Agra, U.P.



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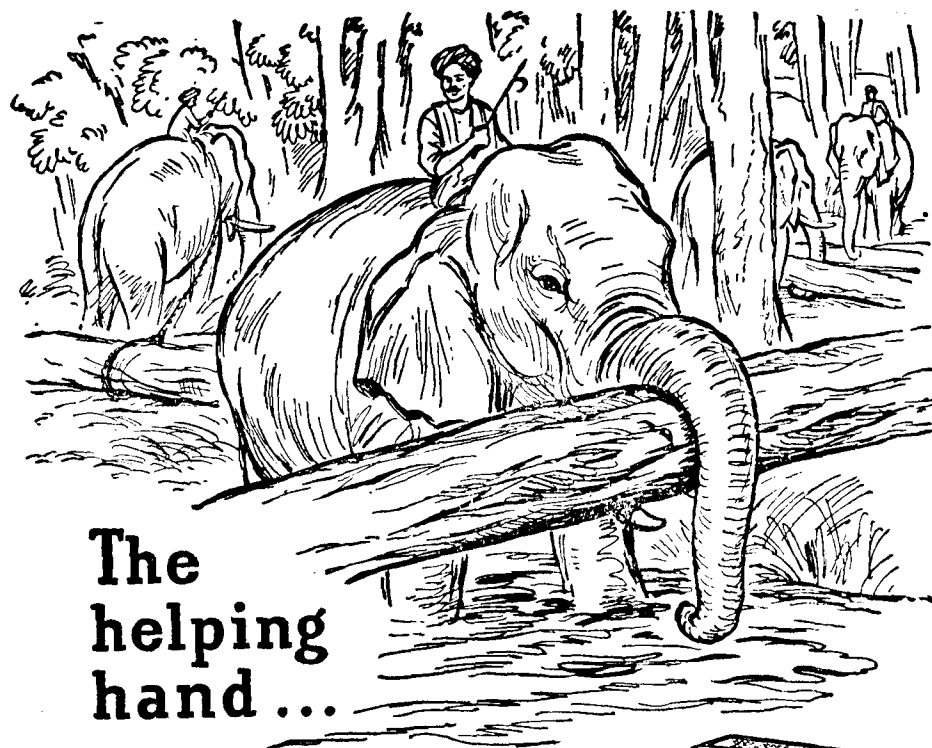
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Caffein. B. P.	—	—	—	0.9 %
Aneurin Hydrochlor. B. P.	—	—	—	10 mg.
Nicotinamid. B. P.	—	—	—	100 mg.
Acid. Cit. B. P.	—	—	—	2.5 g
Vehicle.	—	—	—	

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THE USE OF CHLORPROMAZINE IN GENERAL PRACTICE

(A Review of the Literature)

CHLORPROMAZINE (*syn*: Largactil in U.K., France, Canada and Italy; Thorazine in U.S.A.; Megaphen in Germany; Hibernol in Sweden; Amplictic in South American countries) is available as tablets for oral use and as a 0.5 or 2.5% solution for parenteral use. The aqueous solutions are acid in reaction and irritant to the tissues; it is closely related to phenargan and diethazine. It has been used as an anti-emetic, as sedative, as an adjunct to anaesthesia and also in other clinical conditions.

Though it has been used in a variety of conditions, it has not as yet been accorded definite or finalised clinical evaluation. In view of the somewhat conflicting views in the appraisal of its value in general practice, we give a review of the available literature.

It was first introduced by LABORIT and HUHENARD in 1951 as a drug to prepare patients for operation, and was given along with promethazine and pethidine. The action of chlorpromazine would appear to be primarily on the autonomic and central nervous systems. COURVOISIER and her colleagues (*Act. Int. Pharmacodyn.*, 92: 3 and 5, 1953) affirm that it acts at the level of the hypothalamus, and depresses the reactions of the autonomous nervous system to stress. Other reactions have also been recorded, e.g., thermo-regulation. The action of the drug in causing a fall of body temperature was stated to be dependent on a block of the autonomic system, and this view has gained evidence with various authors, in spite of the irrefutable evidence that "the main control of the body temperature is due to the tonic impulses passing down the voluntary nerves to the skeletal muscle. Recently HOLZBAUER and VOGT (*Br. J. Pharmacol.*, 9: 402, 1954) have shown that one form

[715]

of sympathetic activity which is originated centrally is not affected by chlorpromazine, viz: that which follows the administration of morphine. They found no diminution in the central stimulant action of morphine as a result of the previous administration of as much as 25 mg. of chlorpromazine." They have also disproved the suggestion that the drug prevents ACTH being released after the trauma of an operation and thereby diminishes the effect of stress; they have further showed that not only chlorpromazine by itself caused the release of some ACTH but also that it did not modify the release of ACTH by adrenaline.

FOSTER *et al* (*Lancet*, 25-9-1954) studied its action on the circulation in man and found that it usually caused a fall in blood-pressure and a rise in the pulse-rate, but that the extent of these changes was very variable and unpredictable. The hypotension was postural and passed-off in 4 to 6 hours. The results of their detailed study further showed conclusively that chlorpromazine caused vaso-dilatation in the limbs, which was greatest in the hands where vaso-constrictor tone was the strongest. It reversed the action of adrenaline on the vessels of the hand; the use of nor-adrenalin and not adrenaline is recommended to restore the blood pressure in cases of excessive hypotension due to this drug.

Although not an antihistamine itself, chlorpromazine has been described as "an young near-relative of the antihistamine substances (*Lancet*, 1953)." It is related chemically to promethazine and diethazine hydrochloride and like them has anti-cholinergic properties. The anti-emetic effect of the drug is amongst its most striking actions. FRIEND and CUMMINGS (*J.A.M.A.*, 153: 480., 1953) treated 70 cases of severe vomiting from causes as varied as anaemia, pregnancy, drug intoxication and carcinomatosis and concluded that the action was central. HOMBURGER and SMITHY (*New. Eng. J. of Med.*, 251: 820., dated 11-11-'54), found this drug to be a valuable agent for the relief of vomiting and nausea in 20 patients with advanced incurable cancer. The drug (25 mg. in tablet form) was administered two to four times daily. ISAACS and MACARTHUR (1954) showed that the drug had a significant effect in man in preventing emesis caused by apomorphine. MOYER *et al* (1954) reported that it was effective in the prevention and treatment of nausea and vomiting associated with the administration of drugs e.g., digitalis morphine, nitrogen mustard; various infections especially gastro-enteritis, radiation sickness; alimentary disorders; pregnancy and many other conditions. The drug was found to be very effective in 10 cases with intractable hiccough who failed to respond to all other remedies. The hiccoughs were dramatically arrested within 20 minutes of injecting 25 mg. intramuscularly (*vide abstract p. 134, ANTISEPTIC, Feb. 1955, and Arizona Medicine, May 1955*).

O'SULLIVAN of Dublin (*Jour. Irish Med. Assoc.*, Aug. 1954) found that the drug when used on the emotionally unstable

patients had potent effects on most, but these effects were unpredictable and many of them undesirable: "the drug was therefore one not likely to find universal favour in the field of general practice." KOPERA and ARMITAGE (*Br. J. Pharmacol.*, 9: 392, 1954) demonstrated a peripheral action on the skeletal muscle, which when exerted on all the skeletal muscles even to a small extent would be the most likely explanation of its temperature-lowering property." (*B.M.J.*, 5-2-1955, Editorial).

DELAY and his co-workers (*Am. Med. Psychol.*, 11: 276., 1952) and SIGWALD and BOUTTIER (*Ann. Med.*, 54: 150., 1953) found the drug was effective in managing the psychomotor excitement seen in states of anxiety confusion, mania, obsessions and phobias. Using higher dosage levels, LETUMANN and HAURICHAN (*Arch. Neurol. and Psychiat.*, 71: 227., '54) noted improvements of various degrees in schizophrenics. LABORIT *et al* (*Anaesth. et Analg.*, 9: 232., 1952) and FORSTER *et al* (*Anaes. et Analg.*, 9: 250., 1952) found that the drug when used preoperatively potentiated the action of hypnotics and anaesthetics. WALLIS of New York (*N. Y. St. J. Med.*, 15-1-1955) used chlorpromazine to potentiate the action of other drugs in 3 groups of 39 non-surgical patients: (a) patients unable to sleep in spite of their taking Seconal, Nembutal or Tuinal before bedtime; (b) patients with acute and chronic pains unrelieved to any appreciable extent by usual analgesics and therapies; and (c) anxious and tense patients with psychosomatic complaints. He found that chlorpromazine was definitely useful in all these three types of patients.

Quite a large number of important papers, have been recently published on the use of chlorpromazine as a sedative in the treatment of states of mania, delirium, confusion and agitation irrespective of the underlying psychopathology. ELKES and ELKES (*B.M.J.*, 2: 560., 1954) found it had a quietening effect and the response was only symptomatic, making the patients more amenable to suggestion and guidance. An increase in appetite and weight was often noted. LOMAS (*B.M.J.*, 9-4-'55) reported a study of 205 patients of different psychotic categories. The most striking results were obtained in chronic psychotics, for whom the prognosis would have been very bad. SEAGER (*B.M.J.*, 9-4-'55) has reported a controlled experiment on 46 elderly psychotic women; most of them became more manageable. VAUGHAN *et al* (*Lancet*, 28-5-1955) treated 224 female patients suffering from recent and chronic neurotic and psychotic states. The most dramatic improvement was in the schizophrenic group and was comparable to the remarkable effects produced by maintenance-electro-convulsive therapy (E.C.T.). The overall conclusion from this very important controlled study is that the drug effectively controls the symptoms of psychomotor over-activity, aggressiveness, agitation and psychotic tension. It is therefore, particularly valuable for the chronic

over-active, deteriorated schizophrenic patients with mania and with schizophrenic excitement and patients who are unsuited for E.C.T., or other forms of physical treatment. AYD (*South. Med. J.*, Feb. 1955). MORGAN, as well as ANDERMANN and LINDSAY (*Med. Jour. Austral.*, 16-7-'55) have separately reported encouraging results from the use of chlorpromazine.

J. M. MACGREGOR, Neurologist of Groote Schur Hospital, Capetown, S. Africa is very enthusiastic in his appraisal of this synthetic drug, which he has used in 100 patients with a variety of psychomotor and neurological disorders (*S. Afr. Jour. of Clin. Sc.*, Dec. 1954). His case records include acute mania, schizoid cases giving good response) vomiting, hiccup, epilepsy etc. The main effects as recorded by him, are the lowering of the psycho-motor excitement, lessening general tension, relieving nausea and vomiting and controlling those factors which lead to an exacerbation of pains of neurovegetative origin. "It is singularly free from serious toxic effects and does not appear to lead to addiction. It acts synergistically with a number of sedatives and anaesthetics."

LOMAS *et al* (*Lancet*, 4-6-1955) however, have recorded their observations on 800 patients treated with this drug and the complications they noted are divided into side-effects and toxic reactions. The most common side-effects are: dryness of the mouth, tachycardia and postural hypotension the last being the only one requiring special precautions. Jaundice, blood-dyscrasias, the skin reactions and oedema, pyrexia and epileptic fits all occurred as toxic manifestations.

WRIGHT and ANDERSON (*Dis. Nerv. Syst.*, 16:114-119., April '55) have elaborately described the side-effects and complications encountered in 251 cases of psychotics, treated with chlorpromazine.

Complications which have occurred have been divided into the following five groups according to aetiology: (1) *Complications due to local irritation*: burning in mouth and oesophagus, 10%; nausea and vomiting 60%; persistent bad taste, 2%; (2) *Complications attributable to autonomic disturbance*: dry mouth 90%; nasal congestion 60%; facial pallor, 40%; Seborrhoea, 10%; blurring of vision, 15%; hypotension 90 per cent; tachycardia, 90 per cent; constipation 30 per cent; urinary frequency, 2 per cent; (3) *Complications attributable to interference with central regulatory mechanisms*: hyperthermia, 3 per cent; fever, 18 per cent; increase of appetite, 80 per cent; respiratory irregularities, 6 per cent; somnolence, 85 per cent; insomnia, 4 per cent; inhibition of drive, 67 per cent; (4) *Complications which may be regarded as sensitivity reactions*: obstructive jaundice, 0.8 per cent; dermatitis, 12 per cent; photosensitivity, 4 per cent; (5) *Complications of unexplained origin*: alarming dreams 25 per cent; tremor, 16 per cent; parkinsonism, 7 per cent; confusion, 1.5 per cent; engorgement of female breast, secretion of colostrum, 12 per cent; increased sexual desire, 9 per cent.—(*Dig. Neur. Psychiatry*).

The above side-effects, complications and toxic reactions have been recorded also by COHEN *Am. J. Med. Sc.*, 229: 255., 1955);

LEMIRE *et al* (*Clin. Res. Proc.*, 3: 23., 1955); LEWIS and SAWICKY (*J.A.M.A.*, 157: 909-10., 1955); WILSON and WOOD (*Pract.*, 174: 194., April '55); TRETHOWAN (*Lancet*, 16-4-55), SEAGAR (*B.M.J.*, 9-4-55); FRANCKE (*Bull. Pharm. Therap. Commee.*, Oct. 1954), and several others from different countries.

The dosage of the drug must be based on individual requirements. The initial oral dose for mildly to moderately affected patients is 10 mg. three to four times daily. This may be increased as necessary, or as tolerance permits to 20 or 25 mg three or four times daily. The dosage for children under 5 years of age is 1 to 2 mg. per kilogram of body-weight, two or three times a day. Children over 5 may receive from one third to one-half the adult dose.

The initial dose for the seriously ill non-ambulatory patient is 25 to 50 mg. three or four times daily, given either orally or by intramuscular injection. The dosage should then be adjusted according to response. Intramuscular injection should be made deep into a large muscle mass. To guard against postural hypotension the patient should remain in the lying-down position for at least thirty minutes after each injection.

The drug should be given intravenously, *only* by a very experienced anaesthesiologist. Intravenous administration may lead to severe hypotension. For intravenous administration, 10 to 25 mg. of the drug is diluted to not less than 20 cc. and infused slowly over a period of approximately five minutes. Subcutaneous injection is contraindicated because of local irritation.

Other uses.—Reports have recently come to hand relating to its successful use for pre-medication in ophthalmic surgery, for detoxifying the acute alcoholic and for relief in labour pains. Thus GIBSON MOORE (*Br. Jour. Ophthalm.*, Feb. 1955) used Largactil for pre-medication in 58 ophthalmic operations and found that it produced a more relaxed patient and an uneventful post-operative period.

SERMENT *et al* of Marseille secured adequate sedation and decrease of pain during labour and delivery in 50 patients, by the administration of chlorpromazine and phenargan. The drugs were given orally to 60 patients as soon as dilation of the external os reached 1 to 2 cm. The sedative and analgesic effects were evident in half an hour and lasted for an hour and a half. The contractions became less painful without decreasing in intensity. No ill-effects due to the drug were noted in any of the infants.

Many of the side-effects and complications commonly observed in chlorpromazine therapy are benign and transitory in nature. From the published literature, we gather that it should *not* be given to patients with liver disease. It is contra-indicated in the treatment of coma due to the use of central-nervous-system-depressants like alcohol and barbiturates. Its combination with other drugs which are liable to produce agranulocytosis or leukopenia should be avoided.

THE MANUFACTURE OF DRUGS IN INDIA (Expansion of Industry)

THE Union Government has accepted the recommendations of the Pharmaceutical Enquiry Committee, for the progressive expansion of the manufacturing activities of pharmaceutical concerns, to achieve the production of pharmaceuticals starting from basic chemicals. In our editorial review of this report made in December last, we gave our readers an account of the salient features of this valuable report.

The Committee's recommendations regarding the guiding principles to promote foreign participation in the industry has also been accepted by Government. Applications for licences under the Industries (Development and Regulation) Act are examined in the light of these general principles.

The Pharmaceutical Inquiry Committee submitted its report in June last year. The report was published in September 1954 and comments on the Report received from the State Governments and the public have since been taken into consideration by the Central Government.

According to the statement, following the recommendations of the Committee, the Government are actively considering measures to centralise the administration of the Drugs Act, and exercise Central Control in the quantum of production. As a first step, to bring about a better coordination in the working of the Drugs Act, and the Industries (Development and Regulation) Act, the Government have appointed the Drug Controller (India) as an ex-officio industrial adviser (pharmaceuticals and drugs).

As recommended by the Committee, a Development Council for pharmaceuticals and drugs had been set up for advising Government on matters relating to the industry. This Development Council held its first meeting on April 20, 1955 and is at present engaged in drawing up the Second Five Year Plan for pharmaceuticals and drugs. The statement also states, Government had been considering the possibility of expanding the existing laboratories under the control of the Central Board of Revenue, and the setting up of new ones in several places.

The Government has also accepted in principle, the recommendation that the duty on raw materials should be so adjusted as to amount to a total incidence, which is less than the duty levied on the finished products, and such relief should be given either in the form of reduction, remission or rebate of the duties levied on the raw materials.

The Committee has recommended that slaughter houses on modern lines equipped with facilities to collect and store the glands and organs required by the pharmaceutical industry should be provided in all big cities and large towns. The State Governments have been impressed of the need for taking up a programme of the

modernising of slaughter houses in big cities such as Madras, Bombay, Calcutta, Delhi, Kanpur and Hyderabad. It has been urged on them that this question should be discussed at a conference with the representatives of the Pharmaceutical Industry, the municipal authorities and the State Drug Controllers and a practical and workable programme drawn up for the purpose.

The Ministry of Food and Agriculture has also appointed an 'ad hoc' committee, to examine *inter alia* the report of the Pharmaceutical Enquiry Committee relating to the improvement of supply of animal glands and organs required for the manufacture of hormones and other glandular products.

The recommendations of the Committee which refer to the improvement of State-owned quinine factories, and other Government institutions manufacturing vaccines, sera and synthetic drugs and other recommendations like organising the cultivation and collection of medicinal plants and improving the supply of raw materials required by the industry are being brought to the notice of the State Governments concerned and the importance of early implementation impressed on them.

The attention of the industry and trade is being drawn to the recommendations of the Committee which relate to them such as improving the co-operation between manufacturing and formulating units in their activities, the pooling of resources of small-scale manufacturers to set up properly equipped co-operative units, setting up of testing laboratories in co-operation with the medical profession for certifying the products made by the industry to foster public confidence in the indigenous products and assisting Government in preventing the sale of sub-standard and spurious drugs.

Speaking in Bombay on 24th August 1955, Major-General SABIB SINGH SOKHEY, M.P., who recently returned from a tour of Russia and Czechoslovakia, said that the Soviet Union was willing to help India to become self-sufficient in essential drugs and that he would shortly be submitting a scheme to the Central Government on how India could manufacture the requirements of essential drugs for less money than is now being spent annually in importing them. India annually imported drugs worth Rs. 18 to 20 crores which, if produced here, would cost much less and would at the same time save valuable foreign exchange. We are sure that this will also provide employment to thousands and also draw forth latent Indian talent. Gen. SOKHEY said he undertook his present tour of Russia in the company of two other chemists to investigate the possibility of making in the country all the essential drugs, recommended in the report of the Government of India's Pharmaceutical Inquiry Committee and the various reports of the Government Pharmaceutical and Drugs Research Committees, of which he was President.

He said the Soviet authorities had expressed their desire to help India in developing the drug industry. All the plants would be supplied at cost price, and the technical know-how, would be made available free for India. Training facilities would be made available to any number of Indians under a scheme and Soviet experts would take Indians into confidence at every stage of the erection of the plants, so that afterwards these Indians could set up more plants of the same type without foreign help. This to our mind, is a very generous offer and should be accepted. Gen. SOKHEY said his 'unofficial delegation' studied in particular how to manufacture: (1) Drugs from medicinal herbs in which India was rich but which at present were sold unprocessed "for a song" to foreign firms. (*the italics are ours*). It may be recalled by our readers, that this happened quite recently in India with regard to Rauwolfia Serpentina, which has now been in short supply as a result of heavy exports to foreign countries. Botanical surveys have therefore, been started in North and South India and the Central Government have launched measures to establish four regional circles for the purpose at Shillong, Poona, Dehra Dun and Coimbatore with the Central Headquarters at Calcutta. We know that a Central Research Laboratory for researches into the cytology, anatomy and physiology of plants has been established at Lucknow temporarily. Measures to equip this laboratory with means to study the effect of radio-isotopes on plants are also being considered.

Gen. SOKHEY also studied while in U.S.S.R., chemical synthetic drugs and allied products; vitamins; all antibiotics; and also all the heavy chemicals and intermediates needed to make these drugs.

It is thus quite manifest that India can and will soon become quite self-sufficient in the matter of drugs and chemicals. The quinine and DDT factories have already been manufacturing their respective chemical products successfully and in conformity with accepted standards. It is welcome news to hear that the State-owned Penicillin Factory at Pimpri, near Poona, which went into production on the 1st August 1955 has already exceeded the rated capacity and that, according to the latest press-release from the Union Ministry of Production, the Penicillin produced in this factory has, as a result of sample tests in the United States and Britain, been found to compare favourably with penicillin produced in those countries.

Streptomycin and Bacillin will soon be manufactured in addition to penicillin at this factory.

We are glad to note the fairly rapid progress that is being made in the matter of manufacturing valuable drugs and chemicals in order to make our country self-sufficient and we may truly hope that the day is not far off when we may be in a position even to export high class drugs and chemicals to other countries.

Gleanings from the Medical Press

MEDICINE AND THERAPEUTICS

The nature and frequent of delirium tremens and allied conditions.—(R. W. Armstrong, and Jonathan Gould, *J. Ment. Sci.*, 101: 70-84, January, 1955, via *Dig. Neur. Psych.*).

Standard treatment for delirium tremens is by sedation and the administration of fluids and glucose, with paraldehyde the drug of choice. Sedation—usually with barbiturates—is also used in toxic-infective delirium. The use of vitamins in treatment or toxic organic states has usually been limited to the giving of one vitamin in high concentration although there is evidence that this may precipitate signs of deficiency of other vitamins. The authors consider delirium tremens to be essentially an avitaminosis B₁ equivalent. However, believing that single avitaminosis does not usually occur clinically, they decided to use very large amounts of several vitamins and developed empirically a technique in which high potency vitamin mixtures given parenterally were used in the treatment of delirium and allied psychotic states associated with alcohol, infection, and drugs. They present 14 cases.

Doses and dosage patterns varied from case to case. Really rapid improvements or recoveries were associated with mass doses and with the pattern of 1500 mg. ascorbic acid, 1000 mg. aneurin hydrochloride, and 100–200 mg. nicotinamide except in one case in which the psychosis was associated only with infection. The use of large doses of mixed vitamins is supported by physiological considerations. Delirium tremens may be considered as resulting from (1) a progressive imperilling of the basic carbohydrate respiration of the brain due to increasing lack of vitamins and (2) a deviant pattern of metabolism due to the forcing of alcohol as an alternative oxidizable substratum. If this interpretation is accepted, then it follows that different factors may predominate in different cases. Vitamins, therefore, should be given in amounts large

enough to rectify the disturbed metabolic pattern of the brain as well as to provide for a therapeutically produced imbalance and daily dietary needs. The patterns of dosage used in the cases presented followed this general theme. Use of high potency vitamin mixtures was extended from delirium tremens to include deliria due to drugs and toxic-infective delirium as well as other disorders of brain functions because of the basic similarity of these toxic-organic reactions and their probably similar biochemical aetiology—interference with brain carbohydrate respiration.

Although the number of cases presented is small, the authors consider the responses obtained good enough to warrant further clinical trial. They suggest that the following dosage regime be used: ascorbic acid 1500 mg., aneurin hydrochloride 1000 mg., nicotinamide 100 to 400 mg., pyridoxin 200 mg., repeat in 4 to 8 hours s.o.s., followed by half doses at 4 to 8 hourly intervals as indicated clinically.—

Angina pectoris and angina innocens.—(Kerr L. White, Joseph L. Grant, and William N. Chambers, *Psychosom. Med.*, 17: 128-138, March-April, 1955, via *Dig. Neurol. Psychiat.*).

The authors have studied 55 patients with anginoid pain. Twenty had classical angina pectoris with well documented myocardial infarction; 20 had angina innocens, or chest discomfort referred by them to the heart without evidence of organic heart disease; 15 did not fall clearly into either group. It was found that most of the patients with angina pectoris were over 45 years of age when their symptoms began, while most of those with angina innocens were under 45. The angina pectoris patients tended to avoid using the word "heart" when describing their symptoms, while the other groups tended to use it. The patients with angina pectoris tended to deny the significance of their symptoms by words

and behaviour, while the patients with angina innocens tended to dramatize their symptoms. Patients with angina pectoris had substernal pain, lasting less than 20 minutes and relieved by rest. Patients with angina innocens gave descriptions of their pain that were frequently bizarre and variable; the pain varied in duration from a few seconds to several days, and was not so promptly relieved by rest. Patients with angina pectoris had coronary artery disease, by definition; in addition, three had other organic conditions contributing to chest pain, and others had other organic conditions. Eleven of the patients with angina innocens had organic conditions, contributing to the pain.

A history of broken homes was found most frequently in the mixed group and often in the angina innocens group. Phobias, hysteria and hypochondria were most common in the angina innocens and mixed groups, while depression was more frequent in angina pectoris. Obsessive-compulsive traits were common in all three groups, as were strong dependency needs and a tendency to fall short of personal goals. The angina pectoris group showed anxiety in their face and manner rather than their statements, while patients with angina innocens openly expressed anxiety. Most patients gave a history of chronic emotional tension. The average number of all diseases per patient was highest in the mixed group which also had the greatest number of hospitalizations. The mixed group and the angina innocens group had consulted the greatest number of physicians. Twelve patients died after the study began, 10 in the angina pectoris group and 2 in the mixed group. Three quarters of those in the angina innocens and mixed groups improved after combined medical and psychological treatment, but none was cured. Seven patients with angina pectoris showed improvement. It was found useless and occasionally ill-advised to insist on the absence of heart disease in patients who were intensely dependent upon the gain which they derived from their "illness."

It is concluded that consideration of the patient's social, psychological and

physical attributes is essential in the evaluation, treatment and prevention of anginal pain.

Electroshock treatment: indications and contraindications.—(S. Wohlfahrt, *Nord. Med.*, 53: 53-55, 13-1-'55, via J.A.M.A.).

The main indication for electroshock therapy is the depressive stage of manic depressive disease. About three fourths of the patients treated become free from symptoms. Involuntary melancholias and the depressive psychoses during and shortly after the climacteric also constitute a large and important group that often reacts quickly and reliably to electroshock. In selected cases enduring [results can be attained with perhaps three or four electroshock treatments. Electroshock therapy in depressed older persons on the whole gives the same good results as in younger persons, but special care is called for. If careful internal medical analysis of the condition is made and the modern electroshock technique is employed, i.e., oxygen administration together with muscle relaxants, physically normal persons up to 75 years of age can be treated. Moderate cardiac, vascular, or pulmonary insufficiency need not always contraindicate electroshock therapy. Ambulant treatment can be carried out in moderate depressions but not in schizophrenia and other psychoses. Brief amnesic disturbances follow electroshock. If many treatments are given in close succession the reactions can accumulate. The prognosis for this insufficiency is good provided the number of treatments is kept within normal limits, at the most 10 shocks in succession. At the Sodersjukhus treatment is individualized and more than four successive treatments are rarely given.

New method for study of intracellular parasites with the electron microscope.—(B. N. Dutta, N. N. Das Gupta, M. L. De, A. Guha, S. Nandi).

Electron microscope examination of parasites contained within an erythrocyte is difficult, because the red blood corpuscle itself is too thick for the penetration of the 50-kv. electron beam.

In the electronic image, the infected blood cell appears uniformly dense, within which the parasites cannot be identified. Several methods have been proposed for overcoming this difficulty. This first is to subject unfixed cells to osmotic hemolysis in distilled water. Another method is to make ultra-thin sections suitable for electron microscopy, either by means of special microtomes or by splitting of specimens.

We wish to report a method that is suitable for routine use and is much easier to use than the method of ultra-thin sectioning. This method has been used for the electron microscopic study of malarial parasites contained within the red blood corpuscle.

In this method, infected blood is first smeared on collodion-coated glass slides which are fixed subsequently by exposure to the vapor of 2 per cent OsO₄ solution for 3 min. The slides after a careful wash, are hydrolyzed in normal HCl at 60°C for 10 min and then again washed in distilled water. After the slides are thoroughly dry, the collodion film with the hydrolyzed smear of blood is stripped from the glass and mounted on steel mesh for examination under the electron microscope. —(*Science*, 10—9—54).

Liver function tests in viral hepatitis.—(*Gastroenterology*, 26: 1954, via *Mod. Med.*, 1-10-'54).

Total serum bilirubin and the forty-five minute bromsulphalein retention are the two essential tests to guide therapy for viral hepatitis with jaundice. A third test, thymol turbidity, parallels bromsulphalein retention in the convalescent period and is of value to confirm results obtained by the latter.

Measurement of serum bilirubin is employed alone until jaundice subsides, usually when values decline below 1 mg. per 100 cc. The second procedure is then added, and results may be confirmed by the thymol turbidity technique.

Weekly determinations until levels are normal, guard against leaving bed or resuming work too soon. Any relapse is noted, while avoiding the delay and expense of unwarranted medical care.

Tests that proved less reliable in 106 cases of hepatitis are zinc sulphate turbidity, colloidal red, gamma globulin, forty-eight hour cephalincholesterol flocculation, and phenol turbidity.

The icterus index, though of some help, is far less precise than total serum bilirubin. The one minute method for serum bilirubin is useless.

Most of the group examined by Kimmel *et al* were admitted to the hospital within two weeks after becoming jaundiced. Serum hepatitis was diagnosed in 21 subjects and infectious hepatitis in the remainder. In the infectious group, 63 had serum bilirubin above 3 mg. per 100 cc.

Tests were done weekly throughout the hospital stay. During the jaundiced stage, when liver disease was most obvious, only bromsulphalein retention and total serum bilirubin were uniformly positive. Surprisingly, other methods ranged downward from 52 per cent accuracy of thymol turbidity to 9 per cent for phenol turbidity.

Throughout convalescence, when symptoms are few yet guidance is indispensable, bromsulphalein is unquestionably the most sensitive indicator. The first week after jaundice clears, results are positive in 89 per cent of cases, contrasting with 35 to 3 per cent for other methods. Corresponding figures by the seventh week are 34 per cent, 24 per cent, and 1 per cent.

The recommended tests greatly simplify the management of viral hepatitis. During jaundice, bed rest is complete except for bath-room privileges. The diet has high protein and caloric content with fat moderately restricted and supplements of brewer's yeast.

When jaundice and warning symptoms disappear, freedom of the ward is allowed, with two hours of rest during the day. The following week, liberty extends to hospital grounds. Next, a night is spent away from the institution, then two to four weeks at home.

If subsequent examination discloses less than 1 mg. of serum bilirubin, bromsulphalein retention below 7 per cent, and thymol turbidity under 7 units, the individual is permitted full activity and a regular diet.

A three-test regimen commonly yields good results. Convalescence occasionally takes more than six weeks but proceeds smoothly in 87 per cent

of cases. Relapse occurs in about 8 per cent of cases, chronic illness despite many months of treatment in 4 per cent, and death in 1 per cent.

SURGERY

Dietary control of the postgastrectomy "dumping syndrome."—(M.A. Hayes, *J. Am. Dietet. A.*, 31: 133-137, Feb. 1955, via *J.A.M.A.*).

Following gastric resection, approximately 11% of patients experience distress after eating. In some patients, the symptoms occur during or soon after eating; in others, an hour or two after eating. The early discomfort is more common than the later, but both may occur in the same patient. The type of reconstitution of the gastroenteric continuity seems to be unrelated to the frequency of the syndrome, but the segment of the stomach removed seems to play a part. It has been conclusively demonstrated that when the pyloric antrum and proximal duodenum are removed, delay in gastric emptying by the presence of fat is no longer observed. This is not true when a simple gastroenterostomy is done. This failure of patients in whom partial gastrectomy has been done to gain weight is also an important clinical factor, and some patients who have difficulty in maintaining their weight have complications such as the "dumping syndrome" or recurrence. This report is concerned with the management of both the dumping syndrome and the suboptimal weight complex by supervision of total caloric intake and the source of these calories from protein, carbohydrate, and fat. Studies were made on seven patients, all men, who exhibited varying degrees of the postgastrectomy nutritional deficit syndrome. One patient on whom data are presented in detail had more symptoms than any other, and his weight curve showed the greatest degree of malnutrition. The other six patients were managed on the same dietary regimen with complete subsidence of symptoms and restoration to or toward preoperative weight levels. Two of the seven patients who had displayed both

the early (dumping) and the late (hypoglycemic) symptoms were equally well controlled. The high protein and low carbohydrate content of the diet appears to be as adequate in the control of this induced hypoglycemia as it is in the management of functional hyperinsulinism. A diet of high fat, high protein content (slowly hydrolyzed) should be fed to the maximum exclusion of carbohydrate (easily hydrolyzed). A satisfactory diet is one with the caloric ratios from carbohydrate, protein, and fat, respectively, 1:1.5:5. In view of the high incidence of nutritional problems after gastrectomy, it might be advisable to recommend such a diet to patients in whom gastrectomy has been done as a preventive measure.

Special significance of concomitant gastric and duodenal ulcers.—(H. D. Johnson, *Lancet* 1: 266-270, Feb. 5, 1955, via *J.A.M.A.*).

Although duodenal and gastric ulcers cause similar symptoms and are histologically similar, there are great differences in the patients in whom these lesions develop. There are not only differences in age, sex, and racial distribution, but also the patterns of gastric secretion and muscle tone lie at opposite ends of the scale in the two types of patients. Whereas duodenal ulcer develops on a basis of hyperacidity, hyper-tonicity, and rapidity of gastric evacuation, gastric ulcers are associated with a rate of acid secretion below that of normal subjects and with stomachs that are sagging, sluggish, and slow in emptying. In view of these differences it is surprising that ulcers should sometimes arise in the stomach and duodenum of the same patient. Although reports vary greatly with regard to the incidence of concomitance, Johnson believes that it is probably about 5%, if symptomless ulcers are included. Of ulcer patients

who come to the hospital, about 7 per cent have both duodenal and gastric lesions. Surgeons, however, commonly see a greater proportion of such patients, and Johnson found 29 (or 9 per cent) in 311 patients on whom he performed operations for peptic ulcer. In addition to these 29 patients, he analyzes a further 90 cases made available to him by colleagues. He deduces from this analysis that the duodenal ulcer is the first to appear. The patients have a secretion pattern that lies between that of the patients with duodenal ulcer and that of patients with established pyloric stenosis. It does not resemble the secretion pattern of patients with gastric ulcer. A substantial majority of patients with concomitant ulcers have gastric retention and many have gross pyloric stenosis. About 16 per cent of patients hospitalized with pyloric stenosis have gastric ulcers as well. At operation the gastric ulcer is usually found to be active, while the duodenal ulcer is healed and scarred. Twelve additional cases are described that illustrate how gastric retention from causes other than duodenal ulcer may also be complicated by the development of gastric ulcers. In a series of 39 patients with hiatal hernias the author observed 4 with gastric, 4 with duodenal, and one with both gastric ulcer and a healed, scarred du-

denal ulcer, and he feels that this association can be linked with what has emerged concerning concomitant ulcers. He suggests that reflux oesophagitis may sometimes cause hiatus hernia, instead of *vice versa*, and reflux may in turn be caused by duodenal ulcer and gastric retention. Gastric retention may also apparently cause gastric ulcer, and the association of these lesions may thus be explained. Patients with concomitant ulcers are particularly prone to have hemorrhages, and, when they do, it is usually the gastric ulcer that bleeds. Two facts should be borne in mind in the treatment of combined gastric and duodenal ulcers: first, an element of gastric retention is almost certainly present, and so special preoperative measures are required, such as gastric decompression and lavage, also attention to likely depletion of water, electrolyte, and protein reserves; second, the patient is of the duodenal ulcer type and may have hypersecretion, although this may not be evident in the presence of pyloric obstruction. An operation adequate to control hypersecretion must be performed. The author believes that concomitant gastric and duodenal ulcers are too dangerous to warrant nonoperative management and that surgery should be resorted to early, before the risks become excessive.

OBSTETRICS AND GYNAECOLOGY

Genital moniliasis as a conjugal infection.—(A. M. A. *Arch. Dermatol. Syphilol.*, Dec. 1954).

Simultaneously with an increased incidence of vulvovaginal moniliasis following the administration of broad spectrum antibiotics in women, there has appeared in my practice an increased incidence of genital moniliasis in men. Sexual communicability of the infection caused by *C. albicans* was demonstrated in the study of 9 married male patients. In each case, the disease was acquired from the wife, who had developed vulvovaginal moniliasis during pregnancy or after treatment with broad-spectrum antibiotics.

Needless to say, most of the time moniliasis is not transmitted freely by sexual exposure, as the frequency of genital moniliasis in the female compared with the infrequency of genital moniliasis in the male will affirm. Perhaps there is a greater natural immunity of the male genitalia to invasion by *C. albicans*, owing at least in part to superior aeration of the skin of the external genitalia. Perhaps more important for requirements of contagion is the presence of a mucosal focus of monilial infection, demonstrably capable of macerating the skin of the vulva and contaminating it with a continuous discharge of large numbers of *C. albicans*. In defence of this

suggestion is the observation that when an unmedicated vaginal tampon is constantly worn, the vulvitis often heals with little or no local treatment.

Toxaemia and foetal survival.—(*Obst. and Gynaecology*, 3: 195., 1954).

K. C. McGuire and associates report a study of 750 patients with various types of toxæmia of pregnancy, of whom 455 were pre-eclamptic, 44 were eclamptic and 239 showed hypertensive vascular disease. A study of the foetal survival in the patients with pre-eclampsia showed "no significant difference" in the foetal loss whether labour was induced or the patient delivered spontaneously. It was observed, however, that in the group in which labour was induced, the average period of observation in the hospital prior to delivery was 9.5 days, while in those who went into labour spontaneously it was 6.3 days. This indicated, in the author's opinion, that they had been "too conservative" in induction of labour in these cases, while "nature often solved the problem" by spontaneous termination of the pregnancy. In the hypertensive vascular group with superimposed toxæmia the foetal loss was somewhat higher in those who delivered spontaneously than in those in whom labour was induced. Since January 1953 labour has been induced in patients with severe pre-eclampsia, if there is no dramatic improvement in their condition within three days after admission to the hospital. In the first five months of this period there were 23 patients with toxæmia of pregnancy, including 18 with pre-eclampsia; labour was induced in 9 of these 18 cases, in 5 of which the infants were premature (weighing 1555 to 2300 g.), and all survived. These observations suggest that early termination of pregnancy in severe pre-eclampsia will increase foetal salvage.

Treatment of carcinoma of the cervix.—(*Am. J. Obst. Gynecol.*, Jan. '55).

Carcinoma *in situ* of the cervix continues to be a problem, both from the histological criteria and the method of

treatment. Most cases which have been followed developed into invasive cancer over a period of years, but some regressed or disappeared. During pregnancy the cervix may develop changes identical with carcinoma *in situ* which disappear during the post-partum period. For this reason a positive diagnosis cannot be made at that time. Multiple or ring biopsies should always be made, to rule out possible invasion. Whether treated by radiation or by hysterectomy, these cases do extremely well. Occasionally, following surgery, actual invasion is found. Proper care of the cervix following childbirth, with cauterization when indicated, is important in the prophylaxis of this condition.

Treatment of invasive carcinoma of the cervix, Stages I and II, continues to be either radical surgery with wide gland dissection, or radiation. Proper radiation is available in most areas. The Radical surgery is a highly specialized field requiring special training and experience, as well as properly equipped hospitals. In addition, the postoperative complications of radical surgery can be serious. The same is true, but less common, of radiation. The end-results of radical surgery are good and are possibly better than those of radiation, but the difference is not striking. Undoubtedly, the eventual decision will depend upon the development of a method of determining the radiation sensitivity of cancer. Those cases which are sensitive will be treated by radiation, and those which are resistant by surgery.

Nausea and vomiting of pregnancy.—(*Am. Pract. and Dig. Treat.*, March '55).

Forty of a series of 44 patients treated with Bonamine by McKenna obtained satisfactory or complete symptomatic relief with this new antihistaminic. It was given in 25 mg. doses thrice daily to 22 patients, twice a day to 21, and once a day to one. This drug has a marked advantage inherent in its prolonged action upto 24 hours. A single bed-time dose of 25 to 50 mg. will carry patients through for a whole day. Few side effects were noted.

Reviews of Books, Periodicals and Reports

BOOKS

Synopsis of Obstetrics.—By JENNINGS C. LITZENBERG, B.Sc., M.D., F.A.C.S., 4th Edition, 1952, revised by CHAS. E. McLENNAN, M.D. with 157 illustrations including 5 in color. The C.V. Mosby Co., St. Louis.

This short illustrated pocket book of 378 pages is a synoptic review of obstetrics. Advances are continually being made in the subject and it would be unfair to criticize this book published 3 years ago for not incorporating the more recent advances. It is altogether a useful revision book for the medical student faced with obstetrics in his qualifying examination. As would be expected, the treatment of the subject is from an American angle. V.S.

Handbook of Tropical Dermatology and Medical Mycology.—Vol. II Edited by Dr. R. D. G. PH. SIMONS. 1953. Published by Elsevier Publishing Company, Amsterdam. Distributors Cleaver-Hume Press Ltd., 31 Wright's Lane, London, W. 8. Price £5 0-0 net.

The book is written by a number of specialists in Tropical dermatology practising in different parts of the world and is lavishly illustrated. The paper is glossy and the photographs have reproduced extremely well and the print is a pleasure to read. The aetiology, diagnosis, prognosis and the most recent treatment of the different diseases are dealt with comprehensively. This will be a useful reference book for those who practise dermatology. V.S.

Illustrated Review of Fracture Treatment.—By FREDERICK LEE LIEBOLT, V.S.

A.B.M.D., S. LL.D. 1st Edition 1954. Lange Medical Publications. Distributors in India M/s. Kothari Book Depot, King Edward Road, Parel, Bombay-12.

The object of the book which is a general review of fractures as they affect different parts of the body is to serve as a supplement to standard textbooks in the subject.

It is profusely illustrated not only with excellent black and white drawings but also by instructive X-rays and figure drawings to show the mechanisms involved in various bony injuries. Altogether quite an interesting and instructive addition to any orthopaedic library. V.S.

The Shoulder and Environs.—By JAMES E. BATEMAN, M.D., F.R.C.S. (O) (with drawings by Louis Gordon) 1953. The C. V. Mosby Co. St. Louis.

A Mosby production means excellence both in quality of production and print. This will undoubtedly be accepted by all. Those who read this book will have their belief confirmed again. Profusely illustrated by line drawings, X-rays and clinical photographs, this book discusses in a systemic way all the ailments to which the shoulder and its related parts are prone.

Starting with the evolution and embryological development of the shoulder the author goes on to describe the anatomy, physiology, pathology and diagnosis of shoulder diseases and their treatment.

This book is a veritable orthopaedic treat. V.S.

Books Received

Backache in Women.—By E. SCHLEYER-SAUNDERS, John Wright & Sons Ltd., Bristol 4, Price 7s. 6d.

L.C.P.S., M.L.C., Bombay. 502 Narayan Peth, Poona 2.

Indian Year Book of Ophthalmology 1954—By VAMAN D. SATHAYE B.Sc.,

Indian Practitioner—Special Number on "Cardio-Vascular Diseases"—July '55. 231, Hornby Road, Fort, P.O. Box 376, Bombay 1. Price Rs. 2/-

New Preparations

"Nufertabs"

British Drug Houses have available in India a new iron compound tablet called 'Nufertabs.' The formula is as follows:—Ferrous Sulphate, exsiccated, 3 grains (200 mg. approx.); Ascorbic acid 10 mg; Acetamenaphthone 2 mg. in each tablet.

Clinical experience has shown, that the absorption of iron and the patient's tolerance to it are markedly increased in the presence of Vitamins C and K. The most outstanding feature of 'Nufertabs' is that in addition to providing the most effective form of iron therapy, it does not give rise to gastro-intestinal disturbances.

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'Nufertabs' are specially recommended during pregnancy, since they also enrich the maternal blood with essential Vitamin K and Vitamin C.

New Squibb Antibiotic may change Current Therapy

Until now there has been no effective non-toxic antifungal antibiotic. Now such a preparation has been discovered by E.R. Squibb & Sons, New York, who are marketing this product under the name MYCOSTATIN.

Since the introduction of antibiotics, many reports have appeared on the dislocation of the normal intestinal flora. Considerably more serious effects have been observed with the oral adminis-

tration of BROAD SPECTRUM ANTIBIOTICS, which are used for a wide range of infections caused by gram-positive and gram-negative organisms, various Rickettsiae, certain large viruses, and Endamoeba histolytica but which are ineffective against fungal infections. A fairly large volume of literature has been published showing that oral administration of broad spectrum antibiotics cause an overgrowth of fungi in the intestines, especially of Candida albicans, leading to severe gastro-intestinal distress (moniliasis) and various other fungal infections. It is probably more than mere coincidence that the number of deaths from moniliasis has increased significantly since the introduction and wide-spread use of such antibiotics.

Squibb have discovered that Mycostatin is able to inhibit the growth of or destroy these fungi. Therefore Squibb have now combined this new discovery of Mycostatin with their broad spectrum antibiotic STEOLIN to make the new "MYSTEOLIN" in order to provide broad spectrum antibacterial activity with effective antifungal prophylaxis. Accordingly it has the broadest anti-infective spectrum of any antibiotic preparation on the market which makes MYSTEOLIN, now introduced in India by Sarabhai Chemicals, the only product of its kind. For the first time it is now possible for a doctor to give his patients both antibacterial therapy and anti-fungal prophylaxis in one single capsule. It is expected that this great advance in antibiotic therapy may revolutionize the present mode of treatment since any patient sick enough to need broad spectrum antibiotics deserves the added protection against intestinal moniliasis afforded by MYSTEOLIN.

USE OF COLLOIDAL OATMEAL INSIDE RUBBER GLOVES

Many persons with hand eczema are uncomfortable while wearing rubber gloves even when cotton gloves are worn next to the skin. The use of a suitable colloidal oatmeal powder like Aveeno for dusting on their hands before putting the gloves on, made the patients feel comfortable. The eczema improved more rapidly after this therapy.—(A.M.A. Arch. Dermat., March 1955).

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News and Notes

Penicillin required in India to be produced by State-owned factory

On a recommendation of a Committee of Experts, the Government of India have decided that all types of Penicillin required by hospitals, physicians, surgeons and private practitioners in India will be produced at the State-owned Penicillin Factory at Pimpri near Poona. It is also decided to expand the capacity of this factory by 60 per cent. It is estimated that the annual production will be about 28 to 32 million mega units.

Supply of genuine Ayurvedic Herbs and Drugs

The Committee appointed by the Government of Bombay to evolve a machinery to make available to the public, standard and genuine Ayurvedic herbs and drugs at reasonable prices has started working in its office at the R.A. Poddar Medical College (Ayurvedic) Worli, Bombay 18. It will suggest ways and means of encouraging the growth, collection, storage, preservation and supply of medicinal herbs and drugs especially ayurvedic. It will also prepare an exhaustive record of original names and will identify controversial drug plants.

D.D.T. Production in India

Production of DDT in India—for use in nation-wide anti-malarial campaigns—is now under way. Production will reach an output of 2 tons per day by the end of 1955. All these supplies will be used by the various Indian State Governments in anti-malaria operations under the National Control Programme which has been assisted by many pilot projects undertaken jointly by the UNICEF and the World Health Organization.

Health Facts from the Soviet Union

All expenses for the free health, education and security services in USSR are borne by the State without any contributions from the workers, according to a recent statement by the Soviet representative on the Social Commission

of the United Nations. He added that there are today some 300,000 physicians in the Soviet Union, reinforced by 900,000 highly trained medical assistants; that some 3,000,000 workers (industrial) annually spend their vacations free of charge in rest homes and resorts; that provided they had worked for 25 years, all men at 60 and women at 55 receive pensions for life; that in 1954 there were 4,000,000 students enrolled in universities and other institutions of higher learning and that in 1955 the Soviet Government had allotted 10 billion rubles, or 2 per cent of the national budget, to scientific research, not taking into account the training of scientists.

Britain's Next Major Health Problem

Care of the aged is likely to become one of Britain's major health problem in the near future. This conclusion can be drawn from a recent statement by Lord Beveridge whose famous wartime report inspired the present social security system in the British Isles. Lord Beveridge pointed out that old people need not only money but also personal care. In the future, he added, families will have to do more in this way than is being done now. Personal service will have to be given by people outside the family for the care of old people.

Objectionable Advertisements of Drugs and Magic Remedies

The Government of Bombay has appointed a number of officers for the enforcement of Drugs and Magic Remedies Objectionable Advertisement Act, 1954 in the State. These officers, at any time, may seize and detain any document, article or thing which they have reason to believe contains advertisement which contravenes any of the provisions of the act.

Course in Industrial Hygiene

A short course in Industrial Hygiene will be instituted at the Grant Medical College, Bombay, from 1st October 1955. The course will be of three

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months' duration followed by an examination. Successful candidates will be given certificates of proficiency.

The course is designed to provide training to medically qualified persons intending to become members of the staff of medical services in an Industrial Organisation or Industrial Bureau of local or Government Public Health Department.

Admission to the course will be limited to 10 medical persons passing the M.B.B.S. or L.C.P.S. examination and each will be charged a fee of Rs. 150 for the course. In the matter of admission, preference will be given to candidates sponsored by employers such as industrial concerns, railways, provincial governments etc.

Mass Chest Radiography

A great reduction in the cost of mass chest radiography is made possible by a new development in cameras and equipment.

The new camera uses films 4 in. x 5 in. instead of the more usual 15" x 12" costing atleast seven times as much. In addition, the smaller size enables nine films to be processed simultaneously and viewed on the standard viewing lantern instead of each film having to be individually treated.

STUDY OF WOOL STRUCTURE AIDS MEDICAL RESEARCH

Professor Astbury of Leeds addressed a meeting of the International Wool Research Conference in Sydney on 22nd August. Among the delegates from various countries of the world was Mrs. S. Narayan of the Wool Analysis Laboratory at Jaipur (India). "The truths that had emerged from a study of the cellular and molecular structure of wool had spread through many fields of science, especially the medical field. Knowledge gained, partly, through X-ray photograph of wool had been of immense value in the search for possible causes of cancer, rheumatism, rheumatoid arthritis and problems connected with congealing of blood. It was not without justification that wool was claimed to be the wonder-fibre of the world" said Prof. Astbury.

Corrigendum

ANTISEPTIC, August 1955 issue: (i) p. 585, para 3, line 3, for "vitamin C" read "vitamin G"; (ii) p. 586, line 2 for "such foods" read "animal's diet"; (iii) line 1 under Table I for 100/g, read 100 g.; (iv) under last heading B₁₂ in Table I for 'B₁₂' read 'B₁₂ in micrograms'; (v) in column 2, under B₂ in the Table for 0.6 for the first three items read 0.06; and for value under B₁₂ against wheat, read 0.7.

The camera made by Watson & Sons (Elector-Medical) Ltd., an associate of the General Electric Co., Ltd. of England (represented in India by the General Electric Co. of India Ltd.) is being increasingly used by Health Services for mass chest radiography, and the high quality of the radiographs make them entirely satisfactory for routine examinations and follow up records. There are, of course, certain chest conditions for which full sized radiographs are still necessary.

Award for Hindi Book on Family Planning

"Santati Nigrah: Kyon aur Kaise?" i.e., "Birth Control: Why and How?" written in Hindi by Dr. P. L. Chopra of Jabalpur with a Foreword by Dr. A. P. Pillay and Introduction by Dr. Jivraj Mehta has been recently awarded a prize of Rs. 500 by the Madhya Pradesh Shasan Sahitya Prishad. Dr. Chopra also won the 1st prize in Population Essay Contest (1953) for his article in Hindi on "Bharteya Jan-Sankhya Aur Kautumbic Niyojan."

We offer our hearty congratulations to him.—(ED.)

1955]



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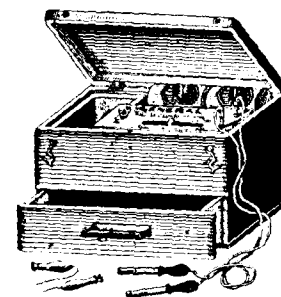
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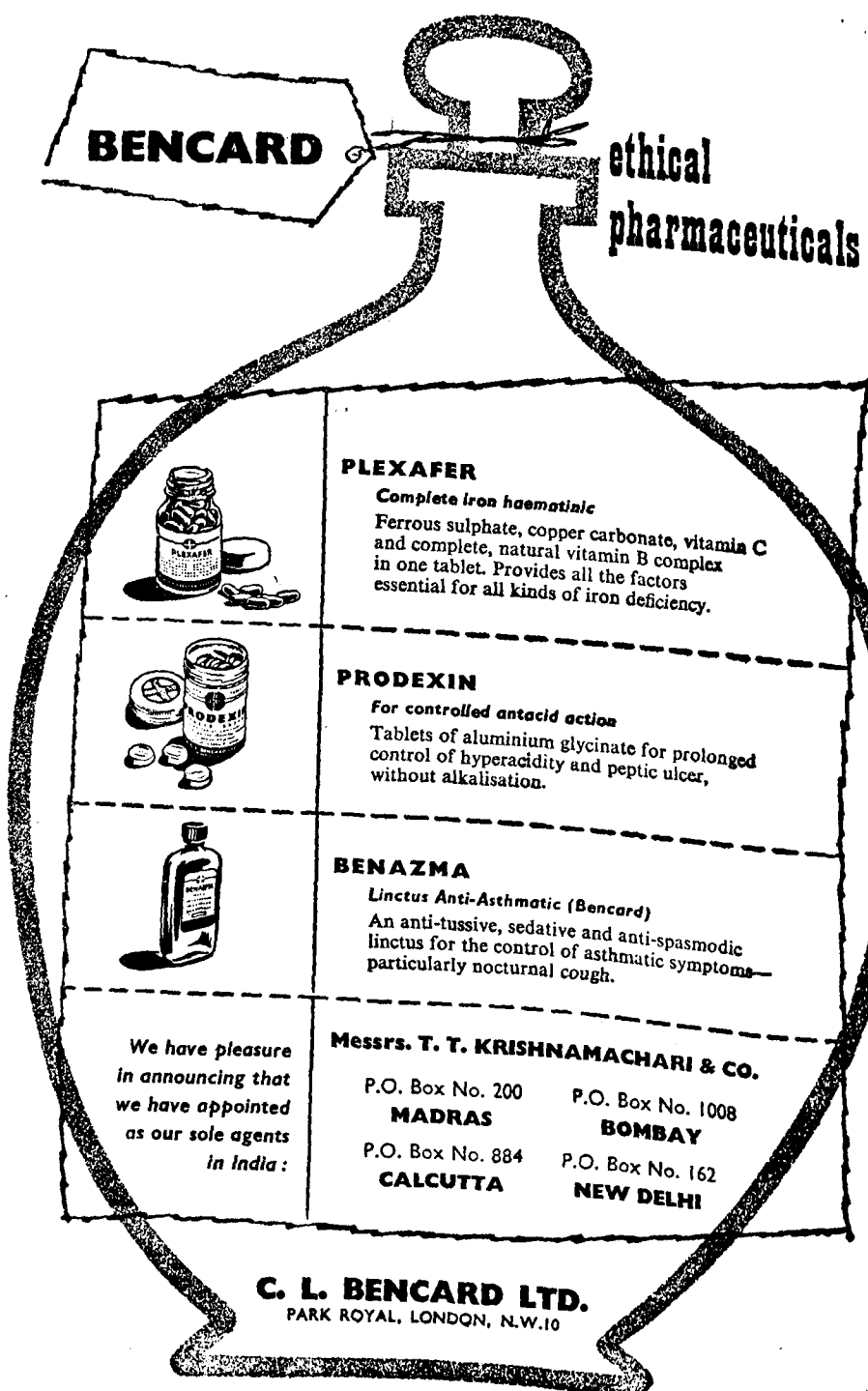
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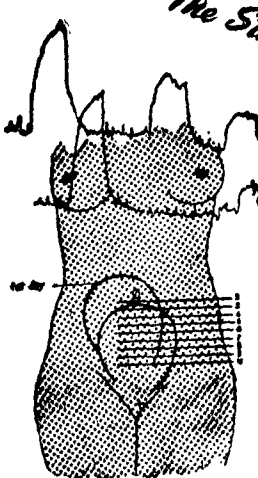
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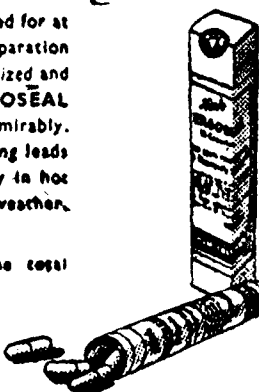
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Tab 2 gr 2-4 5 gr 4-8 100	Paladria 1000 1 g 21-4 3 g 47-12	Stethoscope B.D. 21-8; Ger 8-8
1000 2gr. 18-8; 5 gr 38-12	Vit. C 100 mg 2cc 6 1-1; 50 5-4	Wall Thermometer Jap. 1-8
Howard 5gr. x 1400 49-8	500 mg 5cc 6 2-2; 50 10-0	Vit. C 50 mg 1000 8-4 100 1-8
Bihyd. 2 gr 3-14 5 gr 7-8	Pamaquin Tab. 500 0-12 [1000 8-12	Vit B Complex 100 1-5 1000 16-0
Equinine Germ. 3-13	Phenobarbitas Tab. 1 1/2 gr. 100 1-6;	Bi 10mg, 1000 10-4 100 1-10
[Howards 4-6; Java 3-1	Pet. Chloras 1000 4-4 500 2-8	5mg 100 1-6 1000 7-4
Quin. Bihyd. 100 x 10gr x 2cc	Riboflavin Tab 5mg 100 1-8; 500 4-8	Artery Frocep 2-0 Solisora 2-0
Ind. BDH B.W. EVANS	10mg 100 2-2; 500 8-0	Scalpel 1-4 Probe 0-6
12-0 20-12 33-8 23-8	Resochin 10 1-5; 100 9-6	Tongue Depressor 1-0 (olding 2-0
8-4 14-12 5grx1cc 100 amp	Saridon 10 1-1; 250 24-4	Tooth Forcep Universal 3-14
Aminophyllin 6x10 cc. Ger. 1-10	Sulphanilamide 500 3-12 1000 6-12	Ext Ergot Liqd 4oz 2-8 lb 8-4
Vit. B1 10cc 50mg 1-5; 100mg 1-7	Sulphanilamide Powder 4-14	Aletis ric 9-14 Eng. 2-8
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5cc 7-0 10cc 9-0	Boots 500 6-2	Aspirin 3-10 Sod Salicylas 3-10
Sander 5x10cc 5-2 10x5cc 8-12	Diazine 100 6-14 500 29-0	Totaquina pow Eng. lb. 26-0
with Vit C 10x5cc 9-12	Thiazol 1000 Ind. 16-0 Boots 24-12	Trinitine 1/100 gr. 500 1-8
5x10cc 5-8; 50x5cc 47-0	M & B 693 25 1-10; 500 31-0	Soda Citrate 1002gr. 1-4 5gr 1-10
Distill Water 100 amp 2cc 2-12	760 25 1-12; 500 26-10	Fountain Pen Parker Type Sup. 8-8
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Progesterone 6amp 1cc 50mg 7-0	Glucose Pow. 4oz. 0-5, 1 lb. 1-0	Digitallin 1/100gr 20 0-8
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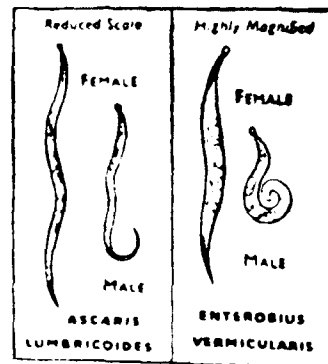
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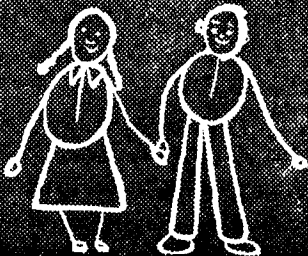
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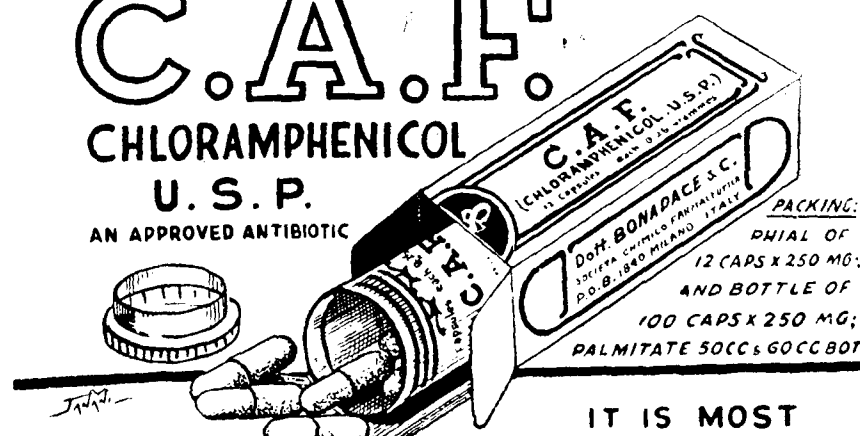
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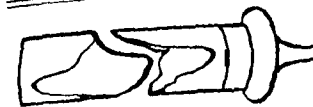
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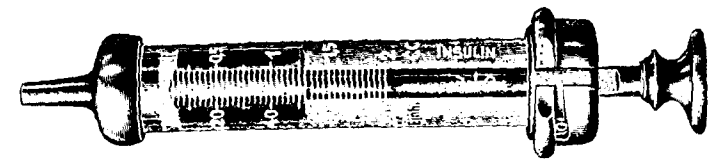
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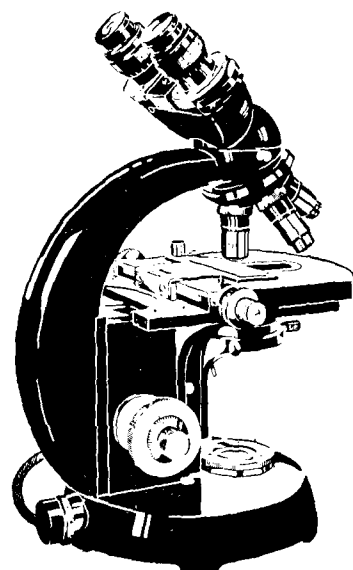
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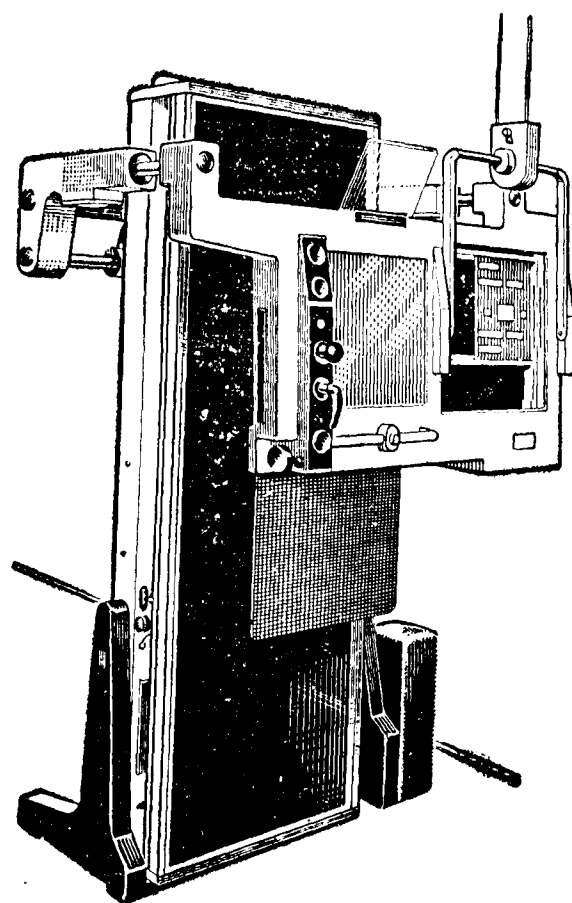
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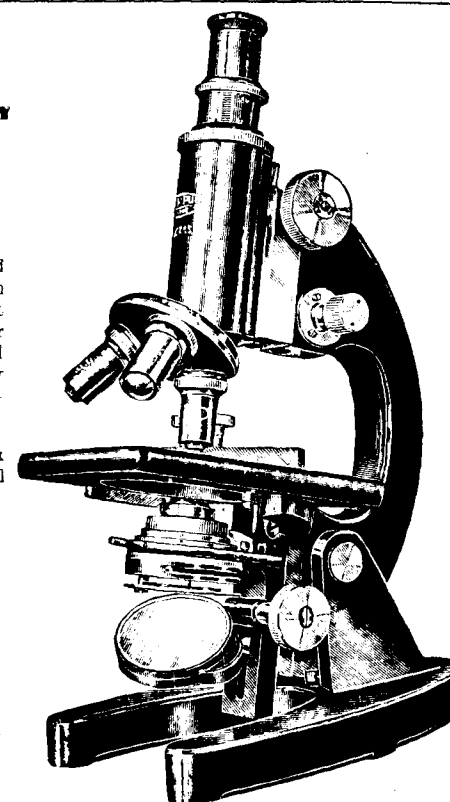
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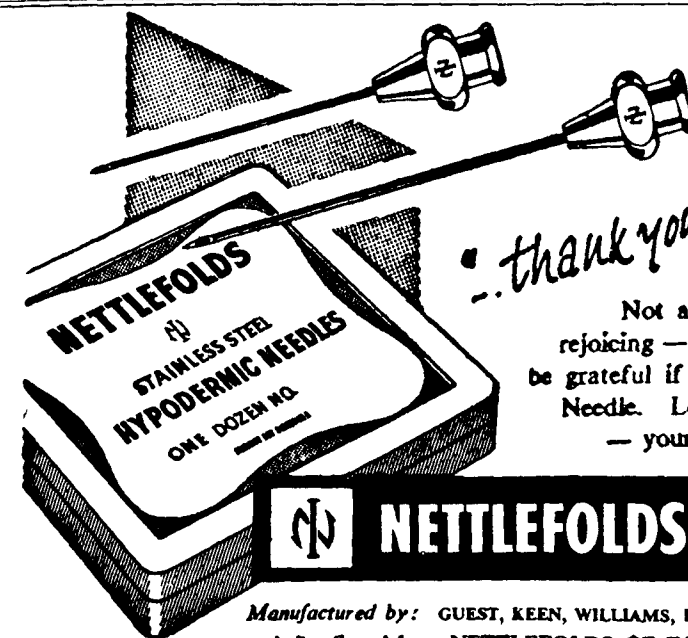
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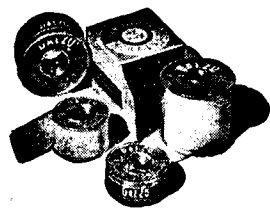
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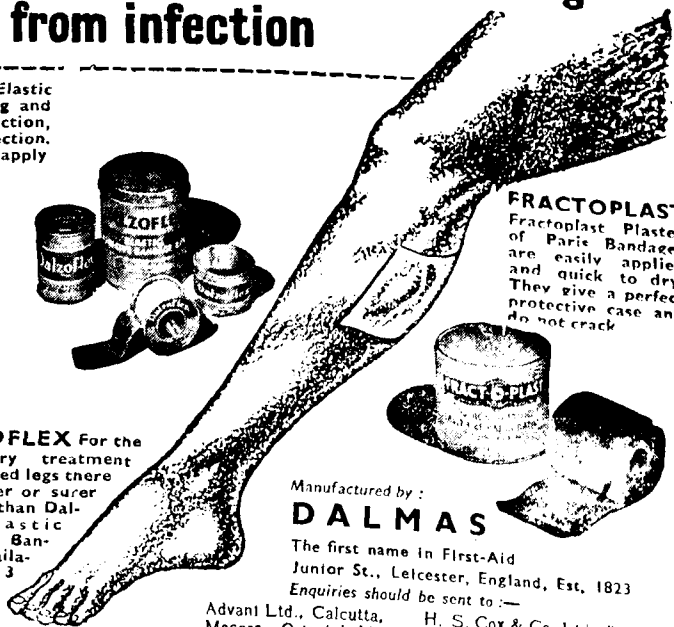
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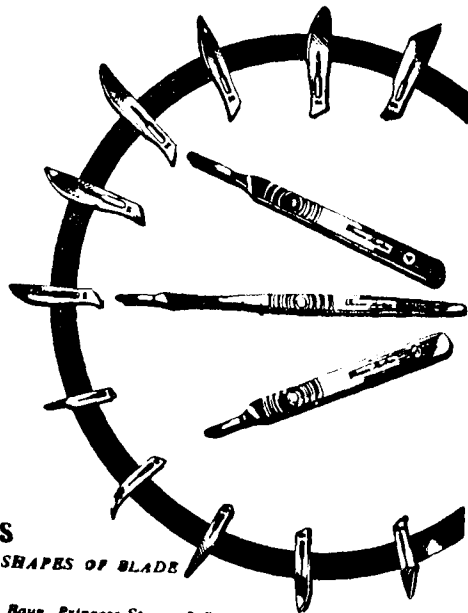
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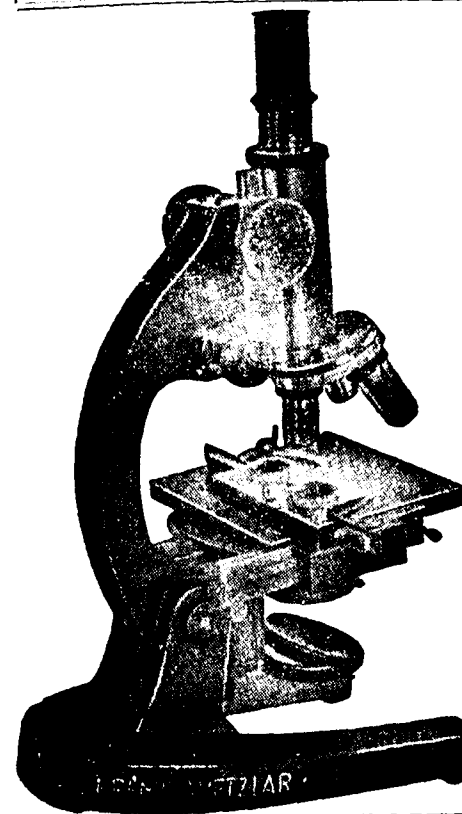
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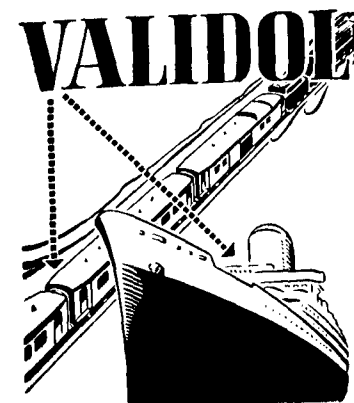
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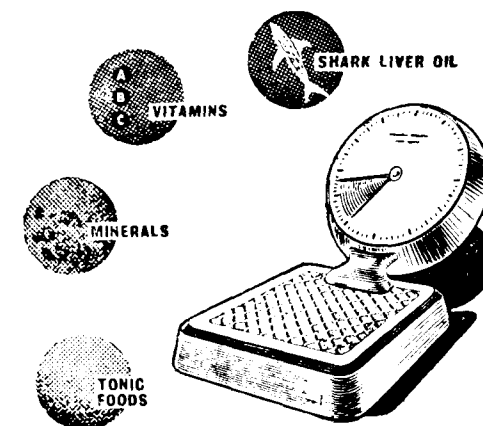


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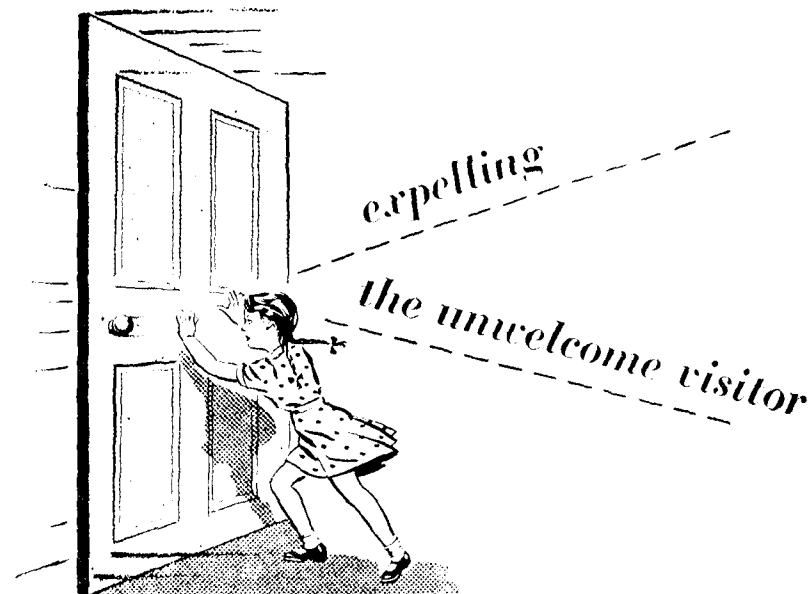
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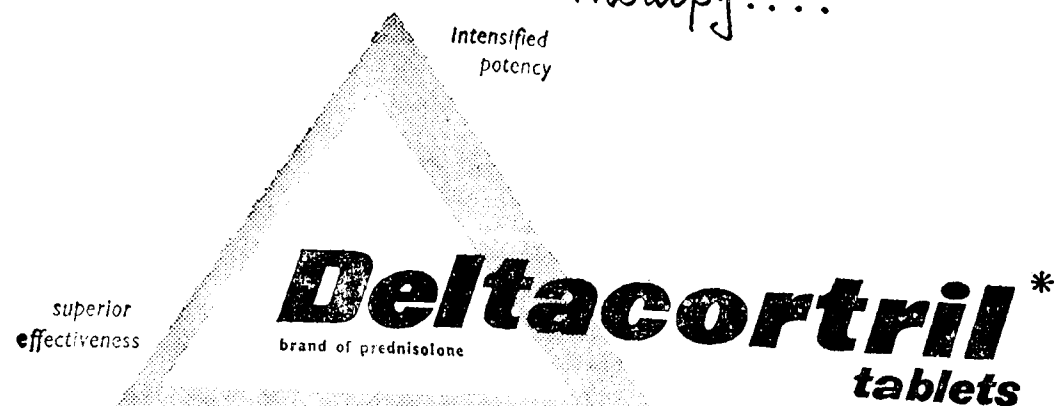
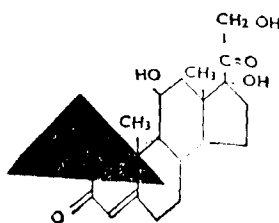
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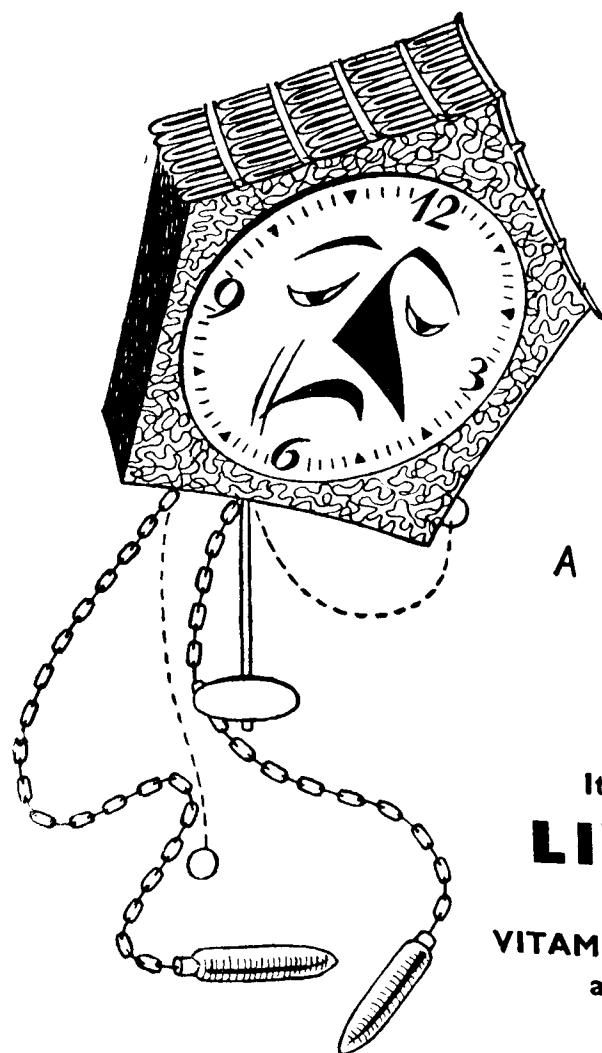
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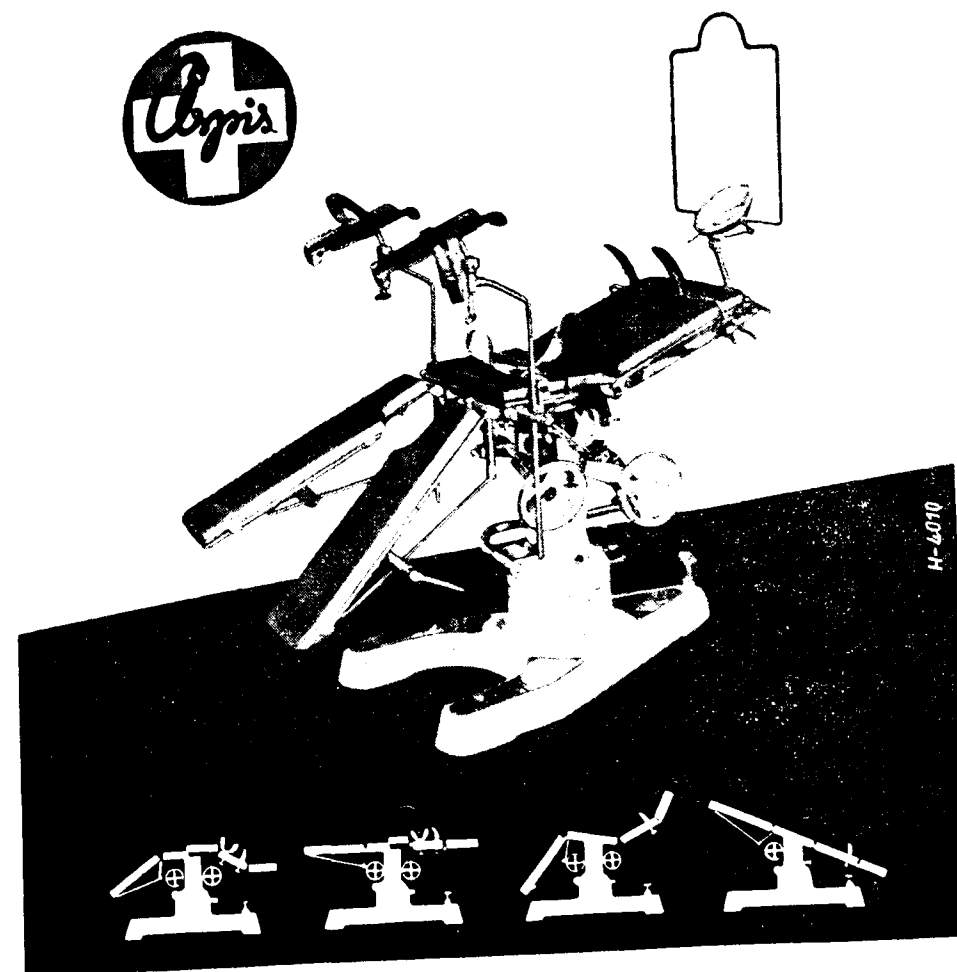
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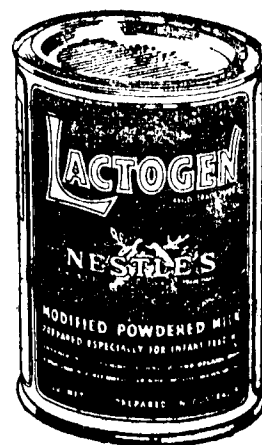
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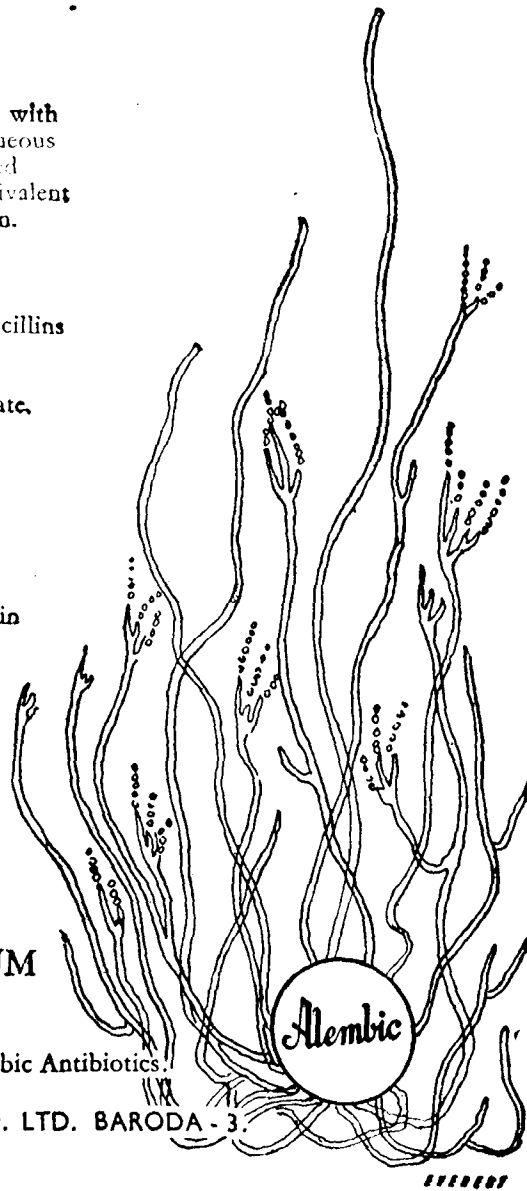
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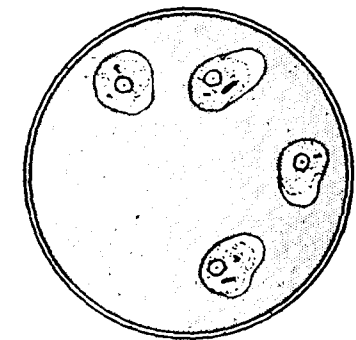
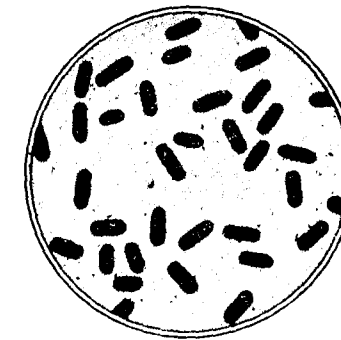
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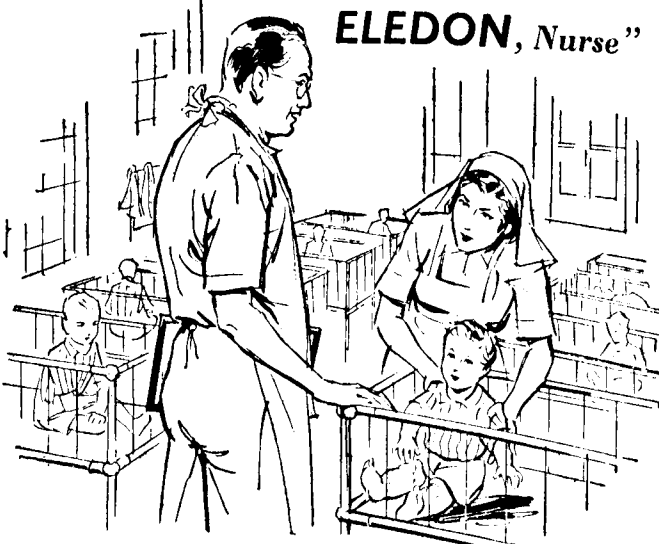
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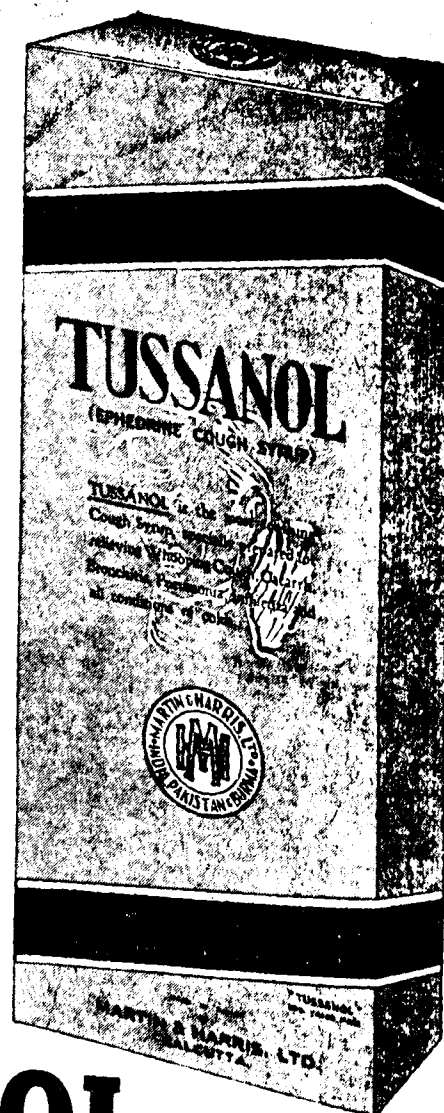
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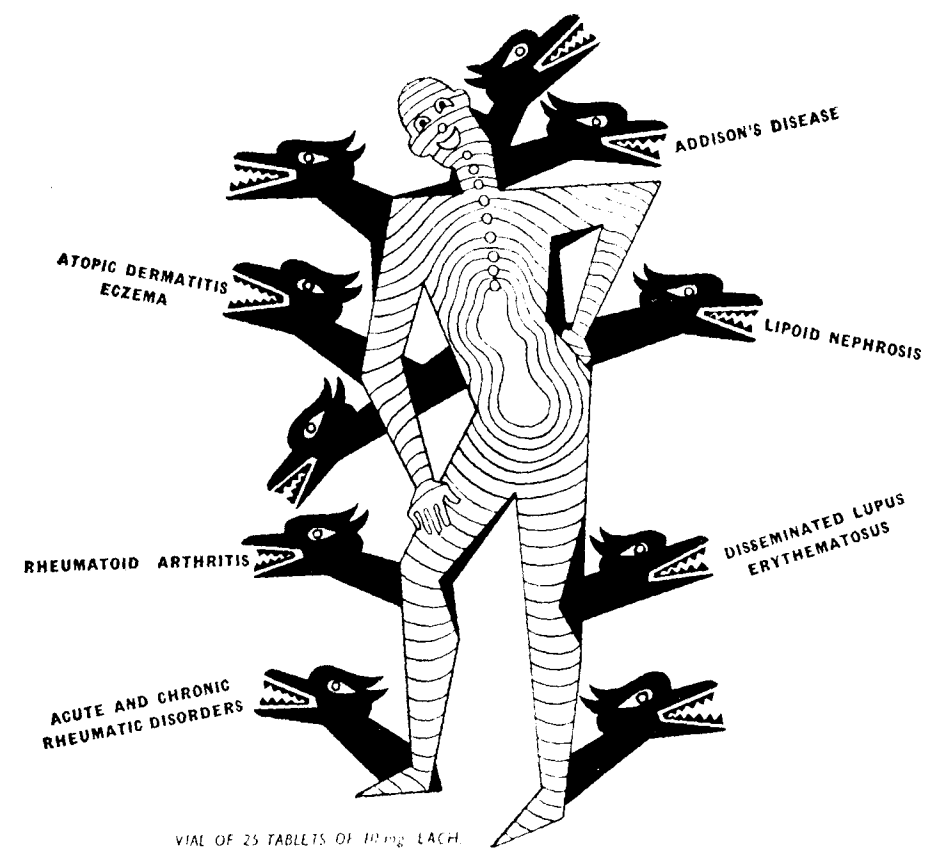


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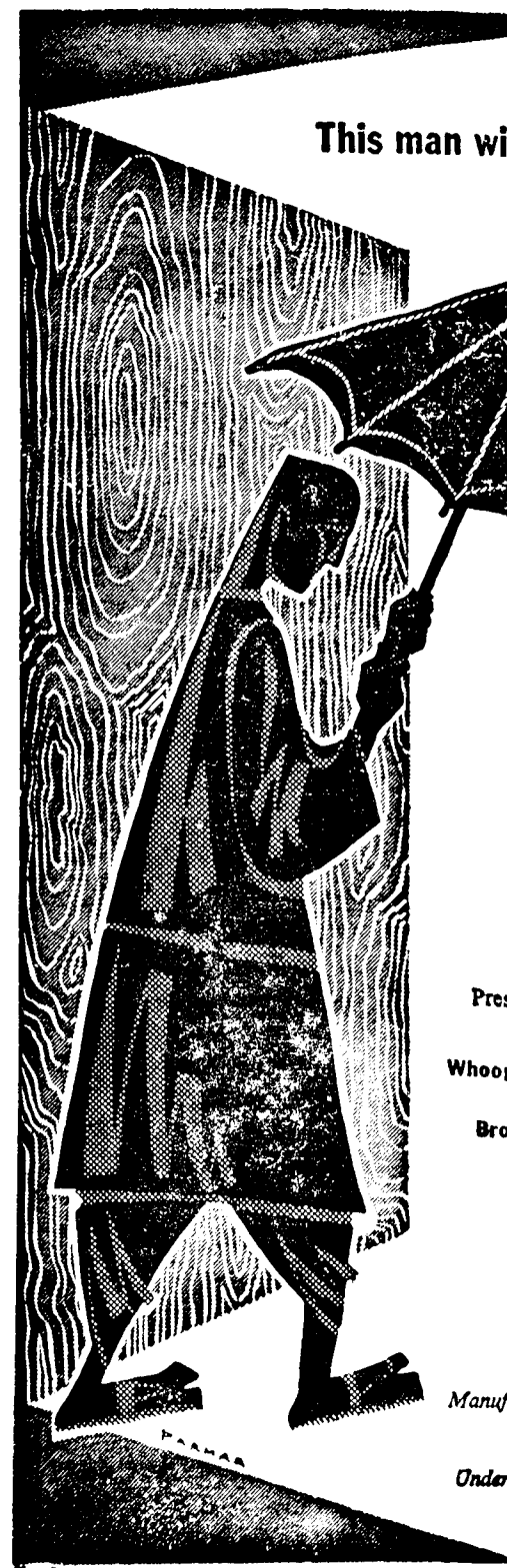
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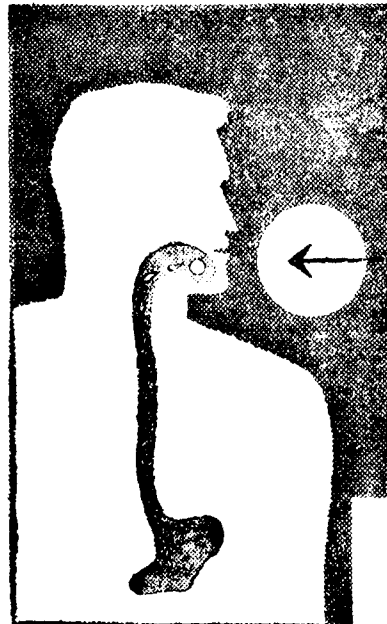
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REFERENCES

Medical Treatment of Peptic Ulcer, *Med. Press*, 27th Feb., 1952, 227: 195

The Control of Gastric Acidity, *Brit. Med. J.*, 26th July, 1952, 2: 180

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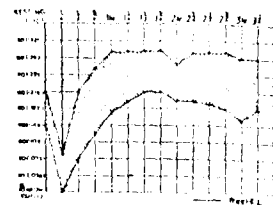
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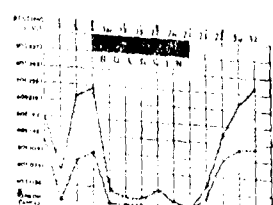
Clinical Investigation into the Action of Antacids, *Practitioner*, July, 1954, 173: 46

Management of Peptic Ulceration in General Practice, *Med. World*, Dec., 1954, 2: 591



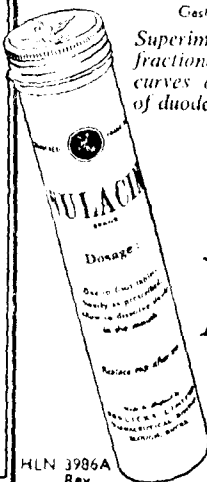
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Gastric Analysis

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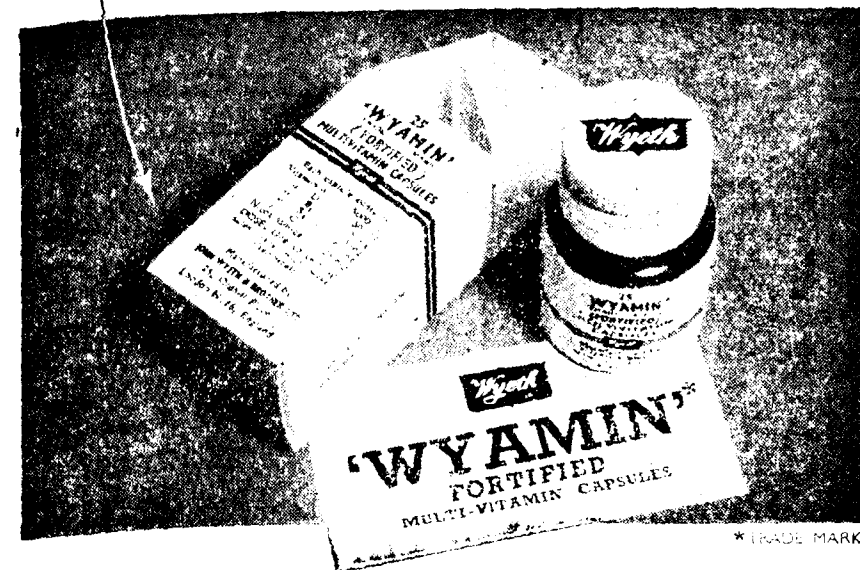
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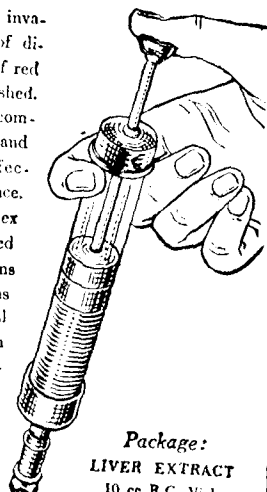
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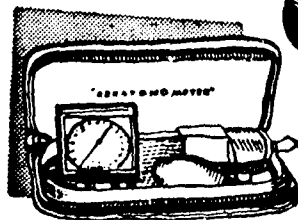
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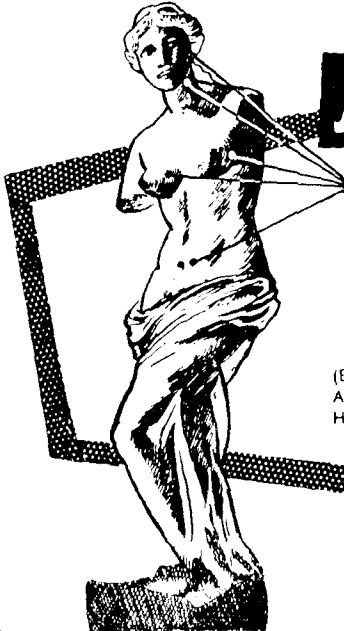


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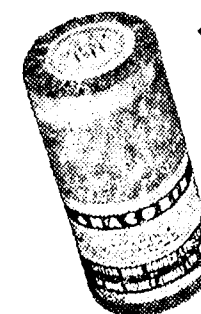
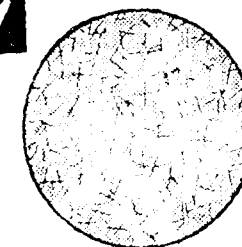
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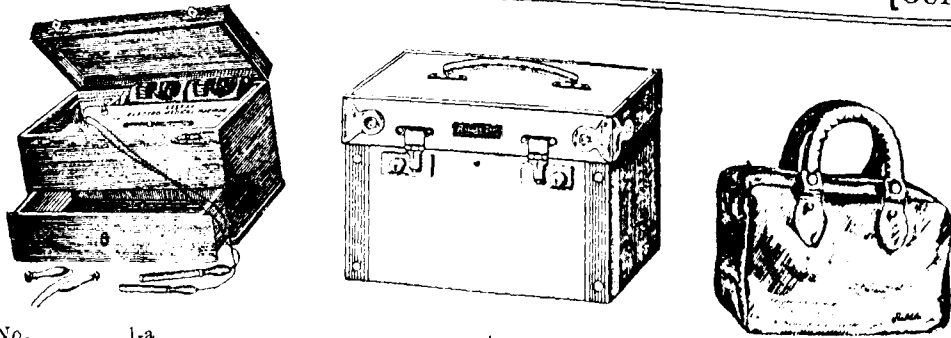
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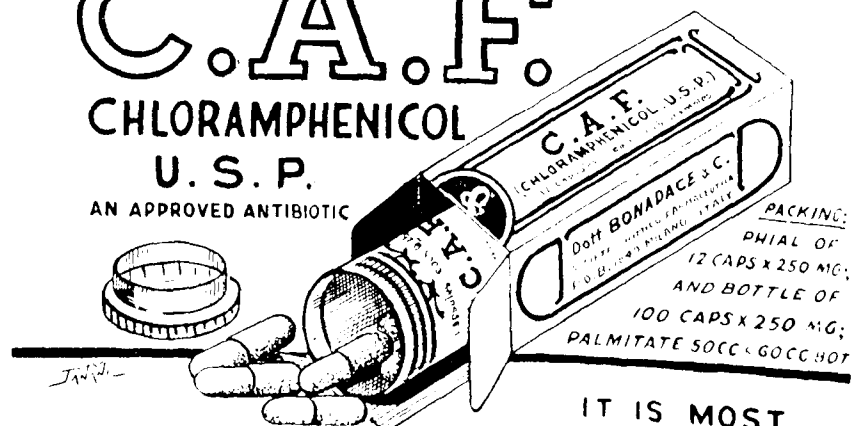
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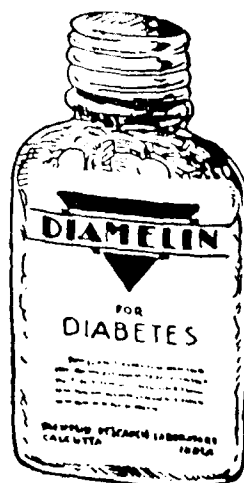
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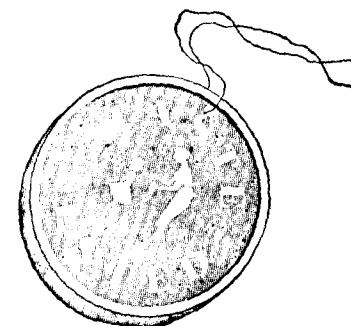
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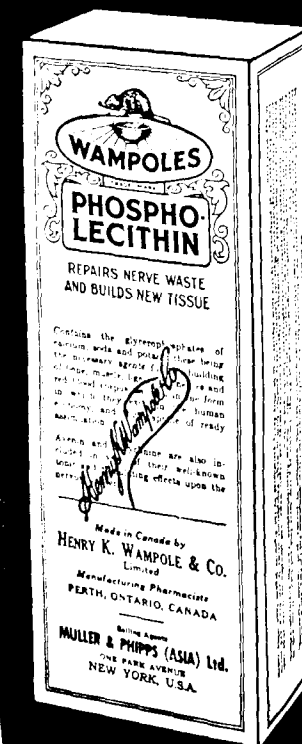
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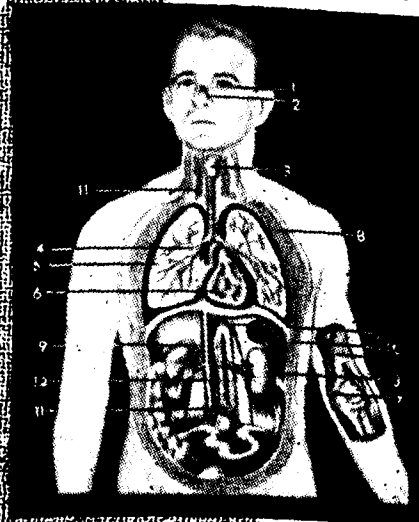
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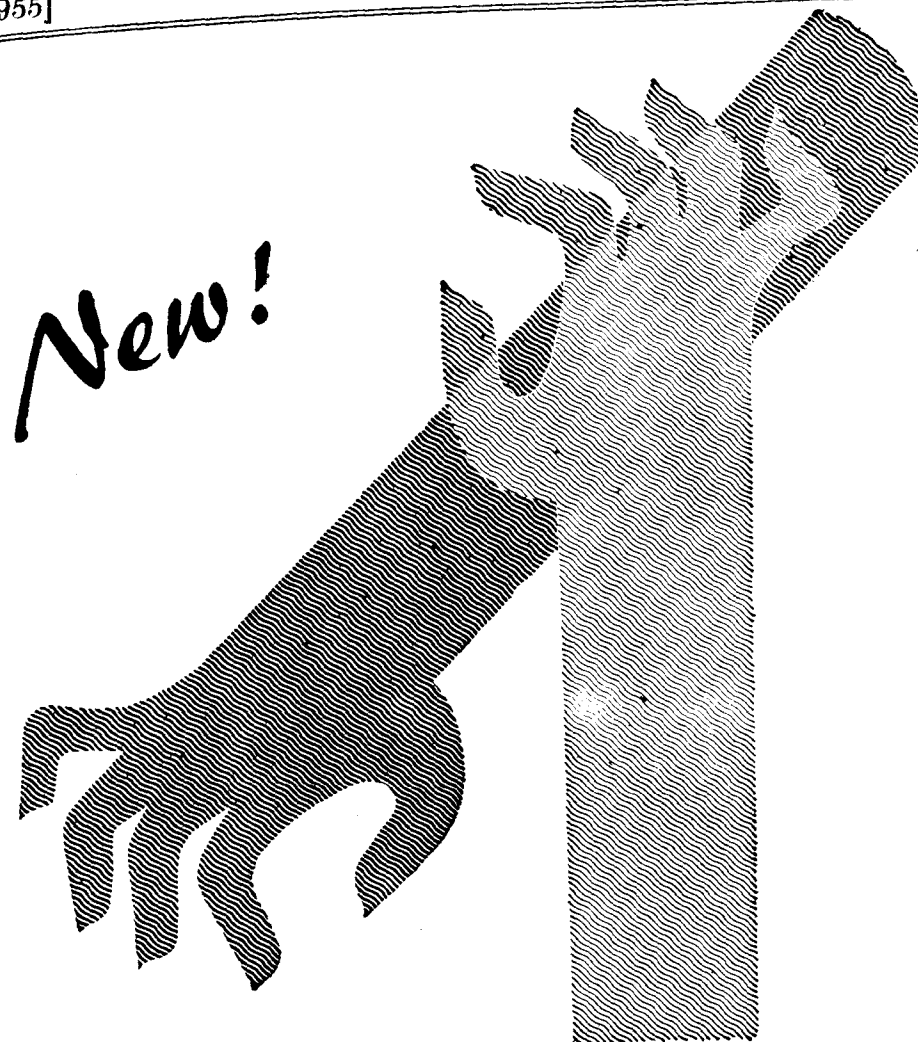
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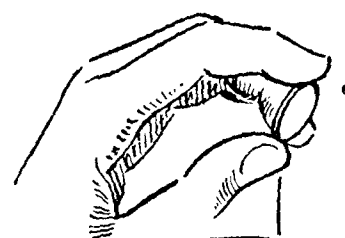
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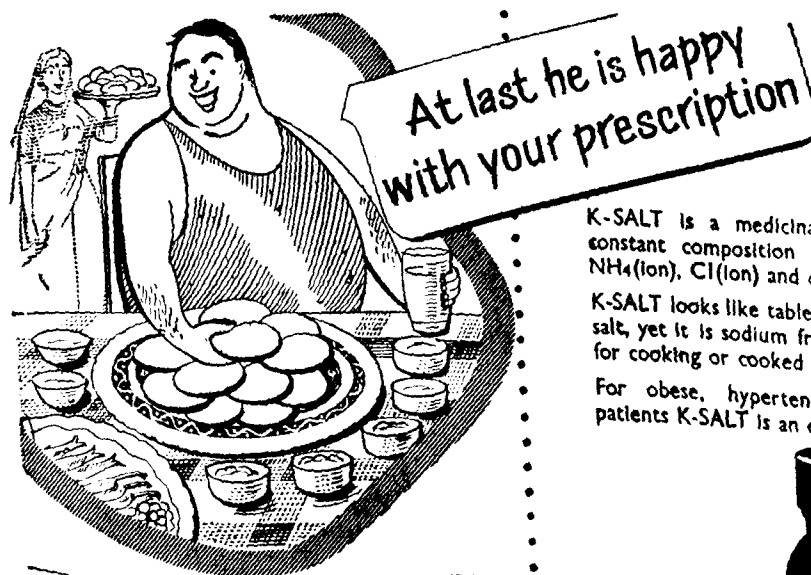
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Original Articles

THE TUBERCULOSIS PROBLEM AND ITS CONTROL IN MADRAS*

(Dr. (Mrs.) PHILIP, M.B., M.R.C.P. (Edin.).

Director

AND

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Introduction.—Tuberculosis is one of the major public health problems of our country and within the last two decades it has claimed the attention of both the Government and the public as well as the Social Service Organisations.

Reliable statistics relating to the infection, morbidity and mortality from this disease, are essential for planning control measures; and these were practically non-existent in India till very recently.

The Public Health Commissioner in his annual report for 1935, suggested that a rough estimate of the mortality from tuberculosis might be made on the assumption that approximately 10 to 20% of the deaths due to fevers and about 20% of those recorded under respiratory diseases, would be really due to pulmonary tuberculosis.

A conservative estimate made by the Tuberculosis Association of India places the mortality due to tuberculosis at 200 per 100,000 of the population and the morbidity at nearly 1000 persons per 100,000 of the population. So nearly 5 lakhs of people die of tuberculosis every year and nearly 25 lakhs suffer from it at a time.

* Specially contributed to the ANTISEPTIC

The incidence of this disease, in recent years, is increasing at an alarming rate due mainly, to the poor socio economic conditions, and also to the lack of knowledge amongst people on health matters, while bad housing and undernourishment further help in the spread of the disease.

Tuberculosis is prevalent all over the world, and is thus a disease of civilization, which has brought in its train social and economic changes too great to be rapidly assimilated into the lives and customs of many people; the high incidence and mortality from tuberculosis are the price, that is being paid for this 'progress.'

The morbidity and the mortality rates from tuberculosis, the seventh in the list of causes of death in U.S.A., was 33.2 per 100,000 in 1947 and approximately $\frac{1}{3}$ to 1% of the adult population of that country have active tuberculosis. Recent studies have revealed that there are nine active cases for every tuberculosis death. Based on a mass X-ray survey, about half a million people in that country are estimated to have active disease, only about half of which come to the notice of the health authorities.

In Brazil the mortality rate according to Bueno is 250 per 100,000 and 3 to 5% of those radiographically examined were found to be suffering from active pulmonary tuberculosis and there tuberculosis ranks as the first cause of death. The tuberculosis mortality rate in Denmark was the lowest in the world being 18 per 100,000 in 1952.

The mortality in Japan from all forms of tuberculosis was 55 per 100,000 and the morbidity was found to be 360 per 100,000 of the population, as revealed by Mass Radiographic Surveys. The mortality rate in the USSR is 160 per 100,000 and 4.5% were said to be of clinical significance. In Australia the mortality was roughly 38 per 100,000 while in New Zealand it was 49 per 100,000 in 1947; 51 for Europeans and 329 for Maoris. Morbidity rates ranged from 0.4% (Europeans) to 2.4% (Maoris).

Morbidity.—Dr. Ukil considers that the mortality rate varied between 200 and 400 per 100,000 of the Indian population. Recent analysis of the mortality records by the statistical section of the Research Office of the WHO revealed that on an average 10 to 13% of all deaths would be attributable to tuberculosis. Aspin believes that the morbidity rate ranges between 2 and 4% in rural areas and from 7 to 10% in industrial areas.

A special committee appointed by the Indian Research Fund Association, about a decade ago, prepared a memorandum embodying detailed instructions for conducting Planned Tuberculosis Surveys.

Surveys to ascertain the incidence of infection and morbidity have been made by various workers in several parts of India at different times, using different procedures in technique and in the interpretation of results. Old tuberculin was used in these surveys,

some using the Von Pirquet's Test and others using varying doses with Mantoux Test. No useful or valid comparison and correlation of the results obtained, could be done with such non-standard procedures; the general impression that was gained however was, that the incidence of the infection and disease was very high especially in the urban areas and fairly moderate in rural parts and that, by and large, the infection and disease were in the ascending curve of the epidemic wave of tuberculosis in our country.

The salient features of the different surveys that have been undertaken in India, are given below:—

Ukil (1930) using Von Pirquet's test, found the incidence of infection to be 55% among urban and 33.4% among rural dwellers; Sahni (1942) obtained similar results; Lal *et al.* (1944) working in Serampore, an industrial area in Bengal, obtained the high rate of 94.0%; but they concurred with the observations recorded by other surveyors, in respect of the incidence of infection in the rural population. Faridi (1944) obtained results similar to those of the previous workers.

A few surveys have been conducted in the Madras State prior to the introduction of the BCG Campaign in 1948.

Benjamin (1939) conducted a survey of 3307 residents of Saidapet, then a suburb of Madras. Mantoux test with old tuberculin was done; physical and radiological examinations were also carried out and the following conclusions were reached:—

Though only a small section of the population was examined about 800 to 900 were found to be suffering from tuberculosis and to need immediate treatment. The magnitude of the problem was thus manifest. 1. The mortality rate was found to be 462 per 100,000, and the incidence of infection was 69.8%. 2. The urgent necessity for establishing a fully equipped tuberculosis clinic at Saidapet to give treatment and to tackle the serious tuberculosis problem was pointed out.

Benjamin (1940) confirmed this high infection rate among urban dwellers in another survey conducted at Chittoor among 3,089 persons; the infection rate in the rural areas as recorded during a survey of the rural population in Vayalpad of Chittoor District, was only 37.8%.

Rao and Cochrane, (1943) conducted another survey in Saidapet area among 2285 persons and found the incidence of tuberculous infection to be as high as 77.8%.

The survey by Sanjivi among the urban dwellers of Madurai showed that the incidence there was nearly the same as in other urban areas.

Syed Nizamuddin Ahmed (1945-46), in a special survey undertaken in Hyderabad City, covering a population of 26,769,—a fairly representative section of the mixed population (both civil and

industrial) of that city, found that the rate of infection in the city as a whole, was 86% and the morbidity rate was 27%, of whom 6.6% were open cases of pulmonary tuberculosis.

Infection and morbidity in Madras.—Since the introduction of the BCG campaign in Madras in 1949, valuable information is to hand regarding tuberculous infection in the different groups that have been tuberculin-tested so far. A survey of over 130,000 persons comprising a fairly representative cross section of the population of Madras City yielded the following information:

TABLE I

Group tested	Number in group	Percentage of reactors
School children	26,882	54.0 per cent
Contacts	2,146	62.6 "
Air-Force personnel	1,820	76.7 "
Nurses	594	71.7 "
Industrial group	3,184	89.0 "

A more detailed analysis of the reactors revealed a high incidence of infection, in the younger-age groups.

In Madras nearly 25–30% of the school going children are infected by the age of five years; this infection rate was as high as 40 per cent in the congested areas of the city, and among the lower socio-economic groups as evidenced by the observations in such areas as Washermanpet, Royapuram, George Town, Choolai and Perambur Barracks, while the rate of infection tended to be lower in areas with wide open spaces and among people in the higher socio-economic groups.

Among the susceptible groups, contacts ranked first in importance. The highest rate of infection was found only in this group, being as high as 50% at the age of five and 75% at the age of 10 years, while the percentage of reactors among nurses stood between 70 and 85.

TABLE II

Group tested	Number tested in the group	Percentage of reactors in age group		
		0–5 yrs.	6–10 yrs.	11–15 yrs.
School children	26,882	30.0%	44.5%	60.8%
Contacts	2,146	48.4%	61.5%	75.8%

Further information has been gained in the recent mass miniature radiographic surveys conducted among different groups during the last three or four years. These surveys shed further light on the already high-incidence of infection by revealing the presence of a high morbidity rate, in the different communities (*vide* Table III on p. 737).

TABLE III

Group	Number in group surveyed	Cases of active tuberculosis	Percentage of morbidity
Industrial workers	6230	139	2.7%
Public (exhibition)	837	5	1.2%
Industrial group (Mills)	1886	50	2.7%
Transport workers	1735	23	1.0%
Police force	2088	22	1.1%
	12776	239	1.87%

The high average morbidity rate of 1.87% among the 'normal' persons, in the community reveals the magnitude of the Tuberculosis problem as it exists in the City to-day. This roughly accounts for the presence of nearly 24,000 persons with clinical tuberculosis in the community in Madras City alone which has a population of about 15 lakhs. Of such a high morbidity, only 46% have been registered as being tuberculous in the various clinics in the City and the other 54% or roughly 13,000 cases are either unregistered, (while they may be undergoing private treatment) or remain undetected, and continue to spread the infection.

Out of 40,543 cases that attended the various tuberculosis clinics in the City in 1952, persons who were diagnosed as suffering from tuberculosis of the lungs, in all stages of the disease numbered 11,915. Of 12,206 persons who attended the Government Tuberculosis Institute at Egmore, 2974 were diagnosed as tuberculous. The majority of these 2974 cases were found in the young adult age groups—persons who should be of the maximum service and use to the community (*vide* Table IV).

TABLE IV

Age-groups	Number in group diagnosed as tuberculous	Number of	
		Males	Females
1–5 years	65	40	25
6–10 years	59	29	30
11–15 years	83	39	44
16–25 years	927	578	349
26–35 years	1098	763	245
36–45 years	507	412	95
46 & above	325	267	58

The mortality from Tuberculosis registered in the Municipal Registers is 830 and deaths from other respiratory diseases accounted for 8918 according to the Annual Report of the Madras Corporation for 1950. The corresponding figures for the year 1952 are 627 deaths from tuberculosis and 10,137 deaths from other respiratory diseases. That the mortality rate, given in these reports, does not reveal the true picture of the tuberculosis problem is evident from a comparative study of the high rates of tuberculous infection and the very

high morbidity rates that have since been recorded in the BCG campaign and the mass radiographic surveys.

Control programme.—An ideal control programme is necessary if this tremendous problem of tuberculosis is to be tackled successfully. Such a programme must be a joint co-operative effort to include the Boards of Health, the Medical profession, and all Government and voluntary organisations engaged in this particular line of work. Each has an important part to play, the medical profession to furnish the facts regarding the diagnosis, prevention and cure; the health authorities to protect the communities, while the Government and social service organisations, give continued support to the schemes.

An ideal Tuberculosis-Control programme should aim at (1) reducing and preventing the spread of infection and disease; (2) detecting early cases; (3) isolating the infected and (4) protecting the susceptible and the exposed ones.

Tackling the various causes that operate in the spread of the disease is of prime importance in any scheme of control. Bradbury, in his classical investigation at Jarrow, listed the following as causal factors in the order of their importance:—(1) poverty; (2) overcrowding; (3) large families; (4) undernourishment; (5) diet; (6) young mothers; (7) bad ventilation. Insanitation will no doubt be also operating in the spread of this disease in our country, besides numerous other factors which may be brought to light in the course of investigations.

The root cause of tuberculosis is the extreme poverty and the consequent low standard of living, among our vast population. People living in crowded tenements and huts without adequate and good food, under bad hygienic conditions are undoubtedly of greater danger to society and run greater risk of reactivation in themselves of the disease than those who are more fortunate and live on a higher economic level, particularly if they belong to the susceptible groups.

Puffer has shown that the offspring of a tuberculous family will show, by the time they are 50 years of age, the same degree of infection whether exposed to sputum-positive cases or not. Those who are intimately exposed will no doubt get infected earlier. It is also important to remember that in both cases the percentage is higher than in the offspring of non-tuberculous families.

All low-income groups, regardless of nationality, show great susceptibility to tuberculosis and this susceptibility is enhanced by the environment, the crowded living conditions and their habits of life. This problem can therefore, be solved only by raising the general standard of living, higher wages, better homes and better food.

Substantial improvements in the housing conditions would cost from 5000 to 10,000 crores of rupees, while raising the standard of nutrition will require about 200 to 300 crores of rupees every year.

Considerably increased resources must therefore, become available before we can embark on this programme.

Next in importance comes the institution of other Anti-Tuberculosis measures *viz.*: (1) early diagnosis; (2) isolation and institution of treatment and education of the patient and (3) after-care colonies. The provision of tuberculosis clinics, hospitals and sanatoria, after-care colonies, and definite anti-tuberculosis measures, should form the basis of providing relief to the suffering, keeping in view at the same time the needs of the community as a whole.

Mass miniature radiography.—The method of choice for the appraisal of tuberculosis morbidity in a community is wholesale case-finding by the use of mass miniature radiography. The larger the number that are X-rayed, the greater the detection of early cases of infection; the larger the number that can be cured, and the fewer the bacilli that will infect the environment and spread the infection. This measure is now widely accepted as having a high diagnostic value in assessing advanced, moderately advanced as well as minimal lesions.

Emphasis should be placed on finding early cases, to ensure prompt treatment and early cure; even though there will be difficulty in finding accommodation for all the cases detected, routine mass miniature radiography aids in the recognition of early cases so that appropriate measures may be taken and the patients may be prevented from developing into hospital and sanatoria stages, or for instituting domiciliary treatment. This method is time-saving and economical as it considerably reduces the number of cases for elaborate further investigation.

Tuberculosis clinics.—Properly equipped tuberculosis clinics must have the priority in any campaign against tuberculosis, as they form the pivots around which, the activities of all control programmes gyrate. The clinic serves as the centre for diagnosis, and for education of the patient and his associates as well as the community; with a domiciliary service attached to it, it undertakes the pre-hospital or pre-sanatorium treatment ambulatory treatment and the post-sanatorium or hospital treatment. These clinics, should be located in and around congested areas, where tuberculosis is very prevalent, as they are potent reservoirs of infection spreading the disease to surrounding areas; they should be instituted, at the rate of one clinic for every 50,000 of the urban population and one for every 100,000 of the rural population. Early diagnosis, even before the person becomes infective should be the chief aim of any tuberculosis clinic. This would control the spread of the disease from the individual patient, by educating the patient and his contacts in the proper disposal of the sputum and attention to the patients' personal hygiene. The patient is enabled thereby to return early to his vocation, without becoming permanently disabled and useless.

The staff attached to the clinic, should also watch for infectious cases, which may be discovered by doctors and health visitors, among the close associates or contacts of the patients whom they visit in their homes. Thus the examination of the immediate and remote contacts of every patient diagnosed to be suffering from tuberculosis, becomes a part of the duties of the Medical Officers of the Clinic as both home-visiting and contact-examination greatly aid in the prevention of disease. The benefit to be derived from BCG inoculation by those in need of such protection should also be explained during such visits.

Isolation of the patients.—Isolation of the patients by sending them to hospitals and sanatoria, is the first and most effective method of preventing the spread of infection. The isolation of patients away from their home surroundings in hospitals or sanatoria, provide healthy home-surroundings to their dependents and immediate contacts and a tuberculosis-free atmosphere for the rest of the family. It is not possible in most cases to isolate patients in the above manner owing to the paucity of accommodation. In India, only a fraction of these cases can be really isolated, since the total number of beds available for the whole of the country is only 13,703 and the number of beds available in Madras State is only 2400! The ideal method of instituting at least one bed for every death from tuberculosis, has not been possible to achieve by all countries.

The following tabular statement shows the available beds in T.B. hospitals and the mortality from tuberculosis in ten different countries of the world.

TABLE V

Country	Population	No. of deaths per 100,000	No. of beds available
Britain ..	41.79 million	55.0	
Belgium ...	8.5 ..	64.0	No information
Canada ..	12.9 ..	47.4	3,879
China ..	450.0 ..	300.0	12,088
Denmark ..	4.15 ..	30.0	38,000
Germany ...	69.3 ..	74.0	4,345
Japan ..	80.2 ..	300.0	4,900
India ..	331.8 ..	250.0	75,000
U.S.A. ...	146.6 ..	33.2	13,703
U.S.S.R. ...	190.0 ..	160.0	No information
			87,000

Domiciliary service.—The need for the isolation of the tuberculous patient was recognised as early as the discovery of the causative bacillus by Koch, whose posthumous message was that 11/12 of tuberculosis comes from human beings and consequently to prevent the disease, infection must be stopped at the source, thus emphasising the need for specific attention to the isolation of the individual patient.

But the great paucity in the number of beds in sanatoria for this purpose results in the unsatisfactory but necessary alternative of having to try and isolate the patient in his own house; the home-care of the tuberculosis patient assumes great importance and is one of the chief functions of the tuberculosis clinic. However imperfect such care may be, it becomes a necessary component in the measures directed at the control of tuberculosis even in advanced countries like U.S.A.

The duty of the staff attached to the domiciliary service of the clinic is to teach the patient to destroy all the sputum, to cover his mouth while coughing so as to prevent the dispersal of infective tubercle bacilli into the air, to occupy all alone, if possible, a room that is simply furnished, to have separate utensils for himself, to avoid association with children and to have the contaminated articles quickly disinfected. This programme minimises the danger of infection to others.

Domiciliary service should include (a) organised scientific diagnosis comprising a complete investigation and an active contact-examination programme besides the follow-up of suspicious cases, and (b) the scientific treatment of the patient in his house, (domiciliary treatment) owing to the lack of provision for institutional treatment. The aim of domiciliary treatment is thus to afford as far as possible, the beneficial results that would accrue from sanatorium treatment.

Contact examination is one of the important activities of the tuberculosis clinics. An open case in the home is a potential source of infection and the results of such an infection in the familial contacts may be realised from the following conclusions reached in an analysis of the cases of tuberculosis diagnosed from patients who attended in 1952, the tuberculosis clinic at the Government Tuberculosis Institute, Egmore. 9.5% of all child-contacts who attended the tuberculosis clinic were suffering from pulmonary tuberculosis and of a total of 207 cases of pulmonary tuberculosis diagnosed among children under 15 years of age, nearly 24.6% were child-contacts of known sputum-positive cases. Tuberculosis among contacts of all ages was seen in 12.6% of the cases during the year 1952. To check this high morbidity and at the same time, make an early diagnosis, it is important that contact-examination should be undertaken periodically not only of the entire family but also of the neighbours living in close proximity. Contact examination, as already stated, is a very efficient procedure in the case-finding programme; the danger of heavy exposure always exists among contacts, particularly in children of tuberculous families; since it has been universally observed that a large proportion of children are found infected, a search should be made for as many contacts as possible even before infection occurs, and suitable preventive measures like BCG vaccination instituted.

Care-committees.—Care-committees are necessary adjuncts to the Anti-Tuberculosis campaign. These committees are almost entirely composed of private agencies, and social workers who constitute the back-bone of the anti-tuberculosis service; they give help and encouragement to the patient and his family and also provide financial assistance to the family when the patient happens to be the breadwinner; the patient is enabled thereby to be free from mental worries over family affairs and to pursue his treatment without interruption.

These care-committees look after the rehabilitation of discharged patients and also raise funds for the Anti-Tuberculosis campaign.

Provision of after-care colonies.—After-care colonies are the necessary corollary for the rehabilitation of the patients discharged from the sanatoria. Rehabilitation aims at restoring the individual patient to the fullest possible re-enjoyment of normal routine life consistent with his disability and limitations.

It is well known that the tuberculous patient can never return to his active normal life, after leaving the Sanatoria, and that he requires sheltered life for sometime there after. Rehabilitation is itself an integral part of the treatment and furnishes a reliable guide for the assessment of the patient's clinical condition before active treatment is discontinued. A necessary procedure in all schemes of rehabilitation should be to deal with patients who have had some sanatorium treatment, and provide them with part time sheltered work for fixed hours consistent with the history and clinical findings of individual cases, at the same time providing sufficient wages and subsidies for the patient and his family. He should be rehabilitated into an occupation suited to his capacity, and kept under medical attention and guidance enabling him to return to normal life in due time. Rehabilitation on such grand systematic and organised scale as obtains in the Rehabilitation Centres at Papworth, Preston Hall, Altroor U.S.S.R's Prophylactic Workshop, is not necessary or possible under conditions obtaining in India. Facilities must be provided for the re-employment of the rehabilitated tuberculous persons in the ordinary industries, by employing them in tasks suited to their physical condition, by providing additional food while they are under training and by paying wages which compare favourably with the prevailing trade union rates, and by safeguarding at the same time the health and security of the patient, so as to avoid relapses.

The origin and development of anti-tuberculosis services in Madras.—The Executive Committee of the Tuberculosis Association in Madras, decided that the most appropriate memorial to King Edward VII, should take the form of a hospital for consumptive patients and a T.B. sanatorium in the province. This decision was

reconsidered in 1912 and it was decided that the hospital should take the form of a tuberculin dispensary in the City of Madras, such as was being worked with remarkable success in Europe. The Government while agreeing with the new proposal suggested that the institution be named as the Tuberculosis Institute and that it may be attached to the out-patient department of the Government General Hospital. But later, the Government agreed to the proposal not to merge it with a Government institution but to preserve its individuality as a personal tribute to the late King Edward VII, and granted a site in the Spur tank maidan to locate the institution centrally so as to afford easy access to the public and to the medical profession. The Government, however, deputed one of its own medical officers to be the head of the institution which was opened first in a rented building in Pantheon Road on 15th July 1916, and then moved on 18th May, 1921 into its present habitation immediately after its construction. This institution was taken over by Government on 1-1-'52 and named Government Edward VII Memorial Tuberculosis Institute.

Thus the first unit in the Anti-tuberculosis measures—the provision of a tuberculosis clinic—came into existence in Madras City, so early as 1916.

The next step in this campaign, namely the opening of a block of wards, was rendered possible through the gift of Rs. 50,000 by a philanthropic citizen. In 1921 the opening of the Tuberculosis Hospital in Royapettah for accommodating 60 patients for the isolation and institutional treatment of tuberculous patients, marked the next stage, the Tuberculosis Clinic at Egmore being the feeder for this hospital.

The need for a sanatorium was greatly felt and for long; this was met by Government taking over in 1937 a private sanatorium at Tambaram with a bed strength of 10, which has now gradually expanded and accommodates over 529 patients with wards constructed mostly by the Government; the World University Service donated funds for the construction of one ward for the benefit of students of University classes, and another was built out of funds raised by a Flag Day organised by the Tuberculosis Association of Madras; a ward was donated by the Army for the benefit of Ex-Army personnel, and one ward each by the Army and the Air Force for the isolation of tuberculous members of families of the Army and the Air Force personnel respectively.

As a result of the country-wide programme against tuberculosis initiated and launched by Lady Linlithgow between 1937 and 1939, the Tuberculosis Association of Madras was formed in April 1939 as the Provincial Branch of the Tuberculosis Association of India. With the coming into being of the Madras Branch of the Tuberculosis Association, planned propaganda was undertaken with the help of the Red Cross Association by conducting lectures, with the

aid of magic lantern slides. The State Tuberculosis Association has been helping in the propaganda and in conducting the tuberculosis flag days, and seals sales campaigns for raising funds for the campaign against tuberculosis; it has also aided the campaign by building one Flag-Day-Ward at the Government Tuberculosis Sanatorium, Tambaram in 1948 and has contributed substantially for the construction of the Model Tuberculosis Clinic at Royapettah in 1952.

Domiciliary visits to the patients were organized in 1946. Examination of all contacts, tendering necessary advice to the patient and his family, the isolation of the patient in his own house however small it may be, the proper collection and disinfection of the sputum, and the general care to be taken by other members of the patient's family have all been achieved since the institution of this programme in 1946.

Since the public health problems of the City are primarily the concern of the Corporation of Madras, they undertook to open and run a tuberculosis clinic, in Pulianthope, a very congested locality in the city. The clinic commenced, functioning in 1944 and is being maintained entirely by the Corporation, with all the activities of a Tuberculosis Clinic.

The Corporation is also maintaining a T.B. hospital with 62 beds in Oteri since 1948, which was made possible by the generous munificence of a leading philanthropist who donated the site and adequate funds for the purpose. This hospital is intended only for the citizens of Madras.

In 1948 a sub-committee of the Madras Tuberculosis Association drafted a memorandum detailing a programme for the control of tuberculosis in the City of Madras; Government and the Madras Corporation, were requested to implement these proposals.

The main recommendations were:—the opening of more clinics, increase of beds for hospitalization of patients, intensifying social work and public health measures like the notification of tuberculous cases and introduction of BCG vaccination, besides the utilization of Mass Miniature Radiography.

In pursuance of the above recommendations, the Corporation of Madras in collaboration with Government established in August 1950 four regional Tuberculosis Clinics in the four State Hospitals of the city *viz.*, Government General Hospital, Government Stanley Hospital, Government Royapettah Hospital and Government Kasturba Gandhi Hospital.

The inauguration of the BCG Campaign in Madras in February, 1949 was the next step forward in the tuberculosis-control programme; it was undertaken with help from the UNICEF, WHO and the Union Government. The introduction, of this means of

increasing resistance in the susceptibles by the specific immunisation induced by BCG vaccination, is another step forward in the implementation of the said Sub-committee's proposals.

A beginning in the early diagnosis of disease was made possible in 1951 by the generous gift of a Mass Miniature Radiography Equipment, by the Madras Provincial Welfare Fund. This has been in effective use since then in detecting early cases among the highly susceptible groups *viz.*, industrial workers, workers in public services, the nursing and other staff in hospitals, and the student population; suspected persons are further checked by clinical examination and those diagnosed to be suffering from early disease are sent to the Sanatorium for treatment.

It has been the proud privilege of the Madras City Tuberculosis Association, yet in its adolescence, to come to the aid of the sick tuberculous patients, in providing succour to the families of the wage earning tuberculous patients, while they are undergoing treatment, by the grant of allowances, to twenty families at a time, for a period of six months and thus give solace to the patients and enable them to undergo treatment without worrying themselves about their families being left helpless.

The need for the rehabilitation on lines outlined in the foregoing paragraphs of the tuberculous patient, fit enough for discharge from a sanatorium, but not quite fit to resume normal work, has been kept in mind and a beginning has been made by the opening of the Amritnagar Colony, near the Government Tuberculosis Sanatorium at Tambaram, where provision has been made for rehabilitating fortyfive ex-patients; cottage industries and printing have been introduced as the most suitable avocations for rehabilitation.

Two other schemes, which would complete the campaign against tuberculosis, are under contemplation. *viz.*, the night sanatoria and the chronic hospital, for which necessary plans and estimates have been drawn up and the site acquired. The latter with a bed strength of 200 for the isolation of the chronic incurable cases is likely to come into being soon.

It will thus be seen that every Anti-Tuberculosis measure has been started and is at work in Madras for varying periods. The Government, the Corporation and the Tuberculosis Association of Madras have together planned and developed these anti-tuberculosis schemes in the city; it will now be the duty of the medical profession and the social service organisations to extend their hearty co-operation in tackling this serious menace from tuberculosis.

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PROGRESS OF TUBERCULOSIS CONTROL IN INDIA

"Some changes in the methods of tuberculosis control are discernible in recent years and we must take note of them. One of the pioneer tuberculosis institutions in the world, the Trudeau Sanatorium in U.S.A., founded 75 years ago by a consumptive-patient-doctor, has recently closed down. Now, this is not because there are no tuberculous patients in America. The Trudeau Sanatorium was a private one, catering mainly for well-to-do people. The availability of antibiotic drugs and the emphasis on the home treatment of the tuberculous have reduced the demand for institutional treatment of this group of patients. Further, Government and local bodies have increased free treatment facilities for practically all who need it.

"The recommendations of the Tuberculosis Association of India to the Planning Commission regarding anti-tuberculosis measures take note of this new trend. We in India still need a large number of beds for our tuberculosis patients but, in providing for them, we have to take note of the fact that they will be used mainly by the poor who cannot afford home-care and by those who need some form of surgical treatment. Most of our institutions at present are run by private agencies who provide a large number of paying beds with a view to securing adequate funds for running the sanatoria. Since conditions have now changed many of them are finding it difficult to keep going. Last year the Tuberculosis Association of India had to take over, with Government help, an old institution run by a private organisation and this now caters mainly to the poorer sections of the community. This has become possible only because of Government-aid. There are similar institutions in different parts of the country on the verge of closing down. It is the duty of the State Governments concerned to take over such institutions or else subsidise and keep them going instead of allowing them to vanish.

"Two institutions for the care of tuberculous children will shortly start functioning. In planning them the special needs of children by way of nursing care, educational and diversional facilities must be borne in mind.

"The shifting emphasis on tuberculosis control measures from institutions to the patients' homes imposes a special responsibility on the community as also on the Government. To make home care effective, a large body of doctors and health visitors is needed. In addition to medical care it will be necessary to take note of the social needs of patients and their families.

"In the scheme of things to come, an integrated tuberculosis service will emerge on such a pattern that its ultimate object will be to make the tuberculous individual a useful citizen, earning his living and contributing to national welfare. This will need the starting of centres for training tuberculous patients and in some cases their families also, with a view to their rehabilitation."—(Rajkumari Amrit Kaur in her address to the 16th Annual General Meeting of the Tuberculosis Association of India, 19-4-'55).

NECESSITY FOR TUBERCULOSIS SURVEYS

For a proper planning of tuberculosis control measures in any country, some form of reliable basic data on the prevalence of the disease in the urban and rural areas is essential. Under the present conditions of reporting vital statistics in India such data for tuberculosis morbidity cannot be had. The estimate that there are about 500,000 deaths due to tuberculosis in India and about 2½ million people suffering from the disease is based on certain limited surveys, carried out at different times during the last 15 years. A plan for a scientific survey in different parts of the country on a sample basis is now being undertaken by the Indian Council of Medical Research. There are 7 mobile X ray units in India at present which are expected to co-operate in this important undertaking, which may take a year to complete. The institutions maintained by the Tuberculosis Association of India are run on modern lines and are maintaining a high standard.—(From the 16th Annual Report of the Tuberculosis Association of India).

THE PROBLEM OF MENTAL DEFICIENCY IN INDIA

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MENTAL deficiency is defined as a condition of arrested or incomplete development of mind, existing before the age of 18 years, whether arising from inherent causes or induced by disease or injury. There is a degree of arrest sufficient to prevent social adaptation of the individual, necessitating outside care or supervision. This condition has to be clearly distinguished from mental disorder and mental deterioration or dementia although the two may coexist. As Esquirol put it "the demented man is deprived of the good he formerly enjoyed; he is a rich man become poor. The idiot (ament) has always lived in misfortune and poverty." There are degrees of mental defect—idiotcy, imbecility, feeble mindedness and the slightly-below-average in intelligence.

It has been broadly divided into two groups: Primary due to inheritance and Secondary due to known causes. These factors may play on the developing embryo or at the time of delivery or later. Approximately 80% of all defectives owe their condition to inheritance.

Sociological.—The report of the Royal Commission on the Feeble-minded (1908) says, "...there are numbers of mentally defective persons whose training is neglected, over whom no sufficient control is exercised, and whose wayward and irresponsible lives are productive of crime and misery, of much injury to themselves and to others, and of much continuous expenditure, wasteful to the community and to individual families."

The presence of a mentally defective child in the family causes considerable anxiety and worry to the parents. After years of hope, born out of wrong advice given by well-meaning relatives and friends, they are faced with a future which is extremely gloomy and holds no promise. Pearl Buck says, "Endurance of inescapable sorrow is something one must learn alone"; if successful it will help to lessen the sense of frustration. An honest and straightforward appraisal of the situation at an early enough stage would help to mitigate the misery and sorrow resulting from the tragedy of the birth of the defective in the family. The presence of such an element in the family may also have an adverse effect on the education of the sibs, firstly because of the restlessness and mischief of the child and secondly because

* Specially contributed to the ANTISEPTIC.

of the diversion of parental affection and monetary resources towards the disabled member.

At school, the defective child will find it difficult to cope with the ordinary instruction given to the normal children. He may therefore, absent himself from school or become sullen and create disharmony in and/or outside the classroom. Later, if he is not occupationally guided he will end up as a casual labourer or take to vagrancy or beggary. If it is a girl, she is easily tempted and becomes a prostitute, and a reservoir of venereal infection; and she may give birth to illegitimate children. In the factory, if the work allotted to him is beyond his ability or otherwise unsuited, he may become the victim of an accident or prove indifferent towards his work and hence underproductive. He absents himself from work frequently on grounds of ill-health. He may be utilised by his more intelligent colleagues to foment strikes in industry. The chronic invalid who frequents the out-patients' department of the General Hospital is likely to be a feeble-minded person. Due to poor economic status and lack of a sense of personal hygiene, such defectives dwell in slums which become foci for the spread of infectious diseases. A few become pawns at the hands of intelligent crooks or may take to criminal ways on their own, and soon become habitual criminals or recidivists; punishment or even imprisonment has no corrective influence on them.

In England.—It was during the reign of King Edward I, that a distinction was made for the first time between the idiot (including imbeciles and feeble-minded persons) and the lunatic or person who "hath had understanding, but by grief, disease or other accident hath lost the use of his reason." This distinction in feudal times was a practical one, for if a person were found to be a lunatic, the Crown took possession of his property only during his lunacy, whereas if he were found to be an idiot, the Crown assumed permanent possession of his property subject only to an obligation to provide for his person and estate. Laws were enacted from time to time for the supervision and care of the defective, culminating in the Mental Deficiency Acts of 1913-27. Further, the Education Act of 1921 made provision for those between the ages of seven and sixteen, who were incapable of benefiting by instruction in ordinary schools, but not incapable by reason of the defect, of benefiting by instruction in special schools. Until recently the Local Authorities had to provide institutions for the mentally deficient but by the National Health Service Act of 1946, they have all been taken over by the Regional Hospital Boards.

Report of the Mental Deficiency Committee 1926 (Wood Report).—A survey was conducted by the Royal Commission in 1904 and subsequently in 1924 by a joint-committee of the Board of Education and Board of Control. Dr. E. O. Lewis was asked

to make a survey of the existing conditions and determine the incidence of mental defect in the country and to suggest in the light of his findings the best way of dealing with mental defectives. He found the incidence to be 8 per 1000 of the total population and estimated that there were about 300,000 defectives of all ages and grades in England and Wales. It was found that the incidence was relatively greater in the rural than in the urban areas being 10.4 per 1,000 in the former and 6.7 per 1,000 in the latter. There was also evidence to suggest that there was an absolute increase in the number of defectives—an increase to twice the figure in 20 years' time as compared with the incidence in 1904.

In England, mental defectives are dealt with in one of three ways:—1. Statutory supervision which involves regular visits to the defective's home in order to see the defective as well as the parent or guardian. It is designed to obtain information as to the creature-comforts of the defective and also to establish friendly contact with his family.

2. Guardianship is provided for those who do not need custodial care in an institution but need a degree of control greater than can be provided by statutory supervision or who are in need of financial assistance. They may be placed in suitable lodgings or kept in the care of social workers.

3. Institutional care is needed for all the lowest grades of defect, those emotionally unstable and cannot be managed in the house and for those who exhibit anti-social conduct. Even the institutional case may be allowed out on licence or be placed in employment even if it be at rates of pay lower than the normal.

In India.—*The report of the Health Survey and Development Committee (1946) —(The Bhore-Committee):*—No intelligent or useful suggestions are found in this report relating to the subject under consideration. After stating that nothing is known of the incidence of mental deficiency in India, the report goes on to say: "Their numbers are likely to run into millions in this country if the ratio of incidence in England and America can be taken as even an approximate guide for estimating the number of such cases in India." The Indian Lunacy Act makes no distinction between mental disorder and mental deficiency and defines a lunatic "as an idiot or a person of unsound mind." This has led to the indiscriminate herding together of the curable and the incurable, the acute and the chronic, thereby making the atmosphere of the present Mental Hospitals, uncongenial for the rehabilitation of cases with a reversible mental disorder. The Bhore-Committee, while recommending the establishment of seven institutions during the shorter-term-programme, stated "as far as we are aware, no homes of reasonable size, with adequate facilities for the reception and treatment of mental defectives and of incurables exist in this country.....The need for an expansion

of Mental Hospital accommodation is, under existing conditions, so great that we do not wish to suggest that any of the seven institutions..... should be homes of either of these two types." Col. Taylor in his report to this Committee recommended the conversion of a military camp in Bihar into a suitable colony for forty to fifty thousand mental defectives. It is hard to imagine a more absurd suggestion.

Suggestions.—The suggestions made hereunder may appear idealistic and perhaps also impracticable in the present social and economic set-up of our country. It will, however, be no mean achievement to attempt to start such a service although it may fall considerably short of expectations.

Survey.—It is of fundamental importance to determine first the approximate incidence of mental deficiency in the country. A survey covering scattered but representative areas all over the country by a well-organised team would yield results in a couple of years. The team should consist of a qualified and experienced psychiatrist, a psychologist, a general physician with paediatric leanings, social workers, a medical statistician and other auxiliary personnel. The differential incidence of mental deficiency in the rural and urban populations, the ratio between the three different categories, (idiocy, imbecility and feeble mindedness), the predominant aetiological factors, the influence of malnutrition, the existence of inbred and large-sized clans of defectives, the relationship of deficiency to poverty, slum-dwelling, prostitution, crime, etc., are all interesting aspects which should be investigated by this team, which could then draw up schemes to meet at least the elementary requisites of the defectives.

Education.—The sheep must be separated from the goats in schools. Children unable to profit by the instruction in ordinary schools should be detected with the help of the teacher, and the qualified school medical officer and with the co-operation of the parents themselves. Arrangements must then be made for their education in special schools where visual and other special aids are used in teaching. Here the bias should be on manual work and the teaching of simple trades to those who are likely to benefit thereby. Day schools for those who have good home conditions and residential schools for the less fortunate must be established. The residential school has the advantage that such simple but essential things, as keeping clean, living in a disciplined group, etc., are probably learnt better, in out-of-school hours. An experienced and sympathetic matron or warden would be able to inculcate good habits of living and conduct.

Occupation.—For the older defectives who come out of the special schools, there must be centres for vocational guidance. Apart from intellectual and scholastic attributes, temperamental qualities such as the emotional stability of the individual should

be carefully assessed at different sessions and the parent advised as to the nature of employment suited to the defective. Vocational training may be given before allowing them to enter industry. It has been found that 20% of all work in the United States is done by the unskilled worker: most of them are defectives probably dullards or feeble minded persons. Work of a routine nature, involving little originality or judgement and monotonous and repetitive work, is done best by them as they appear to be relatively immune to boredom and fatigue. Further research in the occupational placement of the defective is necessary. It can be confidently stated that this will bring out latent unutilised man-power so very necessary at present for national reconstruction. River valley projects, community development schemes, development of communications, all need a very large share of unskilled work. This large source can be tapped with considerable profit to the nation and will lighten the burden on the community.

Legal.—It is essential to have a separate act for the mental defectives on the pattern of the Mental Deficiency Acts of 1912-27 of England. It may be simplified and modified to suit local conditions. Statutory provision of institutional and other care for the defectives will prevent indiscriminate mingling of the curable and incurable, in the mental hospital population and help to relieve the congestion to some extent. The atmosphere may then be helpful for a greater discharge rate and a rapid turnover in hospital service. At the present time, considerable silting occurs and it has been found difficult if not impossible to find outside placement for those defectives who have gravitated into the chronic wards. They occupy valuable hospital beds so very necessary for the acute mental cases.

An act on the model of the Education Act of 1921 of England is also necessary as it is felt that legal enforcement is needed to help the education of the backward child by making it obligatory on the part of the Government to provide special schools, etc., for their benefit.

Other useful measures envisaged are the institution of juvenile courts, reformatories and open and closed Borstals.

Organisation and administration.—We visualize a dual agency in the Directorate of Mental Health, one for Mental Disorder and another exclusively for Mental Deficiency Services. This separation is necessary in the light of the differential needs of the two divisions. In one, psycho-therapy and physical forms of treatment like electro-convulsion, abreaction, narcosis and leucotomy play the major role in rehabilitation. In the other branch, are necessary emotionally balanced and sedate people with more than the average share of humane feelings towards these less fortunate fellowmen. Here greater attention is paid to simple educative methods and occupational needs although on occasions, more active

forms of treatment like convulsive treatment or leucotomy may be necessary to bring round the disturbed defective.

The Mental Deficiency Service envisages the development of institutions and attached colonies. As an emergency measure, there must be at least one such in each of the big states. Monetary and other voluntary help from the public will be forthcoming with intelligent propaganda. Each institution should have a population of between 500 to 1,000 and it is desirable to have units or blocks separately for children, adults, the epileptic and post-encephalitic patients. About 500 acres of cultivable land must adjoin the institution where the patients could have scope for farming, gardening, dairy-keeping, poultry-farming and other established forms of occupation under expert guidance. Recreational facilities must also be afforded. The institution should be a more or less self-contained unit and in a few years' time, it must be able to defray about 50% of the cost of its maintenance. Human material should not be exploited but latent energies should be brought out to serve more profitable ends. Patients may be brought out to serve more profitable ends. Patients may be sent out on licence for employment in nearby farms and work-places and part of their earnings, collected by the institution for their support.

The fatalistic attitude taken by the average Indian acts as a double-edged weapon. On the one hand, such a passive attitude has adverse effects on the family and on the person of the defective economically and socially. On the other hand, he is tolerated and even spoilt by excessive parental love. This sentiment helps in the support of the defective inside the family for a life-time although he is a permanent liability. Neglect of and cruelty to these less-endowed and otherwise helpless members are thus prevented and many of them may not seek institutional care even when such services are available.

Supervision of the defective, although undertaken with the best of intentions, may be resented by most parents. Guardianship may be a satisfactory form of care especially when it is undertaken by the true parent or relative, a social worker or some other responsible person. Government pays a subsidy or gives financial assistance for the maintenance of the defective. Light penalties are imposed on those who neglect to take proper care and supervision of the defective.

Preventive and curative measures.—Public health measures, antenatal care and good maternity services, extension of general medical care to the interior villages, improvement in the standard of nutrition etc., all tend to increase the assets as well as the liabilities of the community and it is likely that more defectives will be preserved who would otherwise not have survived. Segregation of the defectives during the reproductive age-period, sterilization, birth-control, marriage guidance and eugenics are all steps which

tend to mitigate only a fraction of the severity of the problem. Each has its limitations and defects; a detailed consideration of these is impossible in a short paper. When it is remembered that only 10% of the defectives have defective parents and that there is normally a wide range in the distribution of intelligence, it becomes obvious that there can be no short-cut to the solution of this immense problem. We will always have defectives amidst us and measures are therefore, necessary to care for them.

Curative methods are unknown, for mental deficiency is a permanent state of arrested development. A few reports on glutamic acid show that it may be able to push up the 'Intelligence Quotient' by about 10 in certain grades of primary aments. Considering the prolonged nature of this course and the prohibitive cost of this treatment and the insignificant benefit derived, the use of this drug is perhaps only of theoretical interest.

Summary.—Mental deficiency and its social implications are mentioned in brief. An outline is given of the present position in India and a comparison is made with that in England. Suggestions are made for the amelioration of this problem in India.

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MENTAL HEALTH AND ILL HEALTH (Relief of Strain and Stress Conditions)

Mental health is a state of mental serenity. The mental tension which has harmful physical results is caused by a mind lacking in serenity, a mind that is restless because it knows no security or refuge from fear, frustration, perplexity and anxiety. "Mental unrest" were the words used to sum up a recent diagnostic analysis of patients' case histories by a group of six doctors in general practice in urban, suburban and rural districts. They concluded that no fewer than 51 of the conditions they were treating were stress disorders, and estimated that 20 to 25% of all the cases that came to them were due to mental stress.

Others who have made a special study of the subject have placed the incidence of stress disorders as high as 80 per cent of all illness. Sir Allen Daley has expressed the opinion (in an article on the "Health of the Nation" published in the *B.M.J.*) that the "psychoses and psychosomatic illnesses are probably the greatest single group of causes of unhappiness and inefficiency."

There can be no arbitrary division between the mental and the physical. The mental faculties, and peace of mind are, in all but the most exceptional cases, affected by physical conditions and *vice versa*. Much depends on the individual; there are long-suffering invalids who accept physical illness without their minds being in the least affected by it.

In considering what can be done to improve the over-all picture of psychosomatic ill-health, we must, as in all cases of impaired health and efficiency, seek both to remove the underlying cause and to treat the symptoms. In general terms, the underlying cause is, as we have seen, mental unrest; but who can

remove mental unrest from the world today? It is spreading like a contagious disease. The very atmosphere we breathe seems to be saturated with unrest engendered by increasingly complex living conditions—more and more speed, keener competition in the struggle for a living, more uncertainty, less hope, less security. The ordinary mortal has little control over his environment or protection against it. He is caught up in it, and although he may, if he is fortunate, be free from stress in his personal life, he is still to some extent influenced by the tensions self-knowledge and control that gives immunity from the stress and strain; but such a goal can be achieved only by the elect few.

For the great majority of mankind who know only fear, frustration and insecurity in their work, their economic struggles and their personal relationships, there seems to be little hope of avoiding tension and attaining a high degree of mental serenity. Unlike the healthy tension of our hypothetical, care-free mental worker who relaxes and refreshes himself by going for a walk, chopping wood, like Bernard Shaw and Gladstone—the tension that causes illness never relaxes, it goes on and on, waking and sleeping, to and by becoming subconscious, habitual (the "worrying habit") even though the circumstances, real or imaginary, and that started it may have ceased to exist, or to matter to the victim. That the cause of the mental tension exists at times only in the imagination, makes not the slightest difference to the reality of its damaging effect on the health.

This damage, as we have seen, may be one of a great many stress disorders, ranging from migraine, backache and sore throat to constipation, abnormal blood pressure, thrombosis or duodenal ulcer. The diversity in individual effect is a matter of physical constitution; as a rule the weakest organ and the area with the lower resistance form the starting point of the stress disorder.

To help the patient we must somehow release him from his tensions by breaking the vicious circle of influence of mind on body, and body on mind. This is the basic principle of a method for dealing with stress conditions which I have found effective. To appreciate how the therapy works, it is helpful to regard the nerves as lines of communication between mind and body. The shifting, cross-currents of thought and emotion which occupy the mind are for ever being transmitted to the nerves. This is what is meant by describing a physical illness of nervous origin. To say that a patient has nervous indigestion does not mean—as the patient is too often permitted to believe—that his physical symptoms are imaginary; they are only too real. What may be imaginary is the cause of the mental disturbance (or worry) which has acted upon the nerves over a long period in such a way as to produce the physical symptoms.

To break the vicious circle of bad influence of mind on body and of body on mind by releasing the patient from the never ending tension causing it, is not easy. The opposite of tension is relaxation; but one might as well tell a tense patient to jump over the moon as advise or order him to relax. He has to be relaxed without, at first, taking any part in the process himself. It is possible to achieve a state of artificial relaxation by the use of sedative drugs; to remove permanently the capacity for chronic anxiety by brain surgery; to give relief by convulsion therapy, hypnosis, and so on. Not every patient is willing to undergo the last three types of treatment; far too many become hopelessly dependent on the first, with progressive deterioration of their physical and mental condition.

The victim of chronic tension can, however, be relaxed and his damaged nerves regenerated by purely physical means. This can be done by a special kind of manipulation of the deep nerve centres, ganglia, plexi, trunks and the finer fibres where accessible.—(Dr. E. F. Stephen, M.D., D.Ph. in 'Mental Health,' London, Summer number, 1954, xiii, 3).

MANAGEMENT IN DIABETES MELLITUS*

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THE actual treatment of diabetes is in one way simplified. The diet should contain daily at least 150 g. of carbohydrate, 1 g. of protein per kilo of bodyweight with adjustment of growth requirements and sufficient to furnish adequate calories for the maintenance of vigour and growth.

Aetiology and prevention of diabetes.—The fields of aetiology and prevention are contiguous. A lively interest has to be taken in the patients to secure information regarding the heredity. The term heredity is divided into hereditary and familial. Under hereditary are included grand-parents, parents, uncles, aunts and children; under the term familial are included brothers, sisters and cousins.

The factors in favour of the theory that diabetes is inherited are:—1. The occurrence of diabetes in twins has been mentioned; 2. statistically significant excess of diabetes in blood-relatives of diabetic patients; and 3. the tendency for diabetes to skip over one or more generations.

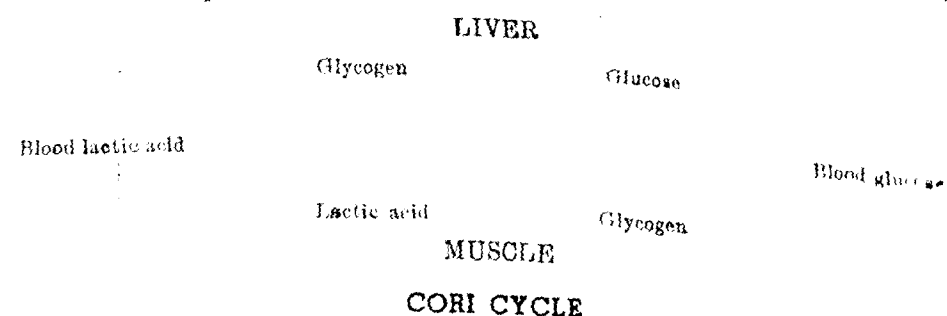
Other factors about diabetes are:—1. Obesity is a precipitating factor in diabetes; 2. the incidence is greater in very tall men; 3. Himsworth has pointed out that it is the high proportion of fat in the diet, rather than the carbohydrate, which favours the development of diabetes and; 4. arteriosclerosis is a bad enough foe for diabetes without blaming it for the causation of the disease.

If the diabetics marry, their descendents are destined to get diabetes. If a diabetic marries a non-diabetic, but in a diabetic family, the incidence is cut into half. If two non-diabetics belonging to a diabetic family marry, one fourth of the children are destined to have the disease. If a diabetic marries a non-diabetic of a non-diabetic family their children escape but are carriers of the disease.

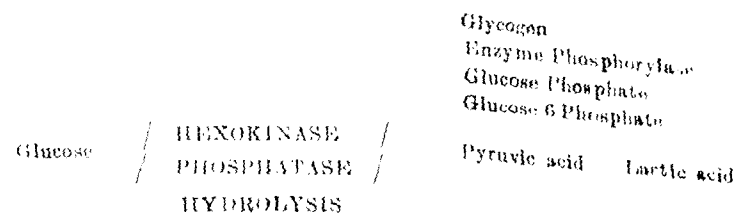
Physiology of diabetes.—*Metabolic interactions*:—Glucose from the blood is deposited in the liver as glycogen. The liver is a site of temporary storage and the glycogen is broken down when required to form glucose. The glucose from the blood which is converted into glycogen and stored in the muscles can serve as a source of blood glucose only indirectly. The glycogen in the muscles is converted into lactic acid carried to the liver and

*Specially contributed to the ANTISEPTIC.

transformed as glycogen from which glucose is formed. This is called Cori Cycle.



The steps involved in the formation of glycogen in muscles and liver are:—



The steps from glycogen to pyruvic acid can occur anaerobically. In the further steps if there is oxygen, pyruvic acid is broken ending in CO_2 and water. If there is relative lack of oxygen pyruvic acid is converted to lactic acid which diffuses into the blood stream, carried to the liver and reconverted into glycogen. The chain to the steps to pyruvic acid is known as the Embden Meyerhof cycle and the chain from pyruvic acid back to glycogen is known as the Cori Cycle.

In the body the oxidative conversion of pyruvate to carbon dioxide and water represents the main biological energy-yielding reaction and is also the meeting point of 3 major groups of biological substances, namely, carbohydrates, proteins and fats.

The steps are:—Pyruvic acid undergoes decarboxylation yielding acetic acid which condenses to oxaloacetic acid to form aconitic acid and with the addition of water, iso-citric acid. This iso-citric acid is dehydrogenated to form oxalosuccinic acid and decarboxylated to form alpha-ketoglutaric acid. Oxidative decarboxylation thus gives rise to succinic acid which is dehydrogenated to fumaric acid and then hydrated to malic acid. Malic acid is converted to oxaloacetic acid which re-enters the cycle.

This cycle, called the tricarboxylic acid cycle of Krebs offers many points at which the metabolic pathways of proteins, fats and carbohydrates converge.

Thus acetic acid is the main product of the metabolism of fats. In the diabetic the formation of pyruvic acid is impaired. In a

normal person the ingestion of glucose raises the blood pyruvate level. Such a response is absent or decreased or delayed in diabetes. Normally the carbohydrate is chiefly and preferentially the body source of energy. In the diabetes catabolism of fats, ketone bodies are formed as normal intermediate compounds in the utilisation of fat. When the ketone bodies are produced in large quantities as in diabetes, they come to the circulation in large quantities and the excess is excreted in urine. A condition of keto-acidosis occurs and if unchecked, diabetic coma will result.

Role and site of action of insulin.—1. Insulin greatly facilitates the conversion of glucose to glycogen. 2. Insulin enhances the ability of the tissues to oxidise glucose to carbon dioxide and water. 3. Stettin states that the insulin greatly favours the conversion of glucose to fat. 4. Insulin furthers the synthesis of proteins from amino-acids as has been shown by Lotspeich and Chaikoff.

Two blocks are operative in diabetes in the conversion of glucose to glycogen:—(a) At the hexokinase level; (b) Insulin shifts the utilisation of pyruvate from oxidation to lipid synthesis. A second block may be at this level. Clinically a diabetic syndrome may occur as a result of: (i) pancreatic islet insufficiency e.g., diabetes mellitus; and (ii) hyperpituitarism—the action of diabetogenic hormone of the anterior pituitary.

(a) *In the liver*:—(i) Produces effects opposite to those of insulin. Anterior pituitary.

Glucogens in the liver.....Glucose in blood.

INSULIN

(ii) Increases conversions of glucogens (glycogen and amino-acids into glucose; (iii) increases conversion of fatty acids into ketone bodies.

(b) *In the tissues* (i) the anterior pituitary inhibits conversion of glucose into hexose 6 phosphate, (ii) stimulates the conversion of tissue-proteins into amino-acids, (iii) metabolises depot fat, (a) neutralises insulin; and (b) may damage islets.

Hyperthyroidism:—Reasons are:—(a) increase in conversion of glycogen to glucose in the liver; (b) more rapid absorption of glucose from the bowel.

Increased secretion of adrenal cortex:—*Hormones*:—Cortisone opposes the action of insulin. It raises blood sugar and increases neoglucogenesis (new glucose formation from non carbohydrate sources) which are mainly proteins and glycerol derived from fat. Glyco-uria is due partly to hyperglycaemia and partly perhaps to a phloridzin-like action on the renal tubules, paralysing the re-absorption of glucose.

Lipotropic substances are those which prevent or remove an accumulation of excess fat in the liver. The factors are (1)

Pathology of diabetes.—1. Anatomical causes of insulin deficiency may be listed as follows:—(a) pancreatitis: (i) acute, (ii) chronic; (b) malignant disease: (i) primary; (ii) secondary; (c) haemochromatosis, (d) surgical removal. 2. Selective destruction of the insular tissue: (a) hyaline infiltration; (b) fibrosis; (c) toxic injury with lymphocytic infiltration; (d) hydropic degeneration (glycogen infiltration); and (e) reduction in *beta* cells due to unknown causes. 3. Inadequate insular tissue (congenital). 4. Inadequate blood supply—arteriosclerosis.

Extra pancreatic lesions.—1. Pituitary predominance of the acidophilic cells of the anterior pituitary; 2. adrenal glands cortex over-activity; and 3. thyroid—hyperthyroidism.

Examination of urine in diabetes.—1. Volume is usually increased. 2. Specific gravity is usually high. 3. Sugar is present in the urine: (a) qualitative Benedict's; (b) quantity: Fehling's with Carwardine Saccharometer. 4. Acetone in urine: Rothera's test. 5 cc. of urine is saturated with ammonium chloride. A few crystals of sodium nitroprusside are added and shaken; then add a few cc. of liquor ammonia fortis. At the junction, a permanganate colour develops reaching its maximum in 15 minutes. 5. Albumin in the urine: best method is to add sulphosalicylic acid 2% in 0.5% acetic acid. The reagent is added to the urine and at the junction a white precipitate is formed. 6. Casts: showers of granular casts may occur in the urine of patients with diabetic coma. The appearance of Kulz Coma Crystals is an expression of temporary damage to the kidneys and is not an indication necessarily of underlying nephritis. 7. Chlorides in urine: Add to 5 cc. of urine a few drops of nitric acid to keep down the phosphates and sulphates in solution. Next add a few drops of 3% silver nitrate solution. A white curdy precipitate is formed. 8. Renal function.

Diet and diabetes.—(1) Weigh the patient; (2) convert the weight in pounds into kilogram by dividing by 2.2; (3) the total calories are computed by 25 to 30 calories for moderate work and by 50 calories for heavy work. Allow 1 to 1½ g. protein for each kilo of standard weight; (4) for children 3 g. per kilo. For purposes of palatability fat is set between 60 and 110 g.; (5) the remainder is carbohydrate.

The symptoms of diabetes are:—1. polyuria; 2. polyphagia; 3. polydipsia; and 4. progressive emaciation.

Insulin.—There are three kinds:—1. Quick acting: regular insulin (RI); crystalline insulin (CI); 2. Slow acting: protamine zinc insulin—(PZI); 3. Intermediary:—globulin insulin—(GI); neutral protamine Hagedorn insulin (NPH) which is a substitute for a mixture of regular and protamine zinc insulins.

DURATION OF ACTION:—1. RI and CI: 6 to 8 hours; 2. PZI: 20 to 45 hrs.; 3. GI: 18 to 24 hrs.; 4. NPH: 26 to 30 hrs. RI

and CI reach the peak in 30 to 60 minutes; GI and NPH reach the peak in 7 to 8 hours; and PZI a few hours later. Patients taking CI or RI should have their food within 30 mts.

Other combinations of insulin:—Using the above principles three insulin preparations have been prepared in Denmark: *etc.*, Insulin novo-semilente, Insulin novo-lente, Insulin novo-ultralente. Each of these preparations has exactly the same chemical composition but the physical state of the insulin used in manufacture varies from amorphous and crystalline (lente) and pure crystalline (ultralente). I have used Insulin novo-ultralente. This contains a neutral suspension of highly purified insulin in the crystalline state with a small amount of zinc, 2 mg. per 1000 units. The normal range of action is over 24 hours. Insulin novo-semilente consists of amorphous insulin with zinc-2 mg. per 1000 units. The action lasts from 12 to 16 hours. Insulin novo-lente is a combination of 30% semilente and 70% ultralente and the actions of the two components supplement each other, corresponding to the 24-hour requirement.

My usual routine is to start with crystalline insulin (CI) twice daily, gradually increasing the dose according to the percentage of sugar in the urine. Within a week, I usually put the patient on a single daily dose of insulin novo-lente. Thereafter, I maintain the insulin novo-lente with slight adjustments according to the quantity of sugar in the urine, which is examined morning and evening. If the evening urine contains a high percentage of sugar with only a trace in the morning, an additional dose of ultralente is required; but if both samples of the urine contain only traces of sugar, novo-lente is good enough. If the morning urine contains a high percentage of sugar, the addition of semilente is helpful. Estimation of blood-sugar along with examination for presence of sugar in the urine, morning and evening would be the ideal procedure but not feasible in practice as a routine. Personally, I feel that most of the cases can be well stabilised with one daily injection of Insulin novo-lente.

Toxic effects of insulin.—1. Hypoglycaemic action. 2. Pseudo-renal disease or insulin oedema, which appears usually after protamine-zinc insulin and stimulates renal disease. The symptoms disappear when regular insulin is substituted. The explanations given are: (a) insulin increases the hydration capacity of the tissue colloids, (b) the alkalies set free when insulin is given, lead to water-retention and (c) 3 g. of water is retained for each g. of water stored. 3. Lipotrophy may take place after insulin therapy and spontaneous recovery is usual. 4. Local burning may be felt at the site of injection. 5. Insulin resistance—cases of insulin-resistance are reported to benefit with 10 mg. of DOCA possibly due to its inhibition-effect on the anterior pituitary diabetogenic factors. 6. Insulin allergy.—treatment is by (a) desensitization

methods; (b) use of denatured insulin. Denatured insulin is prepared by boiling regular and crystalline zinc insulin.

Diabetic coma.—The following are the points of difference between diabetic coma and insulin hypoglycaemic coma.

Differential diagnosis	Diabetic coma	Insulin coma
1. Onset	Slow—days	Sudden—minutes
2. Food	Too much	Too little
3. Insulin	Too little	Too much
4. Presence of infection	Frequent	None
5. Thirst	Extreme	Absent
6. Hunger	Absent	Frequent
7. Vomiting	Common	Seldom
8. Pain in abdomen	Frequent	Absent
9. Fever	Absent	Absent
10. Skin	Dry	Moist
11. Tremor	Absent	Present
12. Vision	Dim	Double
13. Eye balls	Soft	Normal
14. Appearance	Florid, extremely ill	Pale-weak
15. Respiration	Air hunger	Normal
16. B.P.	Tends to fall	Tends to rise
17. Mental state	Restless	Apathetic
18. Unconsciousness	Gradually approaches	May come on suddenly
19. Urine sugar	Present	Always (ly)
20. Urine acetone	Present	Absent
21. Blood sugar	High	Low
22. Acetophena	Present	Absent
23. Treatment	Insulin-fluid salt	Carbohydrate
24. Response to treatment	Gradual	Quick

DIABETIC COMA:—The mechanism of diabetic acidosis and coma rests on the failure to metabolize glucose. Hepatic stores of glycogen become depleted and the combustion of fat is secondarily increased. Normally certain ketone bodies result from metabolism of fat. But as increasing amounts of fats are being burned with inefficient utilisation of glucose, the ketone bodies become excessive, soon use up the available sources of bicarbonates and carry the patient to acidosis. The patient is dehydrated in part due to polyuria and will suffer electrolyte imbalance due to loss of fluid and salt. Depleted base and fluid losses combine to form a catabolism affecting every cell in the body. Intracellular fluid seeps into the blood vessels carrying with it most of the vital essences as potassium ions which are then excreted. Text books say at this point: "thus the patient goes to coma." Actually complete explanation is not available. The events may cause serious troubles such as: (1) dehydration; (2) loss of base especially potassium ion; and (3) acidosis. Infection and trauma may make matters worse.

Differential diagnosis between diabetic coma vs. other causes

Diagnosis	Colour	Respiration	Eyes	Tongue	Glucose	Ketonuria
Diabetic coma	Flushed	Air hunger; sweet breath	Sunken	Dry	++++	++++
Insulin shock	Pale	Shallow	Normal	Moist	0 - - +	0
Stroke (Cerebro-vascular)	Flushed or pale	Stertorous or Cheyne-Stokes	Pupils	Normal	0 - - +	0
C.N.S. infection	Pale	Stertorous	Pupils	Normal	0 - - +	0
Drug intoxication	Variable	Shallow	Pupils	Normal	0 or false positive	0 or false positive

Garfield H. Duncan of Philadelphia tests also plasma acetone. Diabetic coma is an emergency requiring immediate vigorous management, the keystone of which is insulin.

Over 100 units of insulin are given to the patient as soon as the diagnosis is made, part intravenously and the larger part subcutaneously. Until recovery is in sight 50 units are given every ½ hour, the amount being gauged by urinary and blood sugar and carbondioxide-combining power. When there is a possibility of going to the hypoglycaemic stage some cover the cases with an ampoule of glucose by vein or 5% glucose injection. (See table p. 764).

Gastric lavage is done to avoid acute dilation of the stomach and to prevent aspiration pneumonia. Dehydration is overcome by saline. If serum potassium is low, then give 1 g. of potassium every 4th hour. A moderate dose of 40 to 60 units is given subcutaneously and if the B.P. is low, intravenously. Normal saline is given before moving the patient to hospital.

When repeated blood glucose tests are not possible Root, Joslin and Wilder give insulin according to urine sugar—in diabetic coma.

Red	Orange	Yellow	Green	Blue
20 units	16 units	12 units	0	0

Cardiovascular and renal disease.—(1) diabetes produces a susceptibility to arteriosclerosis. The aim of treatment is to reduce hypercholesteremia by reducing fat and using lipotropic agents; (2) hypertension may occur in diabetes. Rice-fruit diet is recommended. Recently Chapman and Gibbons have recommended the addition of salt-free protein with good results.

Renal lesions in diabetes.—1. Reversible metabolic phenomena: (a) glycogen deposit in renal tubules; (b) fat deposit in tubules; 2. Arteriosclerosis. (Nephrosclerosis.); 3. Inter

capillary glomerulo fibrosis. (Kimmelsterl-Wilson syndrome). 4. Acute and chronic pyelonephritis including necrotising renal papillitis. 5. Arteriosclerosis. Glycogen deposits in the tubules indicate glycosuria whereas fat deposits indicate injury to the tubular epithelium frequently ending in coma.

Time	Evaluation	Lab	Insulin Blood Sugar	Fluid	Others
1st hour	History	Urine	300-600 mgm.	2000 units	
	Physical	Blood	100 units	Normal	Nursing
	Examination	Sugar	600-1000	Saline	Gastric
	X-ray chest	Blood	300 units	2 pints	Lavage
		CO ₂	Above 1000		Warmth
		NPN	400 units of regular insulin		
2nd to 5th hour	FPH & BP every hour	Urine analysis hourly for sugar, acetone blood Sugar and CO ₂ after 3 hours	Insulin according to the blood sugar	Glucose I.V. if blood sugar is approach- ing normal	Antibiotics Do not give potassium (a) when oliguria pre- sent (b) unless blood and ECG indicate ECG hypo- potassium
6th to 24th hour	Watch output of	Urine analysis 1 to 4 hours	Insulin RI	Glucose in saline	Carbohydrate 10 g. per hour
Second day			PZI or NPH		Protein 50 g. Fat 50 g.

Kimmelsterl-Wilson syndrome.—Diabetes, nephrotic oedema, gross albuminuria and hypertension and intercapillary fibrosis of glomeruli may occur together.

Heart disease and diabetes.—A low concentration of potassium may produce:—(a) weakness of muscles; (b) dyspnoea; (c) cyanosis; (d) increased pulse pressure (Corrign) (e) abdominal distention; (f) cardiac enlargement; (g) E.C.G. changes; (i) prolonged QT; (ii) decreased height and the inversion of the T waves; (iii) depression of the ST segments; (iv) prolonged PR. (h) angina pectoris and coronary arteriosclerosis.

Diabetic neuropathy. (i) Pain which is worse especially at night. No adequate explanation for this nocturnal character is available; (ii) parasthenias like burning with numbness, tingling, feeling

of coldness and a sensation of walking on cotton wool; (iii) mental depression and emotional instability are not uncommon; (iv) sensation: disturbance of vibration sense; (v) muscular paralysis as foot and wrist drop; and (vi) involvement of the autonomic nervous system may lead to postural hypotension.

CLASSIFICATIONS OF NEUROPATHY:—A. *Jordan's classification*:—(1) Hyperglycemic: neuritic symptoms as tenderness (2) Circulatory: ischaemic. (3) Degenerative: without normal reflexes. (4) Neuritic: polyneuritis. Motor involvement—parasthenia.

B. *Treusch's classification*:—1. Diabetes mellitus with pain. 2. Ischaemic neuropathy. 3. Diabetic polyneuritis. 4. Diabetic visceral neuritis.

C. *Karnosh classification*:—1. *Primary diabetic neuropathies*: (a) primary diabetic acroneuropathy; (b) diabetic radiculopathy; (c) pseudo-tubes of: (i) bladder, and (ii) joints or foot. 2. *Vascular*: (a) Ischaemic neuropathy; and (b) ischaemic disease of the C.N.S. 3. *Autonomic*: (a) loss of pilomotor control; (b) sweating disturbance; (c) orthostatic hypertension and tachycardia; (d) Argyl Robertson; (e) gastro-intestinal: (i) intermittent nocturnal diarrhoea; (ii) constipation; (f) sexual impotence and (g) diabetic oedema.

TREATMENT:—1. Bring diabetes under control. 2. Vitamin B. 3. Soda salicylas gr v to x 4. Vitamin B₁₂ 30 micrograms daily. 5. BAL has been tried by Schneider.

Disorders of the skin in diabetes—1. Pruritus: control diabetes. 2. Epidermophytosis: usual treatment. 3. Furuncles and boils: treat with antibiotics. 4. Xanthosis resulting from failure to metabolise carotene alipochrome found in green vegetables. Treat diabetes and restrict carotene-rich foods. 5. Xanthoma diabeticorum: bright red nodules occur with deep rose tint: Control diabetes. 6. Xanthelasma: yellow fatty tumours. 7. Necrobiosis lipoidica diabeticorum. 8. Gangrenous dermatitis. 9. Dupuytren's contracture. 10. Lanugo: downy hair on the back of the patient. 11. Lipoido-dystrophy.

Disorders of the eyes in diabetes.—1. Blindness. 2. Retinitis proliferans. 3. Cataract. 4. Depigmented iris. 5. Retinal aneurysms. Retinal abnormalities are: (a) deep retinal haemorrhages; (b) waxy exudates; and (c) nerve fibre layer haemorrhages.

Diabetic retinopathy.—Look for blot haemorrhages, hard white spots and absence of star figure.

When a man lacks mental balance in pneumonia he is said to be delirious. When he lacks mental balance without the pneumonia he is pronounced insane by all smart doctors.—(Martin T. Fischer, U.S.A.F. Med. Jour., July 1955).

FAT METABOLISM AND THE PART PLAYED BY INSULIN

Charles H. Best, C.B.E., M.D., F.R.S., of Toronto addressing the 31th session of the American College of Physicians, said "evidence is accumulating that insulin is a central anabolic hormone without which many of the building processes, some times, attributed entirely to other hormones, cannot proceed at the physiologic rate. Indeed, this is self-evident when we recall the devastating catabolic effects of pancreatectomy in many species, their complete relief by insulin, and the fact that the loss of no other single hormone produces more widespread catabolic derangements. Lack of insulin produces a failure of fat, protein and carbohydrate formation and storage, a decreased oxidation of sugar and a derangement of phosphate and potassium metabolism with a loss of these substances, as well as sugar, nitrogen and ketones, from the body. A fundamental finding which serves as a backdrop against which other aspects of fat metabolism are viewed is the flux or interchange of fatty acids between different tissues which Schoenheimer and Rittenberg revealed by the use of isotopic labelling. The fact that a saturated fatty acid may have a double bond introduced, i.e., become unsaturated, that the reverse of this process can also occur, that the length of the carbon chain can be shortened or lengthened by enzymatic processes in various tissues—these are basic matters of great importance. Superimposed on this flux, are the mass migrations of fat molecules produced, for example, by alterations of hormonal balance, and penetrating through it are the processes by which the fatty acids are oxidized to provide energy and heat. When the source of insulin is removed there is a rapid disappearance of depot fat and a large accumulation in the liver. This was shown by von Mering and Minkowski in 1889. The reversal of this flow by insulin was established by the Toronto group in 1922. Stetten and Boxer in 1944, showed that one of the major metabolic defects in diabetes was the loss of the ability of the body to form fatty acids from dextrose. This was reduced to a small fraction of the normal value, which could be restored by treating the alloxan diabetic rats with insulin. In the normal rabbit treated with insulin, the rate of lipogenesis was increased several-fold. Bloch and Kramer in 1948 were the first to demonstrate an *in vitro* effect of insulin on fat formation. Liver slices incubated in the presence of labelled acetate show incorporation of the label into fatty acids, and this process is enhanced by insulin if pyruvate is present. Fat synthesis requires the presence of an active metabolism of glucose, and the dramatic action of insulin on the former may be a reflection of its effect on the latter, rather than a direct and specific action on one or more of the enzymatic steps in fat synthesis.

"We used to believe that fat-formation from sugar was largely, if not exclusively, a hepatic phenomenon, but the proof that labelled glucose can be converted to fatty acids in the kidney and in diaphragmatic muscle, in heart, mammary gland and in adipose tissue establishes the extra-hepatic synthesis of fat. Popjak and Beeckmans (1950) have shown that labelled acetate is converted into fatty acids in the mucosa of the intestinal tract and in the lungs as well as in the liver. It is still probable, however, that a large proportion of fat synthesis takes place in hepatic cells. A great extension of our knowledge of the mechanism of formation of ketone bodies has been made possible by the use of isotopes. The dramatic suppression of diabetic ketosis by insulin was established by the Toronto work (Banting and Best). This was certainly a decrease of ketone-formation rather increased utilization, as later evidence from the same laboratory showed, but just how this is linked up with the lipogenic action of insulin or its prevention of the flow of depot fat to the liver is not known. Thus we see that insulin has widespread effects on fat formation and mobilization: (a) It promotes lipogenesis from glucose and acetate in the liver and in many extra-hepatic tissues; (b) It prevents the loss of depot fat and accumulation of fatty deposits in the liver; (c) It suppresses ketosis by inhibiting the formation of ketone bodies. These very important effects of insulin on fat metabolism are probably closely inter-related, and all may be linked with its action on the oxidation of glucose."—(*Annals Internal Med.* 39, 3, 433-442).

DYSTOCIA AND DELAYED LABOUR*

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DYSTOCIA means difficult labour and signifies the condition where difficulty is experienced during delivery. Delivery may be prolonged beyond its normal time or there may be signs and symptoms of foetal or maternal distress or in some cases both.

SIGNS AND SYMPTOMS OF MATERNAL DISTRESS:—(1) The temperature is above normal but not very high; (2) the pulse and respiration are above normal; (3) there is the pain in the chest also palpitation and tachycardia and (4) excessive pain in the lower abdomen.

SIGNS AND SYMPTOMS OF FOETAL DISTRESS:—There may be increased movements of the foetus; they may be very slight or absent; (2) the foetal heart sounds are above 160 or below 120; (3) there may be a passing of the meconium through the vaginal canal in vertex presentations.

Causes:—I. Faults in the forces of labour (i.e. uterine contractions may be either very strong or only very slight; II. Faults in the maternal passage.—Pelvis—external and internal, uterus, cervix, vaginal canal, perineum; or III. Faults in the passenger.—(1) Defects in the presentation and position of the foetus; disproportion between the size of the foetal head and pelvis; (2) Foetal abnormalities: (a) hydrocephalus, (b) monster, (c) large meningocele, (d) foetal ascites, (e) any tumour in the foetus or too big foetus, and (f) anencephaly.

I. Faults in the forces of labour.—(1) *Primary uterine inertia*: weak irregular uterine contractions; (2) in some cases the uterine contraction and the contraction of the abdominal muscle are hard but irregular. This occurs in the 1st stage and is common in primigravida. Generally due to ill-health, nervousness or under-development of uterine muscle (uterine hypoplasia) extreme anaemia (R.B.C. below 2 million) is another factor of primary uterine inertia.

In some of these cases, labour pain starts 2, 3 or 4 weeks before full term. Sometimes due to hydramnios or twin pregnancy there is an over-distention of the uterus. Therefore, the uterine contraction is very slight though the patient complains of pain in the abdomen and chest. Some patients complain of dyspnoea and palpitation.

2. *Secondary uterine inertia*.—Initially hard and strong contractions of the uterus get weaker due to exhaustion. In a number

of cases the signs and symptoms of maternal or foetal distress or both appear and the pain weakens. The commonest cause is obstructed labour. In some cases an early rupture of the membrane occurs before the cervix is fully dilated. Secondary uterine inertia generally occurs in the 2nd stage though in a few cases it may occur also during the 1st stage. This is generally due to malpresentation and wrong position of the foetus, contracted pelvis, large foetal head (disproportion between the foetal head and the pelvis). In mild hydrocephalus, previous diagnosis is not possible, labour is delayed and chances of normal delivery are usually remote. But in a small percentage of cases delivery does occur when the size of the pelvis is big. After forceps delivery, the death rate of the foetus is high.

II. Faults in the maternal passage.—(1) Contracted pelvis—contraction of inlet, cavity or outlet or any disproportion of the foetal head in relation to the pelvis. In a small percentage of cases sacral promontory, sacrum or coccyx is found deviated too much anteriorly. (2) Any mass obstructing the passage or pressing the lower uterine segment or cervix—subserous fibroid, sub-mucous fibroid, ovarian cyst, or cervical polyp, or (3) A loaded rectum or distended bladder. (4) Defects in cervix:—(a) excessive rigidity of cervix—in elderly primigravida; (b) organic rigidity of the cervix due to an inflammatory condition leading to cicatrization; (c) trauma of the cervix generally following child-birth leading to irregular cicatrix formation; (d) amputation of the cervix; (e) new growth in the cervical canal e.g. cervical polyp; (f) oedema of the cervix; (g) malposition of the cervix—acute antelexion of the cervix or the cervix deviated posteriorly towards the sacral hollow or laterally; (h) prolapse of the cervix outside the vaginal canal; during labour there is insufficient dilatation of the cervical canal, the external os is particularly not fully dilated. (5) Malposition of the uterus:—Due to a very highly pendulous abdomen seen especially in multipara, too much uterine obliquity; a retroverted gravid uterus leading to secontation of the anterior wall of the uterus; (6) Tumour of the uterus or its adnexa; (7) Malformation of the body of the uterus due to hormone deficiency; (8) Premature rupture of membrane due to various causes e.g. malposition of foetus or disproportion between the foetal head and pelvis. Dilatation of the cervix is delayed, and in some cases liquor amni is heavily drained leading to dry labour; (9) too tough a membrane but this is rare; (10) Placenta prævia—especially central; (11) Atresia, oedema, elephantiasis, hæmatoma or cyst of the vulva.

III. Faults in the passenger i.e., the foetus.—Faulty attitude, malposition or malpresentation—occipito-posterior, face mento-posterior, brow, breech, specially with extended legs or arms. Transverse, shoulder presentation.

Foetal abnormality:—Hydrocephalic, monster, anencephaly; a large meningocele, foetal ascitis, any tumour in the foetus, when the foetus is too big or when the circumference of the head is greater than the normal measurement of the head. Diagnosis by palpation in all cases is not possible, as when the head is not engaged in a primipara a few days before the expected date of delivery and in a multipara a few hours after the onset of labour pains; if the head is not engaged an X-ray picture must be taken after giving an enema; if diagnosed, the best treatment is cesarean section. In a number of these cases the membrane ruptures early and there is drainage of the liquor amni. In some cases a prolapse of the cord occurs. Hence an examination of the pregnant woman during the last 2 months is very important whether primigravida or multipara, even if there is no specific trouble or complaint.

Vertex presentation occurs in 96% of deliveries; of these L.O.A. and R.O.A. account for more than 86% while R.O.P. and L.O.P. occur in less than 10%. In 3.5% of cases there is breech presentation, normal breech in about 3% and breech with extended legs or arms in only 0.5% of deliveries. Face, brow, shoulder and transverse presentations occur in about 0.5%. In 25% of occipito-posterior cases, delayed labour and dystocia are encountered, because the occiput is not deviated anteriorly.

In vertex presentations, if the head is deflexed there will be difficulty in delivery and labour delayed. In posterior-vertex, the head is deflexed due to apposition of the vertebral columns of the foetus and of the mother. But during the 1st and 2nd stages of labour the head is flexed in 90% of cases. The occiput then rotates anteriorly effecting normal delivery. But in the other 10% of cases the head remains in the deflexed position, and the anterior fontanelle presents. Occipito-frontal diameter of the foetal head engages (4½") instead of sub-occipito bregmatic (3½"). The head remains in the oblique or transverse diameter of the pelvis or sometimes rotates posteriorly in the sacral hollow. Hence delivery is delayed and dystocia occurs but only in 2 to 2.5% of all vertex presentations. In these cases if the foetus is living, the application of the forceps is immediately necessary. If the foetus is dead, craniotomy should be done. But if the patient is examined a little early, under anaesthesia, forceps may be applied after manual rotation of the head. This mode of delivering results in a large number of live babies. If instead of flexion of the head a minor degree of extension occurs, the brow presents. This is the worst, but luckily rare, type of cephalic presentation occurring only in 1 in 1500 to 2000 cases of labour. This is always abnormal, hence delivery is delayed and dystocia results. The treatment is craniotomy. Early diagnosis is very difficult in these cases; if diagnosis by X-ray is made early, cesarean section will avail. If the head is completely extended the face presents. This occurs in 1 out of 500 cases; the labour is somewhat prolonged but normal delivery takes place when the chin

remains anterior. But if the chin rotates posteriorly i.e. in persistent mento-posterior position dystocia occurs; this happens in 10% of face presentations. Delivery of a live baby by using forceps is well nigh impossible. Hence craniotomy has to be done but if diagnosed early, caesarean section will be successful.

Breech presentation occurs in 3.5% of pregnancies. In more than 70% cases, normal delivery takes place; in about 15 per cent arms or both. In some cases there is considerable difficulty during the delivery of the head, because there is very little chance of moulding of the head and also because of the deflexion of the head. Hence proper precautions must be taken during the delivery of the head. If it is not manually possible, the head should be delivered by forceps.

Transverse shoulder presentation is always abnormal and occurs in 1 of every 200 cases. If diagnosed during full term after external version by a modified Monro-Kerr method, the head will be engaged and normal delivery will occur in some cases. If diagnosed during labour pains, caesarean section will be the procedure of choice. Dystocia and delayed labour always occur and normal delivery is not possible. But when the hand is prolapsed and the foetal heart is heard, the hand should be pushed up and internal cephalic version done, after which vaginal delivery is fairly common. But if the foetal heart sound is absent, decapitation must be done.

Complex presentation is diagnosed when the head presents along with a leg or a hand. Dystocia and delayed labour occur. Normal delivery can be effected, if this condition is properly managed.

Twin pregnancy:—The 1st stage is delayed but delivery is normal. In locked twins, delivery is delayed and dystocia occurs; such deliveries are however, rare. When a patient complains of labour pains, for about 36 hours without a rupture of the membrane, the following procedure should be adopted:—Take the history—age, date of last menstruation, and any complaints during pregnancy, history of previous pregnancies and labour. Make a general examination of the patient—pulse rate, respiration rate, temperature, condition of the heart, lungs and B.P. By *abdominal palpation* the presentation and position of the foetus may be ascertained; height of the fundus; whether the head is engaged or not? In primigravida external measurement of the pelvis—interspinous, intercrural, external conjugate, transverse diameter of the outlet.

P.V. examination:—The extent of dilatation of the cervix; P.H.S. should be taken. If the lady is a primigravida aged, say 19, full term B.O.A., head engaged, P_R , T normal, external measurement normal. (In our country the interspinous is 9 to 10 inches. But in a large number of cases in Bengal normal delivery occurs even when the measurement is slightly less because the size of the foetal head

is usually smaller in our country) with the cervix 2 fingers loose, tell her that she will deliver normally within 8 to 10 hours. Give her one teaspoonful Elixir Bromo-valerianate, or an injection of pethidine 100 mg. Then give her an enema and advise her to pass urine. If she cannot pass urine, draw it under aseptic precautions. She will deliver the baby normally but if the outlet is rigid, episiotomy may be done; this is needed only in a small number of cases showing the anterior vertex presentation.

Take another case of a multipara with labour pains for 36 hours; and also of pain in the chest, dyspnoea and tachycardia. The pulse rate is 120 and respiration 30; temperature normal; previous pregnancies and labour normal; the abdomen is distended, and fundus is at the level of the ensiform cartilage. By palpation the foetal parts are not felt properly. This is a case of hydramnios. Give an injection of pethidine 100 mg. if possible, get her X-rayed to know if it is a case of twin pregnancy and if the presentation and position of the foetus are normal. If constipated, a compound enema may be administered. If the patient has not passed urine for the last 6 or 8 hours, pass a catheter. If the pulse and respiration rates are still high and the patient complains of dyspnoea, give an intravenous injection of 25 per cent glucose 100 cc. and Cal. gluconate (10%) 5 cc.; also administer oxygen and put her to absolute rest in bed with the head high up. Then do a high rupture of the membrane by Bozeman's catheter. If the presentation and position of the foetus are normal she will have a normal delivery within a few hours. Even in twin pregnancy normal delivery will occur. When there is too much distention the foetal heart sound is not heard in some cases. But half an hour after rupture of the membrane, it can be heard and normal delivery will occur.

Take the case of yet another patient with labour pains for about 24 hours, membranes ruptured 4 to 6 hours earlier. Pulse and respiration are slightly high; temperature normal. Palpation shows that the head is engaged but in the occipito-posterior position (R.O.P.); foetal heart rate 140. Vaginal examination shows a fully dilated cervix with the occiput lying posteriorly on the right side. Inject pethidine 100 mg., also glucose (25%) 100 cc. and Cal. gluconate (10%) 5 cc. In a number of cases normal anterior rotation of head will occur after the above treatment and normal delivery will take place within a few hours. If it does not, rotate the head anteriorly under anaesthesia and apply the forceps. In cases where the head is too low down in the vagina, anterior rotation is not done. Apply forceps under anaesthesia. It is desirable to inject Kapillin 10 mg. to the mother. After delivery, administer oxygen to the infant and also an injection of Kapillin. With proper care, foetal mortality can be greatly reduced.

MALPRESENTATIONS

(ONE OF THE FAULTS IN THE PASSENGER)

Three types of malpresentation lead to difficulty in labour and should be capable of diagnosis in the ante-natal period: (a) Occipito-posterior positions of the vertex; (b) Breech presentation; (c) Transverse lie or shoulder presentation. In addition, face, brow or complex presentations may cause dystocia but these are rarely capable of diagnosis in the antenatal period and often arise secondarily during the course of labour.

The occipito-posterior position of the vertex is the commonest cause of delay in labour. The diagnosis of such a position may often be made in the antenatal period. In 80 per cent of cases where labour begins with the occiput posterior, spontaneous delivery with the occiput anterior takes place and so an unnecessarily gloomy view should not be taken of these cases.

Breech presentation increases the risk to the foetus, especially in the primigravida and to a less extent to the mother. For this reason whenever possible prophylactic external version should be carried out. Routine examination of the abdomen should be carried out at the 32nd week. Before this time, spontaneous version is likely but if a breech presentation is found, an attempt at version at the 32nd week offers a high chance of success. Diagnosis of breech presentation depends on feeling the foetal head at the uterine fundus, and the absence of the head at the pelvic brim. The foetal heart sounds may be heard above the umbilicus or often at a lower level. Vaginal examination may help to confirm the diagnosis. Prophylactic external version should be attempted in every case where breech presentation is diagnosed for the first time after the 32nd week of pregnancy. Contraindications to version are multiple pregnancy, antepartum haemorrhage, gross foetal abnormality or an elderly primigravida with some complications such as fibroids or contracted pelvis. When breech presentation is diagnosed for the first time after the 32nd week, an attempt at version is made immediately. If unsuccessful an X-ray will confirm the presentation and position. The patient is best hospitalized. An injection of omnopon gr. 1/3 and scopolamine gr. 1/150 is given and the patient placed in the Trendelenburg position for half to three-quarters of an hour; then a fresh attempt at version may succeed. If it does not, a final attempt is made under a general anaesthetic. It is important to dislodge the breech from the pelvis before attempting to turn the foetus. The foetal heart should be auscultated after version. A close watch is kept for any sign of haemorrhage. It is useful to carry out a sterile vaginal examination while the patient is still anaesthetised as this gives an opportunity of assessing the pelvic shape and capacity. In cases where version is unsuccessful and there is any contraction of the pelvis, caesarean section is the best method of delivery.

Transverse lie and shoulder presentation is commonly found in multiparous patients with laxity of the abdominal and uterine walls. Other causes include contracted pelvis, placenta praevia and gross foetal abnormalities such as foetal ascites. Multiple pregnancy is another relatively common cause. Diagnosis is usually easy. It is justifiable at the end of the 34th week of pregnancy to perform external version and follow this by high puncture of the membranes. The release of the liquor amnii, combined with a firm binder will serve to maintain the head in the pelvis and labour generally begins within a few hours.

Multiple pregnancy: Diagnosis is not easy on clinical examination. It should always be suspected if abdomen is unusually large or in cases where there is hydramnios. It is often possible to outline the parts of more than one foetus and in some cases two foetal hearts can be heard. The diagnosis is conclusive if the difference in rates between the two hearts is greater than ten beats per minute. Pressure symptoms are increased. Breathlessness is common, also varicose veins and haemorrhoids and the patient finds it difficult to get about. There is a striking increase in the incidence of toxæmia of pregnancy and gross oedema is often seen. There is also an increased incidence of antepartum haemorrhage. Premature labour is frequent. Complications include malpresentations, uterine inertia, post-partum haemorrhage and obstetric shock.—(Med. Illust., July 1955).

[772]

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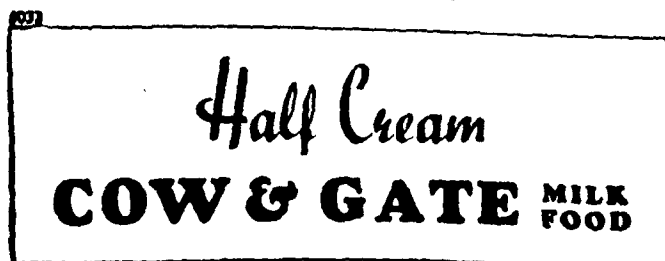


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MEDICO LEGAL PROCEDURES AND JUNIOR MEDICAL OFFICERS IN SERVICE*

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HAVING retired after 35 years spent in government service, during two of which I was an assistant district medical officer, I have had some experience of the difficulties which junior medical officers come across in medico-legal work. All of them do not have opportunities of serving under senior officers who will give advice and directions. When suddenly placed in independent charge of hospitals and dispensaries in outlying stations, they are often at sea in the matter of medico-legal matters. The state of affairs was worse three or four decades ago when medical officers were scarce. Several juniors felt it a bug bear to conduct a post-mortem examination and draft a certificate. Many have asked me how to conduct themselves in courts before a magistrate or judge. A course of lectures in actual procedure after taking the medical degree is essential both in the interest of the medical officer and that of the law-courts. Departmental circulars are no doubt issued from time to time but in many cases they refer to older ones on the subject issued during previous years; so the junior medical officer is very much at a disadvantage for the simple reason that these ancient circulars are not readily forthcoming or that he has not the time or patience to search for them amongst the old records. The junior medical officer entering service should refresh his knowledge of medical jurisprudence.

He must know that the following registers should be maintained by him for all medico-legal purposes:—the first is the *Accident book* in which he should record under the columns provided, all details as soon as a case of accident comes in. It is safer to record every case of accident irrespective of the history furnished, whether it comes under the purview of the Indian Penal Code or not. There have been instances where an injured person gave a statement before the medical officer swearing that it was all a matter of pure accident for which no one but himself was to blame and almost within the next hour, acting apparently under external influence changed his version even to the extent of accusing the medical officer of having acted under the influence of the opposite party. If the medical officer relying on the first version, had failed to record the case in the accident register, he is sure to get into trouble. It is safe therefore, to record every case of accident, irrespective of the version of the injured person. This will enable the doctor later to draft if necessary a certificate that may be

* Specially contributed to the ANTISEPTIC

required by the Police, the Magistrate or the party concerned. In recording the injuries, a correct and detailed description as far as possible of the situation, position, surroundings, edges, colour and dimensions of all the wounds should be noted down. An accurate and correct description is the only means of differentiating an incised, apparently incised or lacerated wound. I need not say that the edges in an incised wound are uninverted but are inverted in the other two. The colour of the wound, particularly contusions, is important. The age of the contusion is determined by its colour. Colour changes begin in 18 to 24 hours; they are red at first but during the next few days turn blue, bluish black or brown, greenish from the 6th day and yellow from the 7th to the 12th day, finally fading out in about 15 days. Sometimes when the colour is not noted, it gives a loophole to the Counsel who will begin to cross-examine at great length and embarrass you a great deal. After recording the injuries, you should also record your opinion as correctly as possible. If you cannot give an opinion with regard to a particular injury or injuries, as from effusion of blood, swelling or a suspected fracture, the opinion is reserved for the treatment, *e.g.*, after radiography or subsidence of swelling when the underlying bone can be clearly felt. If the Police or the Magistrate send a requisition for a certificate one should be furnished at once whether the opinion is expressed or reserved.

It should be remembered that the injuries should be recorded *at once* whether it is night or day, and a certificate issued soon after. A delay of even a few hours is liable to be questioned, particularly if both parties have received injuries and both of them happen to go to you. Great care must be exercised in furnishing your opinion on the injuries. You should only state if the injuries are simple or grievous and if grievous, whether a fatal result is likely to follow. In deciding which injury is grievous, one should carefully study the relevant portion relating to 'grievous hurt' in textbooks on Medical Jurisprudence, before giving an opinion.

Three of the provisions under 'grievous hurt' give more trouble than the rest. In a fracture or dislocation of a tooth, a man may be having pyorrhœa and a slight or gentle slap may dislodge the tooth. Legally it becomes a grievous hurt but in fairness, the medical officer should state that had there been no disease of the gums, the tooth might not have been so affected. In a case of permanent disfiguration of the face—time must decide for one thing and the status perhaps counts for the other. A small trifling scar on the face of a film star may be a serious matter while a much larger one may be of no importance in the case of a labourer. Anything which keeps the person in severe bodily pain keeping him away from his ordinary avocations for 21 days is the third proviso, which sometimes gives trouble. The injured person wants to get his case

registered as one of grievous hurt under the advice of his counsel and tries hard to convince you. You are being spied all the time as also the injured person and his movements. Pressure is often brought to bear on you in several ways. You should boldly resist it, and act fearlessly and conscientiously, even if it means the displeasure of influential persons.

I have seen certificates issued by some medical officers wherein they unnecessarily commit themselves to statements regarding the nature of the weapon used in inflicting the injuries. What you should say is the *probable* weapon and not the actual or *exact* weapon or the *only* weapon with which the injury could have been inflicted. Two common stock questions which Counsels usually ask in cross examinations on wound certificates are the possibilities of causation of injury—accident or self-infliction or whether all the injuries could have been caused by a single fall. It is pure common sense and each case should be dealt with on its own merits. Obviously, when there are injuries in front and at the back, a single fall could *not* have caused them nor could self-inflicted ones be on the right side unless the person is left handed and *vice versa*. Do not forget that the description of the injuries in the wound certificate should be an exact copy of that noted in the accident register. Sometimes the accident register is also summoned to be produced. All medico-legal records should be under lock and key and the key should be in your personal custody. In all cases of accidents admitted to the hospital, case sheets should be maintained carefully with day to day notes relating to the progress of the case. Annoying and irrelevant questions are sometimes asked in court by advocates who may sometimes take you unawares and try to falsify what you have stated for the prosecution. Remember the instructions given in textbooks on Jurisprudence, *viz.*, "keep your temper, do not use superlatives, be concise and precise," and when you are in difficulty, appeal to the judge; more than anything never attend court, unless you are thoroughly prepared. Always remember while recording injuries, that you may have to give evidence in a court of law.

The second register which is an appendix to the first is the *Intimation* register to the Police and the Magistrate. In all cases of grievous hurt it is your duty to furnish information to the Police according to this register and where a dying declaration is required, to send a copy to the Magistrate. In fact as soon as a case of grievous hurt is reported, this register is the first to be filled in after examining the case; for it may be a case where the injured person may have only a few hours to live within which a dying declaration will have to be recorded. If the Police or the Magistrate does not turn up, you can immediately record the dying declaration yourself but (never omit this) you have to certify on the dying declaration, whether the injured person was conscious or not at the time. In the event of an injured person dying while in

hospital, a report must be made to the police immediately asking whether a *post-mortem* examination is required or not. An inquest will have to be held even in cases of accidents like burns and until the police gives you an authority *in writing*, the body should not be handed over to the relatives. If the injured person refuses to stay in the hospital for necessary treatment inform the police accordingly.

Examinations in cases of rape or for estimating the age in juvenile offenders should not be undertaken *unless* you get a requisition from a magistrate. A police officer is *not* authorised to call for such examinations. The procedure for examination in cases of rape will be found in textbooks. If a male medical officer has to examine a female, the consent of the party in the presence of a respectable witness is necessary. Always examine a female in the presence of another female. Age can be determined only approximately on a physical examination. You should never be exact though you are often requested to be precise. Never forget to note down marks of identification in every case nor fail to look for recent injuries although the requisition may ask only for an estimation of the age. If injuries are also found, question the person as to how he came by them and note them down in the accident register. During your visits to subjails, prisoners sometimes point to injuries and make complaints against the police. Your duty is to record the injuries in the accident book and treat them. A note should be made in the medical officer's journal in the subjail.

Do not forget to verify the identification marks in any case in court before you depose. Sometimes it may happen that a wrong person is placed before you, and you cannot remember faces after a length of time. Cases of poisoning are emergencies and what applies to grievous hurt applies here as well, with the added risk that a fatal result may ensue. Stomach washings, vomits and excreta voided after arrival should be collected and sealed in bottles, labelled and reported to the police to be forwarded to the Chemical Examiner for report on a requisition from a magistrate or from a police officer not below the rank of a Deputy Superintendent of Police. Remember in cases of alcoholic poisoning the stomach washings should be preserved in a saturated solution of saline and in all other cases in methylated spirits supplied by the Government Medical Stores Depot.

Post-mortem examinations.—The police or the magistrate are alone competent to authorise a post-mortem examination. A copy of the inquest report should accompany the Police requisition in form No. 186; but this is not invariably done. Such failure however, should not be a bar to conducting the post-mortem examination. A remark to that effect should however, be made when the certificate is sent. Often the particulars given by the police regarding the height, identification marks and the injuries on the body may not be accurate but so long as the body could be identified

without any doubt, the examination should be proceeded with. The exact time of the arrival of the body into the mortuary should be noted. As soon as possible after its reported arrival, even at night, the medical officer should have a good look at the body, note down its condition and record any external injuries with the aid of a powerful light. The rest of the examination may be done after day-break. C. M. form No. 8 is an admirable and exhaustive guide for conducting *post-mortem* examinations. After the *post-mortem* examination is finished the *post-mortem* certificate is prepared. A rough draft before making the final fair copy, is very very useful. You can incorporate concisely all relevant points, omitting unnecessary matter likely to make the certificate clumsy and give a chance to counsel to try and shake you off your feet. Always remember while drafting a certificate that you are liable to be examined in a court of law. The opinion regarding the cause of death should be clearly stated. It is not enough to say that death was due to natural causes, nor is it permissible to say 'no opinion can be given' regarding the cause of death but yet was *probably* due to so and so. If after completing the post-mortem examination you are not able to decide the cause of death, or you suspect it may be due to a poison, preserve in spirit the viscera, *viz.*, stomach and its contents, (2) contents of the small intestines, (3) 1 lb. of and its contents, (4) kidney, (5) urine found in the bladder, (6) a loop of the liver, (7) small bowel (about one yard). For details of transmission and covering letters, see the relevant chapter in the Civil Medical Code. Whether you preserve the viscera of your own accord or at the instance of the officer giving you the requisition, the police and the magistrate must be informed that the viscera are preserved and the Chemical Examiner if so required and if a constable is deputed to take the same. This is a laborious process; you should use a private seal of your own for sealing the bottles and the letter advising despatch. The report of the Chemical Examiner should be furnished in original to the Magistrate and copies to the D.M.O. and the Police, an office copy being maintained and filed along with the post-mortem records. Your opinion so far reserved pending the report of the Chemical Examiner should now be furnished to all concerned.

Inaccurate descriptions are often given about the property on the body, trifles like glass beads and bangles being noted while valuables are omitted. I once did a post-mortem on the body of a female who had about twenty tolas of gold tied round her waist in her sari which had escaped notice. When the cloth was removed on the post-mortem table, perhaps for the first time the find was made. I had it weighed in the presence of the policeman, and then handed it over to the Sub-Inspector or Police on a proper receipt. A preliminary external examination is made on bodies received after dusk, and they are left in the custody of the policeman till morning for safe-keeping.

Wound certificates when required are prepared in triplicate, the original is handed over the same day to the police who will forward it to the magistrate, the duplicate is submitted to the D.M.O. and the triplicate is retained. In post-mortem examinations, certificates are prepared in quadruplicate on the same day, the original is sent to the magistrate in a sealed cover, the duplicate to the police, and the triplicate to the D.M.O. and the quadruplicate is retained as the office copy. Where viscera are forwarded for chemical analysis a detailed description of the post-mortem appearance in C.M.F. No. 66 is also sent.

I have outlined above for the benefit of my junior brethren the procedure to be followed in medico-legal work indicating particularly the snags and pitfalls they should steer clear of.

MEDICO-LEGAL AUTOPSY

Great care is necessary in the removal of clothing in order that traces of dust, dirt, glass, paint fragments or other foreign materials are not shaken out and lost. Any such material loosened in the course of undressing the body should be carefully scraped up with a scalpel or spatula and placed in small transparent envelopes of cellophane or similar material. Transparent envelopes are more satisfactory for the preservation of such material since ready visibility lessens the amount of manipulation when they come to be studied in the crime laboratory. Many bullet wounds are inflicted through clothing, and the underlying skin will give only incomplete information concerning the wound. Do not cut through bullet holes, tears or knife holes; rather cut around them if necessary to facilitate removal. Above all do not stick fingers, pencils or probes through openings; the direction of distortion of fibres may later be of extreme importance in deciding which is the entrance and which is the exit of a bullet.

The character and distribution on clothing should not be altered or distorted. Blood stained clothing should be hung up, and dried at room temperature before packing, otherwise moist stains may putrefy which will interfere with subsequent laboratory tests. Too frequently clothing is forcefully removed and carelessly piled in a corner of the autopsy room. Loose folding of garments with clean paper laid between the folds is the proper method of packing. Generally folds should not pass through suspected seminal stains since spermatozoa may be damaged.

Certain biological specimens must also be taken at the time of autopsy. Flourished blood, or clotted blood must be retained for possible blood typing. Hair, to include not only head and pubic hair but also beard hair, hair from the eye-brows, eyelashes, axillary hair, and body hair, should be plucked out and not cut. Finger-nails should be clipped rather than scraped, and the right and left clippings should be preserved in separate envelopes.

Vaginal smears to be studied for spermatozoa should be taken as soon as possible. They are indicated in all cases of homicide involving a female whether or not sexual assault appears at the time to play a role in the case. If fluid is obtained from the vaginal tract smears should be prepared and air dried.

Foreign material present in the wounds is carefully lifted or scraped away with a scalpel and preserved as recommended previously. Washing must be avoided and air-drying before packaging is desirable. Washing must however be avoided and air-drying before packaging is desirable. The cardinal rule, however is: *Do not probe, scrape, enlarge, cut into, excise, or otherwise distort or destroy any wound until it has been completely measured, charted and photographed!*—(Gradwahl's *Legal Medicine*, 1954).

SOME COMMON KNOWN TESTS ON THE DIAGNOSIS OF EARLY PREGNANCY*

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THE principle and practice of family planning and limitation are now well recognised. The recognition and diagnosis of pregnancy in the early stages are important in any scheme of family planning and limitation. A review of the commonly known tests for the diagnosis of pregnancy during the first three months of conception is presented in this paper.

From ancient times various signs have been suggested to determine early pregnancy. Galen thought that the constituents of urine may undergo some changes during pregnancy. In Ayurveda it has been stated that the urine of pregnant women will adversely affect the growth of the seedlings of germinated black horse-gram (Chowhan 1948). The excretion of hormones in the urine of pregnant women was anticipated by Egyptian medicine 3,500 years ago. The Egyptian priest-doctor offered the herb *Bededaku* powdered and soaked in the milk of a woman who has born a son. "Let the woman eat it. If she vomits it she will bear a child; if she has flatulence she will not bear one." Dr. Culpepers (1771) in his 'Last Legacy' states that a woman should make water in a clean copper or brass vessel at night when she goes to bed and put a nettle in it. The next morning if the nettle shows red spots she is big with child, otherwise not. Dorn and Sugarman (1932) and Na guib Baid of Cairo (1945) attempted to use the hormone secreted in the urine of pregnant women for forecasting the sex of the coming baby. I have tried to elaborate the old Ayurvedic test by studying the effect of the pregnant woman's urine on the growth of different seedlings and also to compare its effects with that of gonadotropic hormone. Most of the tests for the diagnosis of pregnancy in common use now are based on the theory that some urinary changes take place during pregnancy. Many of these tests proved fallacious till the epochal discovery of Aschheim and Zondek who (in 1927) demonstrated an increase in the excretion of gonadotropic substance in the pregnant woman's urine. The original Aschheim Zondek test and its modification by Friedmans and Schneider (rabbit-tests) are still considered the most accurate and of practical value to-day. These and many other simple but less-known tests will now be discussed.

I. Aschheim and Zondek Test, (A-Z Test).—The A-Z and other allied tests depend on the detection in the urine of certain

* Specially contributed to the ANTISEPTIC.

quantities of gonadotropic hormones produced during gestation which are found circulating in the blood and are excreted in the urine.

TECHNIQUE :—The morning urine is collected before breakfast ; on the previous night fluids are restricted. The receptacle should not be cleaned with spirit. A drop of tricresol per ounce may be added to the collected specimen as a preservative. The urine if alkaline, is rendered slightly acid with a few drops of 50% acetic acid. If the urine is turbid it is filtered and if toxic it may be detoxicated by adding 90 cc. of ether to 30 cc. of urine in a separator. Shake for five minutes and then separate the ether and stand the urine in an open vessel for an hour, so as to evaporate any ether left in it ; add 0.9 g. of glucose. Otherwise take 25 cc. of the urine from the collected specimen and add 1 g. of sulpho-salicylic acid and the urine is allowed to stand for 30 minutes with occasional shaking. It is then filtered and neutralised with sodium carbonate and used for the test. The sample may be stored in a refrigerator for future use and should be warmed to 37°C before use. (Heat above 60°C destroys the hormone). A batch of five immature mice, 6 to 8 g. in weight, 3 to 4 weeks old are taken. Each animal is injected subcutaneously into the buttock, twice daily morning and evening according to the scheme given below :—

Mouse No. 1.	0.2 cc. at each injection twice daily for 3 days.
" 2.	0.25 cc. " " "
" 3.	0.30 cc. " " "
" 4.	0.35 cc. " " "
" 5.	0.40 cc. " " "

On the morning of the fifth day after the injection the animals are killed and the ovaries examined with a hand lens or under a binocular microscope. In positive cases the ovaries are found enlarged 3 to 4 times their normal size. The corpora lutea are easily recognised as blood-spots on the surface of the ovaries and the enlarged follicles are noted as white spots. The blood-spots become more patent if the ovaries are steeped in glycerine for a few minutes. The detection of corpus luteum or blood-spots in one or more of the ovaries constitutes a positive test. The presence of enlarged follicles is strictly speaking a negative finding. This test may be positive 3 to 5 days after the first period has been missed by the woman.

The value of the test.—The test is positive where a living product of conception exists or where the chorionic elements are in biological contact with the maternal blood. It is positive also in intra-uterine and ectopic pregnancy, hydatidiform mole, chorionic epithelioma and in a few cases of malignant growth of the uterus, incomplete abortion and teratoma of the testicle. The test may be

negative if the pregnancy has terminated unfavourably by abortion or it might be negative when the amount of gonadotropic hormone has become so small in the urine as not to affect the ovaries of the test animal. It may be positive for a few days after the termination of conception as in the case of suspected abortion. This test may therefore, be used for detecting abortion, hydatidiform mole and chorion-epithelioma. The test has been reported negative in a case of ovarian pregnancy.

The rapid A-Z test.—Rapid results may be obtained if an increased quantity of the active factors are injected into the test animals. The gonadotropic factors in the urine may be concentrated by the following method :—The urine is acidified and enough alcohol is added to make up to 80 per cent. The mixture is allowed to stand and the precipitate formed is centrifugalised and then extracted with ether and the residue is injected into animals. The amount used for injection should be derived from sixteen times as much urine as used for the ordinary test. The animals are killed in 51 to 57 hours and the ovaries examined. The presence of the blood-spots (Corpora-lutea) gives a positive result. The absence of any effect in the ovaries is of no significance. Eberson (1931) used this test in 36 to 48 hours and claimed accuracy in 175 cases.

Kelso (1941) employs four immature rats, two being examined after 24 and two after 72 hours. The doses given are 0.5 to 2.0 cc. according to the specific gravity. Both the ovaries must be enlarged and hyperemic to be regarded as positive tests. About 4 per cent of cases give false positive in the 24 hours' rats but true negative in 72 hours' rats. The 72 hours' test is as accurate as the A-Z or Freidman test.

II. Schneider test —This test is a modification of the A-Z test in that it is performed on rabbits. Healthy virgin female rabbits 12 to 14 weeks old and not less than 1,500 g. in weight are used. The first urine voided in the morning is obtained in a clean receptacle. If the urine is cloudy it is filtered and 10 to 15 cc. is injected into the marginal ear vein, under aseptic precautions. An autopsy of the animals is performed in 24 to 48 hours after the injection and immediate diagnosis is possible by microscopic inspection of the ovaries. In negative cases the ovaries show no change in size and colour and remain small in size. In positive cases 1 to 14 corpora hæmorrhagica and corpora lutea are present in each ovary. In case of dead foetus (*in utero*) the follicles are either turbid or pinkish and clear and compare in size with the follicles seen in the ovaries when urine from a living pregnancy is injected. In the case of ectopic pregnancy the test is not accurate. In some instances a positive test is obtained in 12 hours. Two rabbits may be injected and autopsied after 24 and 48 hours. This test is of value in differentiating normal pregnancy from cessation of menses as a result of tuberculosis, or cardiac and nephritic diseases with

pregnancy and the enlargement of uterus with fibroids. It is also positive in pituitary tumours, hydatidiform mole, chorion-epithelioma and teratoma of the testicles.

III. Friedman test.—Friedman (1929) described another modification of A-Z test, for which quick results are claimed. Here also the urine is injected into the ear veins of the rabbit and the ovaries examined under an anaesthetic after 48 hours and the abdomen is sutured after the observation. The same animal can be used again and again. After a negative result, the animal is given rest for a fortnight before being subjected again to test and in the case of a positive test, rest for at least one month is allowed to let the changes induced in the ovaries pass off. 50 cc. of urine are added to 50 cc. of rectified spirit and the mixture allowed to stand for some minutes, the inert precipitate thus formed is centrifuged, and discarded; 150 cc. of rectified spirit is then added to the supernatant fluid, to bring down the active factor and the precipitate is again centrifuged and the supernatant fluid discarded. The precipitate is extracted with ether to remove any remaining toxic substances; the fraction not removed by the ether is dissolved in 5 cc. of normal saline and neutralised. 3 cc. of this solution is injected intravenously and the animal is operated after 24 hours. If the reaction in some cases (10 to 20%) is doubtful, the remaining 2 cc. are injected and the animal operated after an interval of 24 hours and the result observed.

IV. Two-hour rat-test.—This test is believed to be of the greatest accuracy. Immature female rats 21 to 55 days old, weighing 30 to 80 g. are used. A dose of 2 cc. unconcentrated urine, not necessarily morning urine, is injected intraperitoneally into the lower right and left quadrant of the abdomen. Two hours later, the rats are asphyxiated with ether (and no other anaesthesia). The viscera are exposed without loss of blood and the ovary examined with the least trauma to the organs. A positive result is indicated by ovarian hyperaemia. This test will not be positive unless the test is performed at least one week to 10 days after the missed period or 21 to 35 days after conception has taken place. The test is 99.5% accurate except in ectopic pregnancy. Test animals are easily available. Age and weight may vary considerably in contrast to the close specifications for other tests. Urine can be easily administered and the test can be performed in 2 to 3 hours. The end-point is easy to assess and does not require considerable experience and accuracy. The urine has not to be treated, concentrated or have its pH changed. A morning specimen is preferable but not necessary. All these tests are based on the presence of the gonadotropic hormone which is characteristically present in the urine during pregnancy. False positive results may be observed, if gonadotropic or certain other hormones are being given to the patient, or if there are rare tumours of the ovary, pituitary or adrenal cortex. (Holland-1950),

V. Brouha test.—This test is yet another modification of the A-Z test and relies on the stimulating effect of the gonadotropic hormone on the reproductive glands of the male rodents and causes an increased growth of their seminal vesicles. This test is not so satisfactory as the proper A-Z and the Friedman tests. Brouha and Simonet (1929) advocated the injection of urine for 10 days into male mice subcutaneously. The animals are then killed and the seminal vesicles examined. The test is positive if these organs are definitely enlarged. This test is liable to a number of errors and so is not very reliable. Moreover considerable difficulty is experienced in obtaining animals of the proper age and weight.

VI. Hogben's *Xenopus* test for pregnancy.—Shapiro Zwarenstein (1934) used the South African clawed toad *Xenopus laevis* (Laudin) for the diagnostic test. The adult female frog carries eggs throughout the year but only extrudes them during mating or after the injection of prolan-A-like bodies. The advantage of this test is that the toad lays eggs within 8 to 16 hours after the injection of an extract of pregnancy urine. This biologic test became particularly popular, during World War II owing to the increased cost of the rabbits used in other tests. This test compares well with the Friedman test. The female toad lays eggs within 12 hours of the injection of an extract of pregnancy-urine.

TECHNIQUE OF THE TEST:—The urine is extracted with acetone, filtered and dried. The hormone is soluble in water and so it can be separated from the insoluble constituents of the urine by adding water and centrifuging it. One cc. of the watery fluid is injected into the dorsal lymph sac of the frog. The frog is then placed in a glass aquarium fitted with a gauze floor which permits the eggs to fall through the meshes so that they are not disturbed or eaten by the frog. If the test is positive, the eggs are extruded within 18 hours but if the eggs are not seen within that time a negative result is reported. This test has the advantage that it is quick, gives accurate results and is simple to perform. The test animals are easily obtained and stocked. The most important advantage is that it gives no false positive results.

Three sets of frogs must be kept in the laboratory. The first batch consists of frogs which have given positive reactions and are being allowed a month's rest before being considered suitable for test again; the second group consists of frogs which gave a negative reaction and are being rested for one week before being used again and the third group consists of frogs suitable for immediate use.

Weisman, Snyder and Coats (1942) reported on a series of 267 patients tested, of which 154 had also the rabbit test performed and 113 were tested only on the frogs. The patients were followed up to see if the signs of pregnancy became subsequently obvious. The frog test was accurate in 99.6% in the series of 154 cases.

Foots and Seegar Jones (1946) of Johns Hopkins Hospital performed 68 tests to exclude diagnosis of pregnancy in patients with amenorrhoea associated with obesity, uterine fibroids, tuberculosis, corpus luteum cysts and functional irregular vaginal bleeding. Negative response was obtained in all the 68 cases. In another 60 tests on patients with a final diagnosis of intra-uterine pregnancy 46 were positive. No positive tests were reported before the 10th day of pregnancy. The chorion gonadotropin in urine is not high enough at this stage to give consistently positive results. The Xenopus test will, in proper hands, give results as good as those obtained by skilled workers with rabbits.

VII. Galli Mainini test.—This test is performed on male frogs. Galli Mainini (1947) reported that the male frog or *Bufo arenariorum* promptly responds to the gonadotropic hormone and that the active sperms appear in the cloaca after the injection of pregnant urine. Therefore, the frog or toad with continuous spermatogenesis will make a reliable animal throughout the year. It has been reported recently that not only toads but a large number of Salientia from different parts of the world react suitably to this test. In India Bhaduri (1950) did some pioneer work on this test. He reported that the Bengal croaking frog is most suitable for this work. The male *Xenopus laevis* is more sensitive to chorionic gonadotropic hormone than the female of the species and only a small quantity of urine suffices to produce the reaction. In addition to the above observations *Bufo melanostictus*, *B. stomaticus*, *Rana tigrina*, *Rana limnocorhis*, *Rana hexadactyla*, *Kaloula pulchra* and *Hyla annectans* have also been tried by him and others and reported to be equally suitable for this test. The male frog test has the advantage that the results are obtained in three hours and the frogs can therefore be repeatedly used without any special preparation either of the urine or of the animal. Haines (1948) reports that the results are comparable with A-Z test. The false positive reaction can easily be avoided by the examination of the frog's urine before the test and the false negative reaction can be excluded by previously testing the frogs against the urine of women known to be pregnant. (Azner-Ferrares, 1949).

TECHNIQUE OF THE TEST.—A measured quantity (1 to 10 cc.) of untreated urine from women suspected to be pregnant or otherwise is injected into the subcutaneous dorsolateral lymph sacs of an adult male frog or a toad. After a lapse of $\frac{1}{2}$ to 2 hrs., (spacing half an hour's interval for each examination), the urine of the frog is sampled either by a pipette catheter or by natural voiding, which it often does readily when held in the hand and gently coaxed. A drop of this urine is taken on a clean slide and examined under the microscope. The presence of sperms in any quantity, one or more, dead or living, motile or non-motile, in the urine drop indicates a positive reaction, and its absence, a negative response. The latter may be rechecked 3 to 4 hours later, to confirm the result.

It is, however, useful to mention here that before an injection is made, the urine of the test animal is checked for the presence of sperms which, as a rule, are absent and therefore, this negative feature will serve as its own check. Although a toad or frog may be re-used with success several times, after a good rest (4 to 7 days), fresh toads (*Bufo melanostictus*) should if possible be used for all cases, especially those with disturbed pregnancies and related conditions.

VII. A simplified biologic method of diagnosis of pregnancy.—This test is based on the Allens test, but no attempts are made to determine the hormone that provokes the positive reaction. Two female rats aged 4 to 5 weeks, weighing between 25 to 35 g. are given subcutaneous injections of 0.5 cc. of urine (first morning specimen) and a vaginal smear is subsequently obtained. If the urine is from a pregnant woman, epithelial cells without leucocytes appear at the end of 72 hours and cornified cells appear at the end of 84 to 86 hours. Cornified cells denote a positive reaction. This test is valuable as it is not necessary to kill the animals and they can be used again and again for subsequent tests. Aschheim made this test on two cases of 34th and 35th day after the onset of the last menses and obtained positive results with 0.5 cc. of urine. He concluded that if the test is to be applied at such an early stage, 1 to 2 cc. of the urine should be used. The simplified test requires less time and less cost than Aschheim's original test or the Friedman's and Brouha tests. Of the 35 specimens of urine from women with normal pregnancies, 33 gave a positive reaction. Two rats died of toxic effects of the injection. The earliest test was performed on the 41st after onset of the last menses. One specimen taken the day after operation for a ruptured tubal pregnancy of three months' duration gave a positive reaction. Another specimen taken in a tubal pregnancy of two months' duration was likewise positive; however, a specimen taken in the same case, five weeks later was negative and the operation revealed regression of the pregnancy. A specimen from a woman with an intrauterine pregnancy and a dead foetus was negative. Thirty specimens from non-pregnant women with amenorrhoea, menorrhagia and fibromas, from menopausal woman and from castrated women gave negative results. A specimen from a man with testicular teratoma (without chorionepithelial tissue) gave a negative result. In 52 instances the results were compared with those of Friedman-Brouha method. With the latter, two rabbits died after injection and in 5 the results were false. In 45 instances the results of the two tests agreed.

The following stain has been advocated as the most suitable for demonstrating the presence of vaginal cells in the smear prominently. A single differential stain (called S3) has been described by Shorr (1941). It is a single staining solution. Though simple

and rapid it retains the clinically most valuable features of his original stain, such as sharp differentiation between cornified (brilliant orange red) and noncornified (blue green) cells.

The aspirated secretion is immediately spread thinly on a slide and quickly fixed for one minute in alcohol, allowing no drying, lest distortion of the cells and their staining characteristics occur. The stain is then applied from a dropper, left on for one minute and the slide is then dehydrated by dipping it ten times into 70% and then 50% alcohol. It is next blotted and cleared well in xylol. The slide is then mounted as a permanent preparation. The entire procedure takes three minutes. Reliance should be placed only on the picture observed in the thin areas of the slide.

The composition of the single differential stain (S3) is:—Ethyl alcohol (50%) 100 cc. Biebrich Scarlet (water soluble) 0.5 g; Orange G. 0.25 g; Fast green F.C.F. 0.075 g; Aniline blue (water soluble) 0.04 g; Phosphotungstic acid c.p. 0.5 g; phosphomolybdic acid c.p. 0.5 g; and glacial acetic acid 1.0 cc. When all these ingredients have been completely dissolved the solution is ready for use.

IX. Gutterman colour reaction test.—Gutterman (1945) devised a colour reaction test by detecting the presence of pregnanediol in the urine of pregnant women. This test claims 92% accuracy from a series of 248 cases tested. Browne and Venning (1936) were able to recover the corpus luteum hormone in the urine in water-soluble form as pregnanediol glucuronide. The concentration of this hormone rises to a plateau after ovulation and falls just before menstruation. The test depends on the isolation of pregnanediol by a modification of the procedure devised by Astwood and Jones (1946). Pregnanediol is similar in chemical structure to progesterone and is found in urine only when a corpus luteum or a placenta is actively functioning in the body. It is considered probably an excretion product of progesterone metabolism, it is excreted in the urine as a compound with glycuronic acid sodium metabolism. It is excreted in the urine as a compound with glycuronic acid sodium pregnanediol glucuronide and can be easily isolated and estimated quantitatively by weight. The complete absence of pregnanediol in pregnancy is nearly always evidence of serious abnormality suggesting, in early pregnancy, the imminence of abortion and in late pregnancy the death of the foetus. If impregnation occurs, the compound is found in increasing amounts until parturition.

The method of estimation of pregnanediol:—100 cc. or 24 hours' output of urine, whichever is less, before the 20th week of pregnancy is collected and extracted with butyl alcohol, distilling off the alcohol and dissolving the residue in N/10. sodium hydroxide solution. The solution is again extracted with butyl alcohol and distilled off. The resultant residue is dissolved in a small volume of water and the pregnanediol glucuronide is precipitated by adding

an excess of acetone. The precipitate is again dissolved in a small quantity of water and reprecipitated in acetone and the product purified and weighed. The excretion varies with phases of pregnancy and the maximum recorded figure is 30 to 120 mg. a day in the last 6 weeks of pregnancy. (Cope 1940)

The minimum positive colour is the development of a deep yellow. Results of the pregnanediol colour reaction test in 248 cases involving problems of obstetric diagnosis indicated 92% accuracy. Among those showing false positive results were patients with delayed menses, irregular menstrual cycles, fibromyomas, early menopause. Corpus luteum cysts occur too infrequently to affect the accuracy of this test. Patients with hydatid moles and chorionic neoplasms do not excrete sufficient pregnanediol to give a positive reaction, although the Friedman test may be positive owing to the presence of large amounts of lutenising hormone. The presence of pregnanediol in the urine of women who have missed at least one menstrual period is the basis of the test. Gutterman maintains that a positive test in the presence of amenorrhoea indicates a normal pregnancy. He obtained positive results in the presence of amenorrhoea in a woman with increased hair growth, a pelvic mass and increased 17-ketosteroid excretion, who was proved at operation to have an arrhenoblastoma, in a non-pregnant patient with carcinoma of breast and metastasis in a patient with an abdominal pregnancy and a macerated foetus and in a non-pregnant patient with torsion and infarction of a fallopian tube. The advantage of the Gutterman chemical-colour-reaction test is that it requires no laboratory animals and can be completed in two to three hours. The chemical and the Friedman tests were done simultaneously in 304 patients. In 264 patients the results agreed. Both results were positive in 130 and negative in 132. The negative chemical test and positive Friedman test were obtained in 30 patients with a diagnosis of threatened abortion, since lack of progesterone is the probable cause of abortion. Pregnanediol disappears early from the urine in cases of threatened abortion.

Other less known tests which may be useful in some cases.—In addition to A-Z tests and its modifications, based on the determination of the presence of gonadotropic hormone in the urine of pregnant women during early pregnancy, there are many other indeterminate and more or less empirical tests such as the Barcovitz Papillary reaction and the Monclou colorimetric reaction etc. None of these tests are sufficiently accurate to be recommended for diagnostic purposes. Intravenous injection of pituitrin or pitocin or prostigmin stimulates contractions of the soft uterus in early pregnancy and in the fibroid tumours. Many pregnancies may be diagnosed by these methods but they have not been found accurate enough to be recommended for general use. Mazer-Hoffman (1939) tested the blood serum for oestrone and typifies the use

of increased excretion of oestrogenic substance as a possible diagnostic test for pregnancy. Several tests on this basis have been devised but none have replaced the original A-Z test. The Mazer-Hoffman test is considered to be a valuable aid in the diagnosis of the death of the foetus. A positive A-Z test with a negative Mazer-Hoffman test indicates the death of the foetus. A few tests are discussed below:—

(1) *Colostrum test*:—Colostrum is collected from the breasts of primipara. A small drop of this is fairly diluted and injected intradermally on the flexor surface of the forearm. The test is supposed to give with non-pregnant woman an enlarged wheal surrounded by an areola persisting at least for an hour. Allen and Donaldson (1943) reported that it gives an accuracy of 31% with pregnant women and 88% accuracy with non-pregnant women. This test is therefore of no practical value.

(2) *The pregniotin intradermal test*:—The test is made with pregniotin, an antigen prepared from the human placenta which is given by intradermal injection. A control solution is first injected to form a bleb. Five minutes later 0.1 cc. of the test solution is injected in a parallel location. If pseudopodia appear at the margin of the bleb in from one to four minutes the test is positive. *Peraroff and Biskand (1929) reported on an examination of 48 women that this test is the best of all the skin tests for pregnancy. It is useful for rapid diagnosis but it should be always confirmed by the A-Z or the Friedman tests with which it could be compared for reliability.*

(3) *Anterior pituitary extract test*:—The anterior pituitary substance (*Antintrin-S*) has given 100 per cent results in the hands of Gilfillen and Greggs (1936). This test is stated to be rapid and economical for pregnancy diagnosis and in certain other gynaecological conditions. The test is receiving wide popular attention and therefore, merits further investigation. When the gonadotropin in pregnancy urine was first discussed it was thought to have originated in the anterior-pituitary body and to be identical with the anterior-pituitary hormone. Consequently a pituitary extract was used for intradermal injection. The importance of strictly observing the technique is stressed. Alcohol is not used for sterilising the syringe or the skin, since alcohol is known to precipitate and partially inactivate the hormone. The injection must be done carefully with two minims of the preparation to produce a well circumscribed bleb. An all-glass syringe with a 26 gauge needle is used. The reaction consists of an area of erythema around the site of injection increasing from 7 to 40 mm. If the bleb which is raised by the injection into the skin becomes red the reaction is negative. The reaction in the non-pregnant woman usually begins immediately after the injection or within 2 to 3 minutes. To indicate pregnancy, the reaction should be less than 7 mm.

in diameter. The reading is usually taken half-an-hour after injection. The preparation used for injection contains about 2 mg. of solids per cc.

(4) *Engorgement of breast veins in pregnancy*:—Bowes, Riterhand and Andrews (1948) surprisingly enough found prominently demonstrable engorgement of breast veins in the early stages of pregnancy (8 to 10 weeks). The changes can be readily demonstrated by infra-red photography. This, it is suggested, may supply a simple means of diagnosis of pregnancy (See picture below).

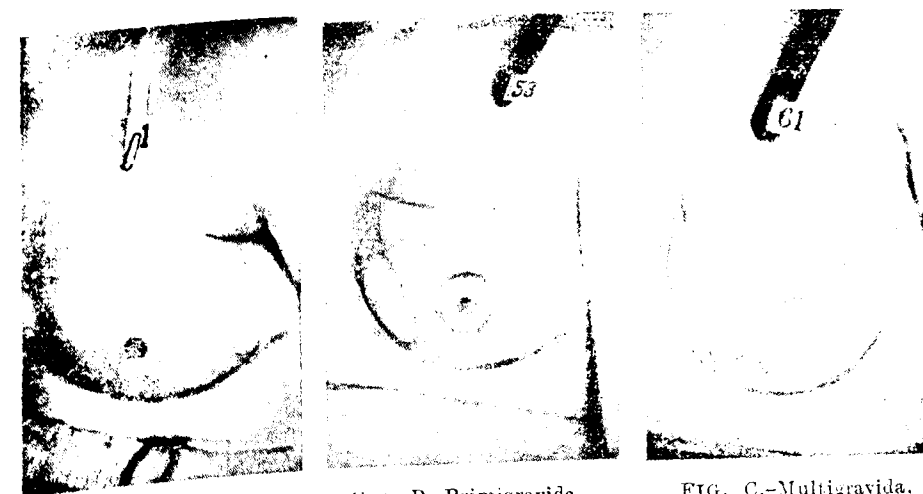


FIG. A.—Primigravida. Diagnosed 'negative,' correctly.

FIG. B.—Primigravida. Diagnosed 'positive,' correctly.

FIG. C.—Multigravida. Diagnosed 'positive,' correctly.

(From Medical Annual, 1949).

(5) *Prostigmin test of early pregnancy*:—This test is simple and reliable in women complaining for the first time of delayed menstruation. Differential diagnosis of early pregnancy and delayed menstruation particularly in regularly menstruating women and those with severe organic or endocrine dysfunction can be made by intramuscular injection of prostigmin which induces a flow of menstrual bleeding in cases of recent amenorrhea, but has no effect on the gravid uterus. In early pregnancy, the occurrence of bleeding precludes pregnancy and the non-occurrence of bleeding on the contrary reinforces the diagnosis of pregnancy.

TECHNIQUE:—1 to 2 cc. Prostigmin (Roche 0.5 to 1 mg.) is injected intramuscularly on 2 to 4 consecutive days or the patient may receive an injection of prostigmin and is then put on prostigmin 5 tablets a day for four days. Reliable and correct diagnosis was obtained in 83 per cent of cases. Occasional side-effects observed were: vertigo, weakness, disorder of speech and increased intestinal and bladder functions, which last only for half to one hour. The test is not indicated in cases of endocrinal disturbances as habitual

abortion and is also of no value in extra-uterine pregnancy. *Results*: If no flow of blood occurs within 5 days of the last dose of prostigmin, pregnancy is likely (Kinnunen, O., 1950).

(6) *Female sex hormone (B.P.) as a test of early pregnancy*: *Garrett's test*:—Menofomine, oily (ethyl oleate of oestrone) is injected intramuscularly in doses of 1 mg. in three doses at intervals of 24, 48 and 72 hours. Absence of uterine bleeding within four days gives a positive pregnancy test. Seitz (1941) observed that bleeding in secondary amenorrhœa could be induced by giving injections of proluton. Zondek (1942) observed that bleeding was induced in secondary amenorrhœa with proluton, provided atrophy of the endometrium is incomplete. In later cases, he added a small amount of progynon. Caffier (1947) advocated the use of proluton and amenorrhœa. Duogynon (Schering) represents 20 mg. of progesterone and 2 mg. of oestradiol benzoate in one cc. which is injected intramuscularly on two successive days. Bleeding is caused within 3 to 6 days. *Early pregnancy is probable* if no bleeding occurs within 3 to 6 days after injection of 2 ampoules of Duogynon. This test is simple and easy to carry out.

(7) *Periodic contraction of uterus in early pregnancy*:—Palmer (1950) has drawn attention to an easily observed clinical sign which can help in the diagnosis of early pregnancy. Braxton Hicks described spontaneous contractions of the uterus as far back as 1872. Palmer states that the contraction of the uterus observed in early pregnancy and in other stages is in direct relation to the stages of pregnancy. The uterus is held between the fingers as in bimanual palpation and the observer notes that the organ periodically disappears, a state brought about by the intermittent relaxation. It is important to time the periodicity with a stop-watch. If the observation is made by the eighth week of gestation, the cycle of contractions is regular. The phases of contractions and relaxations of uterine contractions for different weeks of pregnancy are:—

Week of Pregnancy		Tonic Phase	Relaxation Phase
8th week	...	30 seconds	30 seconds
10th "	...	30 "	90 "
12th "	...	30 "	180 "
16th "	...	30 "	8 minutes
20th "	...	30 "	30 "

This observation should therefore, form a useful clinical sign in the hands of careful observers. This observation should however be supplemented by the urine tests on animals for confirmation.

Summary and conclusion.—Various methods of diagnosis of early pregnancy have been discussed. *Aschheim-Zondek test* is an established one being the most rational method for the diagnosis of early pregnancy but it has the disadvantage of being a long and tedious process requiring the sacrifice of a large number of animals; therefore it is considered more or less an academic test and can be carried out only in a well established laboratory. The other tests as

Galli Mainini, the *Biological test* and the *Guttermann biochemical-colour reaction tests* are almost equally reliable and can be carried out easily anywhere. Of the simple clinical tests *Prostigmin test*, the *Female Sex Hormone test* and/or observation of engorgement of breast vessels which can be only seen under infra-red light or infra-red photography and also the observation of the numbers and type of contractions of the uterus during pregnancy are strongly recommended to practitioners and gynaecologists for giving their expert opinion on early pregnancy. The diagnosis of pregnancy by studying the effect of pregnancy urine on seedlings as advocated in Ayurveda will form the subject of a future communication.

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THE STEIN-LEVENTHAL SYNDROME

Dr. R. N. Rutherford, reviews editorially a very important and outstanding article in the June issue of the *Western Journal of Surgery Obstetrics and Gynecology*, contributed by Dr. I. F. Stein, M.D., of Chicago on the above syndrome.

"Twenty-six years ago, Dr. Stein described the syndrome which consists essentially of a secondary amenorrhoea, a male type of hirsutism, sterility, hypoplasia of the uterus and bilaterally enlarged symmetrical ovaries. Associated signs and symptoms may be present but the classic syndrome as such has been outlined. (The ovaries are usually from 4 to 6 cm. in diameter, symmetrically enlarged, oval in shape, smooth, pearly grey in colour, usually with bluish spots indicating cortical cysts. This syndrome is most commonly found in the age group of from 17 to 30 years in both single and married women; in the single group amenorrhoea and/or hirsutism are common and in the married group, barrenness). Dr. Stein, in his last report, has brought up to date his series of 90 women who qualified for this syndrome and were given definitive treatment—as will be presently mentioned. His figures were underwritten further by the combined experience of the members of the 'American Society for the Study of Sterility', who, by careful questionnaire method not only recognized this syndrome as an entity but also treated it definitively as recommended by Dr. Stein and his group previously."

Dr. Rutherford is all praise for the original description of the syndrome so carefully laid out, defined and treatment proposed which has so signally remained in its simon-pure original form. Dr. Stein is as yet unable to define the aetiological factors except that they somehow are connected with an endocrine imbalance. Many of these patients will have what seems to be a normal adolescence and possibly establishment of a normal ovulatory cycle for a few years only to become habitually anovulatory and then develop the syndrome which so frequently causes infertility in the married woman. Interestingly enough, two of the patients Dr. Stein reports had had one pregnancy each, before complete sterility ensued. He mentions this as an evolutionary phase in the development of the syndrome which is seen usually before the age of marriage.

In our personal experience the diagnosis can be made in the large majority of patients by careful pelvic examination, under anaesthesia, if necessary. Dr. Stein, however, adheres to a rigid rule—that the diagnosis be confirmed by pneumoperitoneography before surgery is recommended. He points out that the majority of these patients can be diagnosed by history alone with a great deal of accuracy but that occasionally objective findings do not bear out the history. Because of this insistence upon proper preoperative diagnostic methods, whatever the individual user may be most familiar with, Dr. Stein is able to report success in an astonishingly high number of patients. Because of a supposed relationship between bilateral polycystic ovaries and endometrial carcinoma, he cautions that curettage should always be performed at the same time.

As well, he has definite ideas about the treatment. In his experience X-ray or hormone therapy has never been successful. He finds no justification for the long time continuation of these treatment forms once the diagnosis has been established. Not only have these treatments been unsuccessful in his experience, but bilateral wedge resection of the ovaries is so uniformly and promptly effective that laparotomy is the treatment of choice, once the diagnosis is demonstrated. In Dr. Stein's cases this is done by X ray studies derived from pneumoperitoneum which can be filed and reviewed again and again if necessary as the years go by.

His own experience coincides with the writer's regarding culdoscopy. While this may be of value, it is often beyond the working plan of gynaecologists at the current moment. Since only one man can have his eye at the key-hole at a time, so to speak, it also is subject to individual interpretations of the sights revealed there.—(*W. J. Surg. Obst. Gynec.*, 63: 6, June 1955).

Cases and Comments

A CASE OF RECURENT "HERPES"

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Case:—A Hindu, male, aged 26 years, came to me on 25.8.'55, at 8 P.M., complaining of "burning over his right upper lip" and said that he was going in for the disease for the 7th time within a period of 2 years and he wanted to avert it this time.

Examination:—I asked him to come on the following day to be fully examined in daylight. There was a slight inflammation, redness, and swelling over the area and nothing else could be seen.

General condition:—Good; a well nourished adult. Temperature: 98.4°F. Pulse: 78 per minute. B.P.: 120/80. Haemoglobin: 105% (Sahli). Total W.B.C.: 8,750 per cmm. *Differential count*:—105% (Sahli). Total W.B.C.: 8,750 per cmm. *Differential count*:—Poly.: 63.5%, Lympho.: 19%, Eosin.: 16.5%, Mono.: 0.5%, Baso.: 0.5%. *Urine*: no sugar and no albumen. Microscopically nothing definite. *Motion*: nil abnormal. *Habits*: takes mixed diet; is not addicted to smoking, alcohol, or betel chewing. *Occupation*: General practitioner of medicine.

The disease and its course.—Its character was quite peculiar and unsteady. As per patient's statement, it ran its own course for about 20 days; and recurred without any regularity.

1st day: Burning over the affected area. *2nd day*: Inflammation, with pain, redness, and swelling; the condition remains so, for 4 or 5 days. *5th day*: The inflammation subsides, pain continues and exudation from the mucous membrane starts, the skin over the area becomes dark and finally dries up—this continues till the 10th day. *11th day*: Pain disappears—exudation ceases; the scab formed by the above process begins to fall bit by bit, thus the mucous membrane in the affected area is left red and exposed. *15th day*: The original colour of the mucous membrane returns—no scar, or trace is left behind. The above is the usual course taken by the disease.

The treatment taken by the patient during each attack, was as follows:—

First attack (March 1953):—Duration was 20 days; R: Nicotinic Acid Tablet, 50 mg —2 t. i. d. oral. Daily for 15 days.

Second attack (December 1953):—Duration: 20 days. R: Nicotinic Acid Tab. 50 mg. daily for 15 days 2 t. i. d. Inj. Calcium gluconate 10% 10 cc.; Vit. C 200 mg. I.V. daily for 7 days only.

Third attack (Apr. '54):—Duration: 15 days. Period shortened by 5 days after antibiotic administration. R: Inj. nicotinic acid I.V. 100 mg.; Inj. Calcium gluconate 10% 10 cc. Vitamin C 200 mg. I.V. for 5 days; Inj. penicillin crystalline 2½ lacs b.d. for 5 days.

Fourth attack (November 1954):—Duration: It ran its course as above for 15 days. R: This time in addition to the treatment given during 3rd attack he had Avil $\frac{1}{2}$ tab. b.d. for 8 days.

Fifth attack (February 1955):—Duration: There was no change. Had treatment as before but with aureomycin ointment used externally in addition.

Sixth attack (June 1955):—Duration: Showed a remarkable reduction; the whole course lasted only 7 days, and it didn't go into the exudation stage. In addition to the above treatment he had Inj. achromycin 100 mg. I.M. for three days. No penicillin was given.

Seventh attack (August 1955):—This time, with the above history of the case, I saw him and my line of treatment was:

Treatment:—R: Inj. Calcium gluconate 10% 10 cc.; Inj. vitamin C 200 mg. Inj. B₁ 500 mg. I.V. daily for 5 days. Inj. Macrabin B₁₂ 100 mg. I.M. b.d. for 5 days. Penicillin ointment externally. Though I wanted to avoid the use of antibiotics this time, owing to the patients' desire and pressure I used Ilotycin sulpha one tablet b.d. for 4 days. The patient felt very pleased and satisfied because the disease subsided this time, within 5 days and he became normal on the 7th day. He didn't suffer from the usual acute conditions. As he was afraid that he may have a recurrence, I asked him to continue Inj. B₁₂ 100 mg. I.M. twice a week. Iron with B₁ tab one t.i.d. daily for 3 months. He was advised to come every month for a check-up.

TREATMENT OF BREAST ABSCESS

Infection in a lactating breast is usually caused by *Staphylococcus aureus*. In a high percentage of cases, prompt antibacterial treatment controls such infection before the stage of abscess formation. Formerly, penicillin was the drug of choice for this purpose. However, in the experience of Sawyer and Walker, penicillin must now be supplanted by other antibiotics (oxytetracycline, chlor-tetracycline, chloramphenicol or bacitracin) because of the prevalence of penicillin-resistant staphylococci.

At the first sign of breast inflammation, the patient receives oxytetracycline or a similar drug of 250 to 500 mg. four times a day. When such treatment is started early, the infection usually is completely aborted. However, if the infection is firmly established before treatment it may go on to suppuration. When this latter course is apparent and there is definite localization (pointing of the inflammation in the area about the areola), incision and drainage are provided promptly and in a way that takes into account the fact that the breast is a compartmented structure. The author describes the technique as follows:—

"The incision should be made around the areola of the nipple, through the skin and subcutaneous tissues, but not entering into the ducts. Then by careful, blunt dissection, preferably with a hæmostat, the compartment of the breast involved is entered. Pus is almost uniformly encountered and by palpation of the breast, if another compartment is involved, the hæmostat can be pushed into this compartment and the pus evacuated. This method does away with the long disfiguring radial incision and the possibility of secondary infection. The antibacterial drugs are continued during the surgical treatment."—(*Surg. Gynaec. and Obst.*, 99 : 368; via G.P., 11 : 2, 1955).

A CASE OF PERFORATED PEPTIC ULCER

RUSTOM B. DARUWALA, B.Sc., L.C.P.S.,
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26-7-55:—A Marathi mill worker aged about 35 was brought to the hospital at about 9 P.M. Patient was apathetic, was perspiring and attempting to vomit. There was diffuse pain in the abdomen and in view of the general condition of the patient no clear precedent history could be elicited.

The abdomen had diffuse tenderness, and was slightly rigid as a whole. The obliteration of the area of liver dullness was of diagnostic significance, in that it pointed to a possible perforation of an abdominal viscus.

The pulse was 140 per minute B.P. 80/60 and the heart sounds were faintly audible.

Preparation of the patient.—Suction was immediately applied to the stomach and 5% glucose-saline drip was started with 1 lac crystalline penicillin G added.

Anæsthesia:—Anæsthesia was induced with Pentothal and 2 cc. Flexidil was given to procure added relaxation. Anæsthesia was continued with ether and oxygen mixture.

Operation:—1. MacBurney's incision was taken, and on opening the peritoneum copious watery yellow liquid welled out. Suction was quickly applied and the appendix was inspected and found normal; the cæcum was returned to the abdominal cavity and the incision rapidly closed.

2. A median incision was taken extending from the xiphoid cartilage to the umbilicus and deepened through the subcutaneous layers linea alba, extra-peritoneal fatty tissue to the peritoneum. The peritoneal cavity was opened. Some yellow liquid was seen to come out and was fully removed by suction. Stained perforation could be seen on the first part of the duodenum. The indurated margins of the peptic ulcer were stitched with linen. The omentum was also stitched over the affected part.

3. A hand was passed behind the abdominal wall, a half inch stab incision was made 2 inches below the umbilicus, a thick walled drainage tube passed into the peritoneal cavity and anchored to the abdominal wall by a single stitch.

4. The supra-umbilical incision was closed layer by layer and at its upper end a rubber catheter was tied, for continuous 2 hourly instillation of 20 cc. "Peni-Strept", intra-peritoneally.

5. Suction was applied to the drainage tube to empty the peritoneal cavity of any fluid accumulated there.

6. 50 cc. of sterile solution in normal saline of one bulb of "Peni-Strept," was injected into the peritoneal cavity through the

rubber catheter stitched in the upper end of the median abdominal incision.

7. The wound was covered with sterile gauze, cotton and closed with adhesive tape.

Post-operative:—560 cc. of 5% glucose in normal saline, with 1 lac crystalline penicillin-G, + 5 cc. of 500 mg. of Vitamin C. ("Redoxon") + 2 cc. of 100 mg. per cc. Vitamin B₁ ("Berin"). + 4 cc. of "Coramine" were given by slow intravenous drip.

2. 100 mg. of "Achromycin" was injected intramuscularly every six hours.

3. 20 cc. of Peni-Strept solution, was injected 2 hourly intraperitoneally through the upper end of the abdominal incision into the rubber catheter.

4. Soiled dressings around the drainage tube stuck in the lower part of the abdomen were changed every 2 hours, a water-partition by a bridge of adhesive tape was made between the upper and the lower parts of the abdomen to shut off any contamination from the lower part of the abdomen into the upper sterile area of incision.

5. A simple 5% glucose saline 560 cc. and 4 cc. 'Veritol' was given after 12 hours to combat peripheral failure.

6. Penicillin 5 lacs plus $\frac{1}{2}$ gm. Strept was injected intramuscularly every 12 hours.

7. Later during the day, the saline-glucose drip was replaced by 200 cc. protein—hydrolysate in glucose (Haffkine's Institute).

8. Continuous O₂ inhalation was given for 48 hours.

9. Continuous suction was applied to the stomach through a stomach-tube for 24 hours. At the end of 24 hours the patient was markedly better, the pulse was 120 p.m. with good volume, basic and regular rhythm. The B.P. was 85/65.

2nd day:—The drip was continued at 6 hourly-intervals, with Penicillin, Redoxon, and Berin added to the first one; Veritol added to the second one; protein hydrolysate was given once daily. The antibiotics were continued parenterally. The patient's pulse was 100 p.m., B.P. was 85/65; urine was voided freely and a little abdominal discomfort was relieved with an injection of "Indyl."

The above routine was carried out on the 3rd, 4th and 5th days also.

Convalescence.—The rest of the convalescence was uneventful. The drainage tube and the rubber catheter were both removed after 48 hours. The patient developed dysentery, on the fifth day after operation and was treated with terramycin capsules, 250 mg. t.d.s. The dysentery rapidly came under control. Stitches were removed on the 10th day and the patient was discharged on the 15th day.

The case was operated on by Dr. S. S. Patro, M.D., M.S., in his Nursing Home.

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Editorials

RECENT ADVANCES IN THE PATHOLOGY (CLASSIFICATION), TREATMENT AND CONTROL OF LEPROSY IN INDIA

(A RESUME)

LEPROSY today is no longer a stigma but has become an intensely interesting medical problem, because it has been considered by distinguished leprologists from different points of view, viz: (1) new light on its pathology (to include classification), (2) advances in specific therapy of the disease, (3) the newer concepts relating to paralysis, paresis and deformities with a more practical and realistic approach to relief, and (4) the application of the newer knowledge and advances to the control and eradication of leprosy. The battle against this dreaded disease has during recent years progressed so far that its elimination—leave alone control—is no longer considered improbable or impracticable. Thus Leprosy Associations have adopted the heartening motto "Leprosy is curable."

We have recently received the 170-page report of the proceedings of the Indian Leprosy Workers' Conference held at Jamshedpur earlier this year. The report embodies also the technical and scientific papers presented and discussed at the Second Biennial Meetings of the Indian Association of Leprologists (IAL) which dealt with every aspect of leprosy, e.g., its classification (which has been a vexed and thorny question amongst the leprologists of the world) the value of surgical and physiotherapeutic measures in rehabilitation, the value of BCG vaccination in the control and of chemotherapy in the treatment, control and prophylaxis of the disease.

The planning and administration of leprosy work, a review of the results of the anti-leprosy campaigns in India, the methods and means for mass education in leprosy, were all discussed at great length at the plenary sessions of the Leprosy Workers' Conference.

Important and valuable conclusions relating to the furtherance of the work were reached. It is proposed in this brief resume to give the salient features of the scientific papers presented to the meeting and of the discussions that followed, bearing on the latest advances in our knowledge of the disease in its varied aspects.

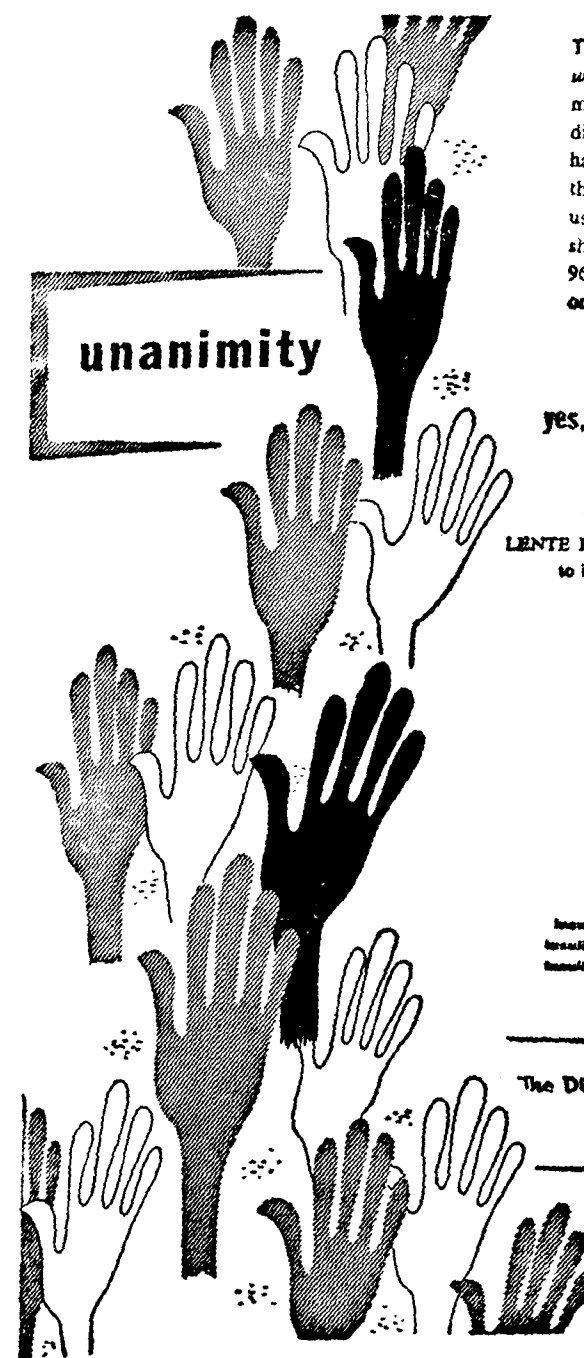
Dr. DHARMENDRA opened a discussion on the 'Classification of Leprosy,' and gave a very clear resume of the present position with regard to it. The evolution of a unanimously agreed system of classification has been offering great difficulties for a long time. Dr. DHARMENDRA said, the recommendations of the Committee of the IAL were based on the following principles:—(1) The classification should be simple enough for the field workers, but at the same time should be capable of being elaborated by field workers who have greater diagnostic and laboratory facilities, (2) its primary basis must be clinico-bacteriological though it should be broad-based on immunological and histological backgrounds; (3) an adequate, though minimum number of classes or forms should be recognized so as to include the various clinical manifestations; and (4) purely polyneuritic cases should be recognized as a separate clinical entity. The Committee's classification thus recognizes six classes or forms of leprosy which may be placed under 3 broad groups:

Non-lepromatous (N)	Intermediate (N?L)	Lepromatous (L)
Tuberculoid (T)	Borderline (B)	Lepromatous (D)
Maculo-anæsthetic (MA)	Intermediate (I)	
Polyneuritis (P)		

This arrangement will permit of the classification of cases of leprosy at various levels according to the needs of and facilities available to the workers.

For the guidance of general medical practitioners and some field workers, most cases of leprosy can be put into two broad groups: Lepromatous (L) and Non-lepromatous (N). There will be a small number of cases which may not conform to either of these groups. The doubt regarding the classification of such cases may be indicated by using the symbols N?L. These workers will therefore, use the symbols N, L, N?L.

Workers who wish to go further can split up non-lepromatous cases into three components based on the clinical differences in the skin lesions and neural manifestations, i.e., red, thick and anæsthetic patches as tuberculoid (T), macular-anæsthetic lesions as maculo-anæsthetic (MA), and polyneuritic sensory or motor changes due to nerve trunk involvement without any evidence or history of skin lesions as polyneuritic (P). Cases of the lepromatous type and of doubtful classification will as before be designated by the symbols, L and N?L respectively. Thus these workers will make use of 5 symbols—T, MA, P, L and N?L.



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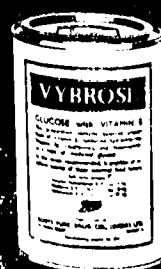
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Finally, those workers who have better laboratory facilities can investigate the nature of the lesions in the doubtful or N?L group and classify them accordingly. The patches in the N?L group may be either flat or thick, the flat ones being sometimes either maculo-anæsthetic or flat lepromatous macules, but mostly intermediate (I) patches. Similarly the thick patches in the N?L group may sometimes be either tuberculoid or thick and localised lepromatous patches but mostly borderline (B) patches. With the help of bacteriological, immunological (lepromin test) and histological findings it will be possible to classify the lesions in this group into appropriate classes. Thus, the workers of this category will recognize all the 6 classes, and use all the 6 symbols MA, T, P, L, I and B.

DHARMENDRA then compared the IAL Committee's classification with the other systems: *viz.*, the Cairo classification (1938), Classification recommended by the WHO Expert Committee on Leprosy (1952), that recommended by Wade (1952), the Madrid Classification (1953), and lastly that recommended by Khanolkar and Cochrane (K and C) at the Madrid Congress (1953). The six-class proposals of the IAL Committee were almost identical with a similar system of classification suggested by Wade, and the three-group proposals of the Association had much in common with the 3 type classification advocated by Khanolkar and Cochrane, of course, with some points of disagreement.

The review clearly indicated that there was a wide agreement regarding the clinical forms of leprosy to be recognized. Difference of opinion arose over terminology of the forms, and still more when attempts were made to group some of the forms to show their relationship. It is now more or less generally agreed that the primary basis of classification must be clinico bacteriological, though it should be broadly based on immunological and histological backgrounds.

Following a long discussion, on the subject, the IAL finally approved of the proposals for the classification of leprosy drafted by the Classification Committee appointed by it at its 1953 session and recommended their adoption by all leprosy workers and centres in India.

The next important communication was on the 'Value of Surgical Aid and Physiotherapeutic Measures' from Dr. PAUL W. BRAND F.R.C.S., Professor of Orthopædic Surgery at the Christian Medical College, Vellore, who has done wonderful pioneer work on the rehabilitation of patients with visible deformities and functional disabilities, through reconstruction. He impressed on his fellow workers, that the function of the reconstructive surgeon is to make his patient as nearly normal as possible in appearance and in the working of his hands and feet. The obvious deformities in the face are the depressed nose, the missing eye-brows, the deformed ears, lagophthalmos and hypo-pigmented patches.

The depressed nose can be restored to its normal shape in many cases, but this operation should be performed only after all nasal mucosal ulcers are soundly healed without likelihood of recurrence. The skin of the nose is then freed from all deeper structures, and a bone or cartilage graft placed under the ridge from the rawed nasal bones and down the columella.

Hair-bearing skin can be grafted from the scalp into the eye-brows. Ears may have nodular outgrowths trimmed off, and left looking normal. If a patient demands a better reconstruction than this, then skin may be grafted from the neck and cartilage or plastic material implanted to give better shape. This latter type of reconstruction demands time and very specialised skill. The results are not always satisfactory. An artificial ear of Vinyl plastic may give better appearance, and is very satisfactory.

The old fashioned intra-dermal injection of Hydnocarpus oil is probably still the best way of removing resistant hypopigmented patches on the skin.

Tarsorrhaphy for lagophthalmos should be performed early, or as soon as it is found that a patient cannot close his eyes. Failure to do this may result in corneal ulceration and perhaps blindness.

Hands that are weakened by paralysis can often be restored to activity by tendon-transfer operations. This is possible because it is now realised that the forearm muscles supplied by the median nerve are not paralysed in leprosy. The indication for tendon operation is the limitation of movement of a joint which is due to muscle-weakness, and not to joint stiffness. If a joint is stiff even to passive movement, then tendon operations will not help. It needs to be mobilised by physiotherapy, by exercises and splinting. After the joint is loose, then the tendon of a strong muscle should be transferred to do the work of the paralysed muscles. So a full range of active movement may be regained. The familiar claw-hand deformity can be corrected in this way and the paralysed thumb may also be made able to oppose the fingers in grasp and pinch.

Skin-plasty operations may be necessary in the fingers and the thumb-web to allow stiff points to open out in cases where the skin is contracted. If this skin contracture will not stretch as a result of physiotherapy, then a full thickness free-graft is advised to provide extra skin to allow a full range of passive movement. Extreme care is required in this operation to prevent division of the digital blood supply, or gangrene of the finger will result. The other common skin operation is on the thumb-web. This often becomes contracted after paralysis, and must be widened to allow the thumb to come forward before tendon transplantation is performed. In this operation a combination of a flap-transfer and a free full thickness graft is used. Bone and joint operations are made when the joints are too stiff to mobilise by physiotherapy. In badly damaged joints, arthrodesis may be necessary and will give a stiff joint in useful

position, or in position that will not give the appearance of a deformity.

Nerve decompressions may be of value in an acutely swollen and tender nerve and as a precaution against paralysis. The removal of the sheath in these cases has been tried in the ulnar, median, radial and lateral popliteal nerves.

In the foot, paralysis is also limited. The medial popliteal nerve is usually spared. It has therefore, become possible to operate for foot-drop, and give a good range of dorsiflexion. Claw toes may be easily corrected in their early stage by a transposition of the long flexor tendon of each toe to the dorsal surface of the proximal phalanx of the same toe. In the later stages where there is some joint rigidity, an arthrodesis of the interphalangeal joint may correct the deformity. In the very late cases, where destruction of the metatarsal head has already taken place, it may not be possible to correct the clawing of the toes, except a partial correction for cosmetic reasons.

Apart from these reconstructive operations, the most important principle in the treatment of ulceration is *rest*. Patients with anæsthetic feet must adjust their lives so that they do not have to walk long distances, or stand for a long time. When they do have to stand, their weight should be spread out over all the underside of the foot by shoes which are moulded to the shape of the foot.

If patients develop ulcers they should be admitted to hospital, or else taught how to dress their own ulcers at home. The daily walk to hospital or clinics for dressings does more harm than good. If dead bone is present, the affected metatarsal is often best removed early in treatment. If amputation is necessary, it should be conservative. Lisfranc's amputation with a skin incision just behind the metatarsal head ulcers, is often very valuable. Dr. BRAND at the conclusion of his brilliant exposition, said that "Education and training of patients in the prevention of deformity is of greater value than attempts to correct the deformity. Only in this way can we send our patients out into society with whole bodies and confident minds."

The available literature of the last four years regarding the effect of 'BCG Vaccination' on the lepromin reaction and the value of the vaccine as a prophylactic agent in leprosy was next reviewed and analysed.

Regarding the conversion of lepromin reaction, it has been noted that spontaneous conversion could take place and that repeated injections of crude lepromin could do so. BCG, dead or alive, also could do the same. BCG could convert the lepromin reaction both in experimental animals and human beings—healthy individuals (contacts and non-contacts), and cases of leprosy of the non-lepromatous or lepromatous type, the latter including cases in which subsidence had occurred. It has also been found to enhance

the reaction in some non-lepromatous cases. The method of vaccination employed has largely been oral, 100 to 200 mg. weekly for one to four weeks, resulting in conversion of the Mitsuda reaction in about 99%, even in 3 weeks in some instances. It has also been used intradermally to a limited extent in about 1/40 mg. dose and conversion of the early lepromin reaction was noted in 44% in 3 months but it rose to 94% in 2 years. This induced-lepromin sensitivity has so far been found to persist up to 3 years.

Regarding the value of the vaccine as a prophylactic agent in leprosy, reports of only four workers were available. They showed that although a few cases of leprosy developed in the vaccinated individuals, all of them were of a benign nature and so far no lepromatous case was found to develop in them. The findings relate either to a small number of individuals observed for a number of years, or to a large group observed for a very short period; it was considered that although there are strong indications about the value and usefulness of the vaccine, a more systematic and thorough investigation into the matter will be necessary.

As a prophylactic agent, BCG vaccination, seems to have some limitations. It cannot afford absolute protection against leprosy infection. Some cases of leprosy do develop among the vaccinated, although as yet no malignant case has been reported. It can be considered an ancillary measure in addition to other well-known methods of prevention, *e.g.*,—isolation. Isolation of contacts even after vaccination will lessen the chance of development of the disease in them, and it is considered essential in the case of new borns whose parents are infectious cases of leprosy.

There are strong indications therefore, that BCG vaccination of lepromin-negative contacts may have some value in building up a certain amount of resistance in the individual against leprosy infection. This method is worth trying in selected cases particularly where the source of infection cannot be easily isolated.

Dr. S. N. CHATTERJEE who read a paper on the "Prospect of Chemotherapy in Leprosy Control in India" felt that an approach to this problem has been made possible by the recent developments and introduction of chemotherapeutic drugs in the treatment of leprosy, and that it is worth investigating the value of chemotherapy in the control of leprosy in India.

Of all the chemotherapeutic drugs, sulphones and thiosemicarbazone alone have been reported on favourably by nearly all the workers. Thiosemicarbazone is however, expensive. DDS, being cheaper and more effective, is the drug of choice for mass treatment, and DDS, *per month*, is the method of treatment generally advocated. The results obtained with this drug are very satisfactory. The drug is amazingly cheap as the treatment with DDS costs only Rs. 3-12-0 per patient for a whole year. Even in lepromatous cases, clinical improvement is rapid, leprotic ulcers and nasal ulcers

heal up quickly, bacilli become segmented, ultimately granular and finally they disappear.

It is to be noted that the surface area of the patient discharging bacilli becomes much reduced in the later part of the treatment. At the beginning, smears from any part of the body of a 3 or 4 plus case may be strongly positive but in the later part of the treatment smears from a few points remain moderately or slightly positive and may continue to be so till the end, while smears from the rest of the body remain negative. Therefore, in these cases although the total period to become negative is rather long, the infective foci are much narrowed towards the later part of the treatment.

Under DDS treatment, patients make rapid clinical improvement. Within a few months leprotic ulcers and nasal ulcers both discharging acid-fast bacilli heal up. Usually within 6 months, bacilli show segmentation, gradually become less acid-fast and get numerically reduced. In the later part they show further disintegration and look like mere acid-fast dots and ultimately smears taken by routine methods, become negative.

There are some patients who cannot stand DDS or thiosemicarbazone even in small doses. In other cases, treatment may be interrupted by repeated lepra-reaction or some intercurrent disease or due to development of anaemia. All these may contribute to the delay in clinical and bacteriological improvement. Some cases stand DDS treatment quite well at the beginning and improve satisfactorily, but show signs of reaction and relapse to the original condition later on, although the same treatment was continued all the time. Wolcott and Ross noticed a similar exacerbation. Some other cases under Dr. CHATTERJEE's observation relapsed after the cessation of treatment. Erickson has also reported a high relapse rate.

Dr. WARDEKAR of the Gandhi Memorial Leprosy Foundation at Wardha considered DDS to be the drug of choice for routine use, while Thiosemicarbazone should be reserved for those who either do not tolerate sulphones or have reached a static stage of improvement. In some cases the combined use of INH and DDS was found useful and necessary.

As long as we do not have a preparation of sulphones, which needs to be given only once in a month or two, we have to depend only on oral sulphones so that, when we get to know the regularity of the patient for a few months, DDS can be dispensed each time for one month, which will reduce his visits from once a week to once a month. The psychological effect of this procedure will also, help the patients a great deal.

"All the objections put forward about disuse or misuse of oral DDS therapy are theoretical, as our experience of the past three years has shown," said Dr. WARDEKAR.

The control of leprosy by chemotherapy is thus, still in an experimental stage but in poor countries like India this method needs a fair trial. Being an experiment, the planning has to be very methodical and scientific; records of the data should be kept in such a way that it will be possible later on to collate and assess them correctly. It must be once more emphasised that even if this results in control of the disease to a certain extent, it does not do away with the necessity for other anti-leprosy measures or raising the standard of living, and improving sanitation and hygiene among of the people of India.

PROGRESS OF HEALTH SCHEMES IN SOUTH EAST ASIA DURING 1954-1955

THE survey of the WHO's work in S. E. Asia between July 1954 and July 1955 forms part of the 120 page-report of Dr. C. MANI, WHO's Regional Director for S. E. Asia, presented at the Eighth Session of the Regional Committee held at Bandung on 5th September 1955.

The 'forward thrust' in the public health activities of the WHO continued and was recently marked by a greater appreciation of the fact that the public health schemes formed an integral part of the wider over-all national planning programme. All the various countries included in the S. E. Asian Region, *viz.*, Afghanistan, Burma, Ceylon, India, Indonesia, Nepal and Thailand, reported very satisfactory progress in their respective health programmes. Over one hundred health projects were actively functioning in the region receiving valuable help and advice from 153 international experts.

We are glad to note that, there has been a welcome shift in the WHO's policy from *malaria control* to *eradication of malaria* and that the report envisages an extension of the *National Eradication Scheme* by the end of 1960. The control campaigns in active operation have succeeded so far in protecting an estimated 150 million people representing nearly 40% of the population in this area. Most of the malaria-affected territory in India, is expected to be covered by the end of 1958, and some of the 29 Indian states *e.g.*, Bombay may have achieved eradication by 1960.

It is interesting to know that the extensive use of insecticides like DDT etc. in the control of malaria has resulted in incidental porary. Plague still remains a potential danger in the South-East Asian region. In this connexion we are glad to learn that the researches on plague and its transmission initiated at Dehra Dun and recently reactivated by the WHO, have yielded interesting results leading to the discovery of new factors regarding the permanent reservoir of plague.

There has also been a growing interest in matters relating to 'Medical Education.' We are happy to learn that India will be holding a National Study Group on Medical Education, next month and that the WHO will arrange to get atleast one expert from each country of the region to attend this conference. A free and frank exchange of views and thoughts on the needs of each country and a dispassionate discussion of the problem of medical education in its varied aspects will, we are sure, eventually result in the evolution of a rational solution to suit the social needs and cultural aims and aspirations of the people in the different countries.

Referring to the progress of the BCG Campaign in the various countries, the report says, that the progress of the world's largest BCG mass programme in India would permit the termination of the main part of the advisory and supervisory services of the WHO in this regard by mid-1955. The BCG campaigns in India, Burma, Ceylon and Indonesia have created large bodies of auxiliaries trained in the skills of tuberculin-testing and BCG vaccination.

Dr. MANI has indeed rightly assessed the extent of the TB problem in the region, when he states "TB remains vast and far from solved. Unless Science can offer a more dramatic solution such as domiciliary chemotherapy, tuberculosis will remain Public Health Enemy No. 1, for many years to come."

The Report of the Regional Director then refers to the attempts made during the year by the countries in the region to become self-sufficient in the matter of drugs, vaccines and other therapeutic substances. In India the penicillin and DDT plants have started production. Burma and Afghanistan have received assistance in vaccine production; Indonesia, Thailand and Ceylon have made steady progress in the local manufacture of therapeutic substances.

On the subject of rural health, the public health provisions are still total community development, the public health provisions are still rather nominal and the basic needs, such as adequate supplies of drinking water and the provision of latrines, are still unmet. Unless the tempo of field activity can be quickly increased it is not impossible that the villagers' newly roused enthusiasm and interest in modern public health services may cool off.

This is timely warning indeed, and it behoves the local authorities in every region to take note of it and act promptly. Otherwise there is bound to be, besides stagnation, an avoidable waste of time, money, energy and talent.

THE TRAINING OF NURSES (PLEA FOR A SPECIAL COURSE)

THE Fifth Annual Conference of the Trained Nurses' Association of India, Madras State Branch was held on the 17th ultimo at Coimbatore, Miss A. JACOB, Nursing Superintendent of the Christian Medical College Hospital, Vellore, presiding.

In her presidential address she reviewed the good work being done by various District Associations, and pleaded for the formation of such associations in districts where they did not exist at present. Referring to the post-graduate and refresher courses in paediatrics, T.B. nursing, public health and sister-tutors etc., which were being conducted from time to time for the benefit of the members of the Association, she appealed to the various institutions and hospitals to afford facilities to their nurses to attend such courses.

Special Refresher Courses for ward sisters and sister-tutors are being arranged this year in Bombay and in Trivandrum and it is hoped that many will take advantage of these very valuable aids. "One of the objects in training nurses is to prepare them to take an effective part in promoting and ensuring good health amongst the people" said Miss JACOB. We may point out that the various national health programmes organized by the Central and State Governments, aim at improving the standard of national health. The training of nurses should therefore, be geared to meet this new additional emphasis on health through prevention and propaganda. The training of nurses should envisage their being made useful as active members of Welfare Committees for furthering community efforts and promoting rural health.

In this connection we wish to reiterate the statements made in these columns 3 years ago (ANTISEPTIC, Sep '52): "To our mind, the training of nurses particularly of those who have to work in rural areas should be very thorough and complete...." "The importance of the nurse in paediatrics must take precedence over other aspects and the time is come when there should be a definite period of training in a children's clinic for all nurse-trainees and the public health nurse should have a more specialised form of training which will include domiciliary visits and training in the preventive and curative aspects of medicine...." "There is a pressing need for increasing the number of fully qualified nurses and making them available to the rural population."

Miss JACOB also rightly emphasised that the basic course in training nurses should include domiciliary nursing and midwifery as also instruction and practice in health-teaching and that this was not possible at present, because of the heavy demand for curative nursing service. The result was that the trained nurses were not in a position to do their part in the health promotion programme of the nation. Rural areas receive very little health service, only about ten to twelve per cent of the medical practitioners being available for the 85% of the country's population living in those areas. Some kind of rural medical and health service continues to be a pressing need as we have been repeatedly pointing out for several years. The training of an adequate number of nurses, male or female, to serve in rural areas, should form part of the State's programme for rural medical relief.

Gleanings from the Medical Press

OPHTHALMOLOGY

Erythromycin in trachoma.—(Practitioner).

In a small series of 21 children with trachoma, satisfactory results are reported by R. R. Button (*American Journal of Ophthalmology*, February 1955, 39: 223) from the use of erythromycin administered orally in doses of 2 to 3 mg. per lb. (4.4 to 6.6 mg. per kg.) body weight, given at four- to six-hour intervals. No local medication was used. The results are described as quite startling with marked improvement in both the clinical signs of the disease and a fairly rapid return of the conjunctival sac to normal. The time taken for reversion to normal cytology averaged 4.0 days in Stage I (4 cases), 4.9 days in Stage II (7 cases), and 5.7 days in Stage III (10 cases). At least twelve days' treatment is recommended. Ten of the cases had previously failed to respond to sulpho-namides. During an eight-months' follow-up period there was no recurrence in any of the cases.

Corneal grafting.—(Am. J. Ophth., Jan. '55; via. Med. J. Austral., 25-6-'55).

A Franceschetti describes the types of corneal graft in use and the indications for their selection. The perforating graft is recommended for keratoconus, deep keratitis, traumatic leukomas, familial corneal dystrophies and some cases of descemetocoele. The lamellar graft may be optical or therapeutic; in the former case it is indicated for superficial opacities and aphakia, and the patients with one eye. The indications for the therapeutic lamellar graft are fewer since the introduction of ACTH and cortisone, but it may be valuable for keratitis due to neurotrophic virus, ulcerous keratitis, luetic interstitial keratitis, alkaline and acid burns and recurrent pterygium. Finally the lamellar graft may be used preparatory to a perforating graft. The mushroom graft is a sub-total lamellar graft with a perforating central foot. There is no firm indication for its use, but it is

useful when other grafts fail, as in severe chemical burns, aphakia and severe leukoma with considerable surface irregularity. A particular indication for its use is Fuchs's corneal degeneration.

Strabismus.—(Understanding and management).—(Northwest Medicine, June 1955).

Strabismus may be due to abnormalities of anatomy, innervation or fusion. Grossly some children seem to outgrow their strabismus. What actually happens is that first, contractures develop and later, concomitance develops. When one examines such a patient, although his eyes may appear cosmetically to be in alignment, reduced vision in one eye will be found.

For a child to develop normal, well rounded binocular stability two conditions are necessary: (i) a clear optical image, (ii) coordinated eyes.

If these conditions are absent, binocularity does not develop normally. Instead there may develop abnormal sensory adaptations to the deviations. The longer the deviation persists, the more deeply rooted becomes these adaptations.

Strabismus is a manifest deviation of the visual axes in one or more positions of gaze and may be comitant or incomitant.

I. Comitant strabismus is deviation of the eyes with a relatively constant angle of deviation in all directions of gaze regardless of which the eye fixates. This type of strabismus is always innervational in origin and represents a supranuclear disorder.

II. Incomitant strabismus is a type in which the angle of deviation varies with the direction of gaze and with the fixating eye. It is always caused by insufficient or excessive activity of one or more of

the ocular muscles. It represents a nuclear or infranuclear disorder.

Types of horizontal strabismus are :

1. Convergent strabismus (esotropia) (a) Accommodative, (b) accommodative element, (c) undetermined.
2. Divergent strabismus (exotropia) (a) Concomitant or constant, (b) intermittent, (c) undetermined.

Vertical deviations may occur as well as horizontal deviations. These may be associated with horizontal deviation or may be manifest alone. In years past it was not very common for one to treat or operate upon vertically acting muscles. Today, vertical deviations are more commonly diagnosed, and treated successfully.

With proper early treatment, these complications may be avoided. The longer the deviation persists, the more complicated becomes the picture and the more difficult it is to separate the complications and the causes.

All treatment is directed toward : (a) the improvement of defective visual activity, (b) the relief of the deviation and abnormal activity, (c) the establishment of normal binocular vision.

The measures utilized in achieving these ends are : 1. Glasses. 2. Patching. 3. Pre-operative orthoptics. 4. Surgery. 5. Post-operative orthoptics.

1. *Glasses* :—In some cases glasses alone may correct strabismus, as in purely accommodative esotropia, because glasses relieve excessive accommodation by doing some focussing. By reducing excessive accommodation, the excessive convergence is relaxed and the eyes remain aligned.

Glasses are useful devices for improving visual acuity. Sometimes the glasses may be used only as a temporary measure until binocular stability is achieved. Later they may be reduced in strength and ultimately discarded.

2. *Patching* :—By patching the normal eye, the crossed eye is forced to fixate with its fovea and thus regain vision. Total constant occlusion is the

only satisfactory method of patching to get the best results.

Patching has its greatest value in the visual formative years, perhaps to the age of 8, and it may restore vision in the deviated amblyopic eye to normal. Patching requires cooperation of the family as well as the patient.

Duration of the patching depends upon many factors, but generally as long as there is continuing improvement of the visual acuity, the patching should be continued.

3. *Orthoptics* :—Orthoptics, commonly referred to as eye-exercises, does not exercise the muscles in the sense of strengthening them. Orthoptics *per se*, rarely cures strabismus nor does it cure nearsightedness, nor do any of the other wonders claimed for it. It does however, teach a patient to unlearn his bad habits of vision, such as suppression, and anomalous correspondence, and it helps teach him normal binocular habits. It is an useful adjunct to the other therapeutic measures of glasses, patching and surgery.

4. *Surgery* :—If there is a constant deviation which is so great that binocular cooperation will never be possible, early surgery is advisable. Where deviation is not great, the child's abnormal adaptations may be alleviated and correction of refractive errors may be performed prior to surgery, these measures should be undertaken first.

In paralytic strabismus or in congenital anatomical abnormality which prevents the eyes from normal rotations, surgery should be performed early. Early surgery restores correct alignment of the eyes when it is anatomically impossible otherwise, and should be done early enough so that normal binocular cooperation may develop in clearly focussed eyes.

By surgery, one merely normalizes the ocular rotations and position of the eye within the orbit. Binocularity is achieved sensorially in those eyes which have been aligned surgically, only by development of fusion in its fullest extent.

DERMATOLOGY

Hydrocortisone ointment in the treatment of infantile eczema.—(Med. Times, 1954).

V. H. Witten *et al* (*Am. Jour. Chil.*, 87: 298, 1954) report the use of hydrocortisone ointment in 30 cases of infantile eczema. In all these cases, the hydrocortisone free alcohol ointment was applied to the lesions in the right side of the body, and the same ointment without hydrocortisone to the lesions on the left side of the body. There was definite improvement in 18 or 67 per cent of the children treated by this method; in these cases some improvement was evident within a week after beginning treatment. In 14 of the 18 patients showing improvement, there was some improvement in the lesions on both sides of the body but the lesions on the sides treated with the hydrocortisone ointment showed a "definitely greater" improvement in 14 of these 18 cases. In 3 cases the lesions on the side treated with the hydrocortisone ointment were almost completely cleared, but those on the side treated with the control ointment showed no improvement. In 5 cases there was no improvement on either side of the body. There was no case in which intolerance to the hydrocortisone ointment developed. In none of these cases has the treatment been discontinued for a sufficiently long period to determine if and when a relapse would occur; in some cases in which improvement was obtained, this has been maintained by a "reduced schedule" for the use of the hydrocortisone ointment. On the basis of these results, the authors conclude that in the majority of cases of infantile eczema, hydrocortisone ointment is "the simplest, cleanest, and most rapidly effective of all topical measures employed."

Acne vulgaris : systemic and topical treatment.—(M. R. Moore, *Connecticut M. J.*, 19: 93-97, Feb. 1955).

This study is based on the hypothesis that three systems, endocrine, hemato-

poietic, and digestive, are involved in acne vulgaris. Therefore, systemic treatment was directed toward the correction of recognizable defects and the maintenance of proper balance among the systems. In addition, local treatment included the topical use of oestrogens. Fifty patients (43 females and 7 males) with acne vulgaris, ranging in age from 12 to 42 years, were studied. Over 80% were 25 years of age or under. Initially, after history-taking, the patients were given a thorough physical examination. Blood cell counts, urinalyses, and basal metabolic rate determinations were done routinely. The basal metabolic rates were less than zero in 35 of the 50 patients. Patients were questioned about the quality and quantity of their diet. They were given skin tests, and foods causing positive skin reactions were interdicted. Hypoallergenic, no-spice, low-fat diets were routinely prescribed. The foods permitted and the daily doses of supplementary vitamins are listed. General hygienic measures such as adequate sleep, daily baths, and regular meals and bowel habits were also stressed. Thirty-eight of the 50 patients took thyroid extract in doses ranging from $\frac{1}{4}$ to 5 grains (16 to 320 mg.) daily. Systemic administration of female sex hormones (oestrogens and progesterone) was indicated in some cases. When the latter hormones were employed, they were given rhythmically with the menstrual cycle to improve menstrual dysfunction. Topical agents were used by all of the patients. The affected areas were cleansed with soap and warm water at bed time and allowed to dry. A natural oestrogen cream was applied and allowed to remain on the skin overnight. This was removed in the morning and a sulphur-resorcinol ointment applied. In 1952 an alcoholic solution of Dienoestrol was substituted for the oestrogen cream and proved most effective. Of two representative case histories, the first concerned a 12 year-old girl. One year after beginning treatment, her acne disappeared almost entirely and she regained her good humour and interest in work and play.

OBSTETRICS AND GYNAECOLOGY

Anxiety in pregnancy.—(P. A. Reynolds, *West J. Surg.*, 63: 88-95, Feb. 1955).

The importance of the role of anxiety and tension in producing some of the complications of pregnancy and childbirth is now generally recognized. It is unfortunate that many women have been made to feel that the only normal woman is the one who can present a facade of complete relaxation during pregnancy and labour. It is as unrealistic to ignore the hazards of childbearing as it is to refuse to acknowledge the multiple dangers of daily existence. Granted that the medical care can and does reduce the hazards of childbearing, the fact remains that women do have something to fear from toxæmia, placenta prævia, abruptio placenta, miscarriage, premature labour, postpartum hæmorrhage, erythroblastosis, and foetal abnormalities. The pattern of any woman's response to the critical event of pregnancy is individual, depending on factors within herself and her environment, as well as on the attitudes and training of the physician and his associates in office and hospital, under whose care she places herself. The author's experience has taught him that there are three important areas in which the obstetrician can operate with reasonable effectiveness: (1) education and reassurance regarding the physical facts of pregnancy, and the innumerable misconceptions of facts as represented

by folklore regarding childbirth; (2) the explanation of ambivalent feelings; and (3) the assistance he can give the patient in accepting herself as an individual, without reference to standards of behaviour imposed by others. Education and reassurance may be effective, but are often over-evaluated. Such books as "Childbirth Without Fear" can increase tension in the patient by calling to her attention the multiple causes and prevalence of anxiety in pregnancy. While many people like to believe that women have babies in response to the maternal or procreative instinct, the author points out that many women are motivated by a variety of reasons very remotely connected with the maternal instinct. They become pregnant by accident, because of rivalry, to possess something, to satisfy a husband, to feel adequate, and so forth, but they do not necessarily like to be pregnant. These women often have anxiety because they feel one way and our culture and their own standards decree they should feel differently. They are often relieved by expressing their true feeling about being pregnant and being told by their physician that many women feel as they do. The author discusses the demands made upon both patient and physician by the current interest in natural childbirth. He calls attention to both the advantages and disadvantages of these new demands and recommends a middle-of-the-road approach.—(J. A. M. A.)

Books Received

Sex Efficiency—Exercises for Women.—By T. H. VAN DE VELDE, M.D., Pp. 156. Messrs William Heinemann Medical Books, Ltd., 99, Great Russell Street, London, W.C. 1. Price: sh. 25 nett.

The Medical Annual 1955—By Sir HENRY TIDY and R. MILNES WALKER. Messrs John Wright & Sons, Ltd., Medical Publishers, The Stonebridge Press, Bath Road, Bristol-4. Price: 32s. 6d.

Whys and Wherefores in Tuberculosis—By GEORGE DAY, M.A., M.D. Pp. 44. National Association for the Prevention of Tuberculosis. Tavistock House, North, London, W.C. 1. Price: 3s. 6d.

Epilepsy—By K. N. NAIR, G. G. JOAG, H. T. BAMBAWALE and V. P. MONDKAR. Pp. 28. Published by the Board of the Indian Journal of Medical Sciences, Bombay-4. Price: Rs. 8.

Reviews of Books, Periodicals and Reports

PERIODICALS

"Punjab Medical Journal," Jullunder City—Special Number on Treatment of Emergencies Parts I and II. The June and July '55 issues of the *Punjab Medical Journal* are devoted to the treatment of emergencies. A number of very useful and interesting articles are found in these two special issues. Medical Emergencies in General Practice, Hæmoptysis as an Emergency in Tuberculosis, Psychiatric Emergencies, Diabetic Coma, Fits as an Emergency, Epistaxis, Emergencies in General Anæsthesia are some of the very interesting articles which I am sure will benefit the general practitioner. U.K.R.

"Indian Practitioner," Bombay—Special number on Cardio-vascular Diseases.

The July '55 number of the *Indian Practitioner* is a special number on Cardio-vascular diseases. The articles cover a variety of subjects. Among the useful ones may be mentioned "The present day status of drugs in the treatment of high blood pressure, Cardio neurotics, Management of cardiac emergencies, Air travel and heart disease, Cardiac arrhythmias and Coronary disease, Coronary insufficiency and its treatment, Common congenital malformations of the heart, Modern methods in the management of failing heart, Low blood pressure, Cardiac surgery, Heart diseases in childhood." A number of articles have also been held over for subsequent issues for want of space. The articles have been written in a very clear and simple manner to benefit the general practitioner. U.K.R.

REPORTS

Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases.

This report on the working of these two institutions for the year 1953 is a record of good work done in research. Valuable contributions have been made by the staff in the field of Malaria, Typhus, Typhoid, Epidemic dropsy, Cholera, Diabetes, Tropical eosinophilia, Nutritional oedema, etc. U.K.R.

Valuable work has been done also in the fields of Bacteriology, Protozoology, and Entomology. In the field of Pharmacology the activities of the department were concerned mainly with indigenous drugs and their actions and also on the actions of new synthetic drugs. Very useful work has been done in the field of nutritional anæmia, anæmia in pregnancy etc. Research has been done in Dermatology and Helminthology also. Kala Azar and Leprosy have received special attention. We are particularly happy to note the number of scientific papers published by the members of the Staff of the School of Tropical Medicine. We congratulate the Director on the useful work done in this institution. U.K.R.

BOOKS

Indian Year Book of Ophthalmology—Edited by VAMAN D. SATHAYE, B.Sc., L.C.P.S., M.L.C., 1954, 194 pages plus a supplement of 38 pages. (Publishing Office: 502, Narayan Path, Poona-2).

This Year-book gives a review of the progress of ophthalmology during the year as gathered from contemporary ophthalmic literature. It has covered all the important ophthalmic literature in the English language and gives a selected review; it will serve as a ready reference book for the busy practitioner. This is very essential in view of the fact that rapid strides are being made in ophthalmology and newer drugs and methods are daily coming into the field. The Year book also contains a few original articles on subjects such as the 'modern treatment of retinal detachment,' 'the problem of blindness,' 'beta rays in ophthalmology' etc. It also gives the places where post-graduate courses in ophthalmology are available in India. Proceedings of ophthalmological societies are also included. The annual report of the working of all the eye hospitals in 1954, whether Government, missionary or private are given in this year-book. Lastly a supplement containing the names, qualifications and addresses of ophthalmic specialists are also given. U.K.R.

Back Ache in Women—By E. SCHLEYER SAUNDERS, M.D., F.I.C.S. with a Foreword by W. C. W. NIXON, M.D., F.R.C.S., F.R.C.O.G., Professor of Obstetrics and Gynaecology, University College Hospital Medical School, London, 1955. John Wright & Sons, Ltd., Briston.

Backache in women is a common complaint which is often suffered in silence, for women believe that it is a normal sequel to childbirth or a natural accompaniment of the menopause. The author of this book, a gynaecologist

who has made a special study of this problem has approached the subject from different angles i.e., gynaecological, orthopaedic, rheumatic, psychoneurotic and associated with intestinal and urological conditions. He has discussed the subject in a very detailed and elaborate manner. The author has also discussed the place of heat, novocain, physiotherapy, counter-irritation and spas in the treatment of backache. The book will be very useful to those interested in the subject.

U.K.R.

Correspondence

To The Editor, The ANTISEPTIC, Madras.

BCG Vaccination

Sir,

Mr. C. R's public objections have been attempted to be treated as misguided or ill-informed opposition of a senile out-moded politician.

I enter my caveat here not as a politician or a Government campaigner. What Rajaji has been questioning, any seasoned medical man could do. In fact, more and more of our medical men should join hands with him in this vital matter affecting the future of our younger generation.

I have on my hand a shattered child—my grandson aged 14 years. He was BCG vaccinated in 1954. Till the time of vaccination his health was perfect. He had a very good physique and stamina and resistance to infections. He was very well-nourished and was playing school games. From the time of vaccination he has developed an allergic state, with eosinophilia. Boils, small and big, crop up intermittently over any part of the body which do not heal in the ordinary way and in the usual time in spite of standard measures. Now a few boils have sloughed out, leaving punched and cup-shaped ulcers, slowly granulating. Another feature is the development of easy and quick inflammatory oedema for a few inches around each boil, unlike ordinary boils where inflammation is self-limited to the base of the boil only. Any how, I

am striving my best to rehabilitate him to normal standard fitness and resistance.

After the recent campaign in Tiruchi with "thundering success" vaccinated children are trickling into my clinic with various complaints, ranging from allergic respiratory troubles to allergic diarrhoeas and staphylococcal infections of the skin with protracted healing-time. The invariable report from the parents or the children is that they were frightened into vaccination in the schools, or private houses in a hustle, without consultation with the parents or elders or even the family doctor who is conversant with the previous state of health (or ill-health) of the children.

I pose here a few questions for the medical profession to ponder over: (1) Does the admittedly very low nutritional status of the children of this land (with per capita consumption of milk at 2 oz. per head per day) warrant the conclusion that BCG will immunise them better than the well-fed children of many Western countries? (2) Can BCG by-pass this low nutritional status with its concomitant low resistance to infection? (3) Why has the WHO prescribed a different standard of assessment of "Mantoux negative" for Indian children so as to include more of the "positives" (by scientific or textbook standard) as "negative" for the purpose of this campaign? (4) Are the vaccinated children being "followed up" by any organised and trained agency

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of the Government for recording their medical history for a certain number of years as against the un-vaccinated children of the same age group in each area? (5) If the urban and belt areas are admittedly showing a high percentage of "Mantoux Positive" in the adult population, cannot the children be spared from BCG so as to produce the same percentage of "positives" when they become adults? (6) Further, will not the children, if un-vaccinated, produce an even greater percentage of "Mantoux Positives" in their adult age in the coming years of improved nutritional status, of reduced seating capacity in buses and trains and school benches to avoid physical contact between person and person, of prohibition of our national spitting habit in public streets and places, of the disappearance of junk metal saucers, cups, dishes, and spoons in our not very sanitary restaurants and hostels, of prohibition of "Ice Fruit" vending before school-gates, and of state care of disease-ridden destitutes?

Trichinopoly 8th July '55.) R. SAMBASIVAN, M.B., B.S.,
Physician and Surgeon.

Reply to the above letter

It is not clear how the allergic state of the writer's grandson could be related to BCG vaccination when it cannot be postulated that the boils have any aetiological relationship to the BCG vaccine. If it is suggested that the technique of vaccination is not Mass Vaccination Programme is not absolutely perfect, the authorities in charge of the programme can certainly be told about it. It cannot be sufficient ground for assailing the entire campaign.

Argument No. 5 in the above letter displays ignorance of the very basis of BCG vaccination. While looking at the Mantoux positive section of the population now alive, one should not omit to reckon the large numbers of children who have died as a result of progressive primary tuberculosis. It is deplorable that throughout the controversy that has been raging in the lay press on BCG vaccination during the last few weeks, this important aspect of

the matter has been completely neglected or by-passed. Few medical men who have seen and appreciated the fatal possibilities of a positive Mantoux reaction obtained by exposure to the highly virulent human bacilli, can advocate such exposure as the best method of obtaining a primary infection.

A complete study of all the literature on the subject will convince any one that the risk of infection is much more to a tuberculin-negative person than what it is to a tuberculin positive person, even when the positive response is the result of BCG vaccination.

Paragraph 6 exhibits some confusion of ideas as the improvement in living and environmental conditions postulated should really tend to produce a lesser percentage of Mantoux positives. In fact, if the ideal summit is reached in those conditions, we may be in the position of Scandinavian countries where BCG is being extensively used to avoid the population reacting as "virgin soil."

[The above reply is by an authority on the subject.—Ed.]

Sir,

Ref: p. 553. The ANTISEPTIC, July 1955. Dr. Ranganathan said, "There are certain symptoms which may develop which can be troublesome and which can result in wrong diagnosis for after treatment."

I shall be highly thankful if you can kindly find out from Dr. Ranganathan, Director, BCG Laboratory as to what exactly are the troublesome symptoms etc. and the remedy for the same and let me know; if published in your esteemed journal, the ANTISEPTIC, the information will be useful for the whole profession.

1. What are the adverse effects of BCG vaccination? (2) After vaccination what approximately is the time within which adverse effects may develop? (3) When do the effects of BCG vaccination wear out? (4) What happens to the live bacilli that are injected intradermally? (5) Do the live bacilli remain alive permanently at the site of injection?

Gandhinagar, } T. S. VISWANATHA IYER,
Bellary-2 } L.M.P.

Reply to Dr. V. Iyer

The following is the correct version of the speech which Dr. Ranganathan made at the Madras Branch of the Indian Medical Association. (We regret for the error in quoting that speech)

"In a discussion of the complications following BCG vaccination it is essential to be quite impersonal and objective. It is important to remember that we are here dealing with vaccination of thousands of children per day. Some of them would fall ill whether vaccinated or not. It is therefore, necessary that this should be borne in mind and the history of BCG vaccination to which parents naturally attach great importance should not unduly influence the diagnosis.

What are the complications that may be expected after BCG vaccination? It is obvious that if the general practitioner is not familiar with the normal course of BCG vaccination—unfortunately there are many—he will not be in a position to know what should be labelled as a complication. The normal course of the intracutaneous BCG vaccination is this. The small wheal caused by the vaccination will disappear within half an hour or so and nothing will be seen at the site of injection for some days. After two to three or even four weeks, a small nodule develops which gradually increases in size slightly for a week or so. It is not generally painful but tender on touch. In most children this nodule softens with the formation of pus which may later escape, leaving a tiny ulcer which remains for some days. It heals by itself without the need for any special treatment. At the end of 10 to 12 weeks all that is visible is a tiny scar about 5 to 7 mm. in diameter. The local reaction is not classed under complications if the small abscess or the local ulcer does not exceed 10 mm in diameter.

BCG vaccination is comparable to the primary tuberculous complex with the difference that it is artificial and cutaneous. In place of the pulmonary component we have the cutaneous component, and in place

of the hilar glandular component we have the axillary or supraclavicular glandular component. Since BCG is attenuated and cannot multiply as rapidly or provoke the same severe cellular reaction as the virulent infection can, the glandular involvement in BCG vaccination is minimal and so overlooked. Occasionally there may be glandular enlargement, but this is not classed as a complication unless the enlargement is appreciable and inconvenient because of size or pain. Still more occasionally there may be suppuration of the glands. This is exceptional and generally occurs in young children below one year.

You will therefore, see that if the general practitioner is not conversant with the facts, he would be only too likely to acquiesce with the parent in regarding the condition as a complication of BCG vaccination."

1. There are generally no adverse effects of BCG vaccination other than the local complications referred to above.

2. The glandular abscess, when it develops, may become evident 3 to 6 months after BCG vaccination

3. The short-term efficacy of BCG vaccination and the persistence of protection is assumed to last as long as the tuberculin reaction is positive. This, on an average is about 5 years, may be longer.

4 and 5. It is obviously impracticable to find out what happens to the live bacilli that are injected intradermally in human beings. It has, however, been shown in experimental animals that the bacilli can be recovered from their bodies 9 months to 1 year after inoculation. They do not live permanently at the site of injection or in the body.

The local complications require very simple treatment. The ulcer, if it is present, needs common cleanliness and a surgical dressing, if it is large. The abscess, if it persists, is cured generally by a single aspiration with an aseptic syringe. Occasionally a second aspiration may be called for, but this is exceptional.

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NEWS AND NOTES

815

[NOTE: The above are the answers by a well known specialist, to the points raised by Dr. Viswanatha Iyer. Editor, ANTISEPTIC].

Diet in Pregnancy

Sir,
It is gratifying to find that Dr. Lal has gone through my paper on 'Diet in Pregnancy' with great interest. While reading he has come across certain doubtful points, and expects them to be cleared. He has suggested that references should have been given and I too feel the want of them. When I was asked to contribute a paper to the Golden Jubilee number, and to choose one from a list of subjects sent to me, I chose the above because an article was ready with me, having been prepared for my revision classes; I sent it on for publication. In preparing that paper I had referred to two books; one "Dietotherapy, Clinical application of modern nutrition", and another A "Hand book of Nutrition, a symposium of the American Medical Association", from which nearly all the figures relating to amounts were taken. Nevertheless I find that some typographical mistakes have occurred.

I plead ignorance of the fact that "The Nutritive Advisory Committee had formulated in 1944 the daily requirements of such workers in India", so does Dr. Lal write and compare my figures with those of that Committee. Had I known that the Committee had also worked out the nutritional requirements of pregnant woman, I would have chosen some other subject.

All the same I notice that the international units for Vitamin D 800 have been printed against Vitamin A, the latter are usually high, being by thousands and not by hundreds.

As to amino-acids Dr. Lal has remarked that my statement was not scientific. I would however earnestly request him to refer to pages 927, 452 of "Dietotherapy" and XVI, 13, 313 to 398 of "Hand Book of Nutrition" which support my statement.

I too realize with Dr. Lal that there is a paucity of milk in India and that, thousands of tins of dried milk powder are imported from U.S. and U.K. which are bought by the people at very high prices out of sheer necessity in order to rear infants. Canned milk foods are no doubt much more expensive than fresh natural milk. But pregnant or lactating women need fresh milk which yields valuable proteins and easily available calcium, without which she is liable to suffer from ill-effects of the deficiency.

Dr. Lal refers to the official reports giving the consumption of milk per head in the whole population as 1.95 oz. But the proportion of pregnant women to the population in any place will be relatively small; so it behoves the town municipality to make arrangements, for the supply to pregnant and lactating women of the requisite quantity of fresh good milk, by special taxation if necessary.

Dr. N. A. PURANDARE,
Bombay.

Address Wanted

Sir,
I shall be obliged if you will kindly publish the following in your columns.

1. Will Dr. Luis Sales Hadrade Sausa of Saura of Duque de Braganca Malanja, Angola, West Africa. Please communicate to me his present address to enable me to send the eye instrument to him?

Balasore, } N. K. BIDHYADHAR, M.B., B.S.,
India } Civil Surgeon.

News and Notes

Free Examination at Haffkine Institute

The Director of the above Institute has been authorised by the State Government to do in future the higher type of pathological and bacteriological work, free of charge, in the case of specimens of poor patients which are sent from some of the well known hospitals of Bombay City.

World Congress of Neuropaths in London

Forty-three countries, including India were represented at the Second International Congress of Neuropaths which opened at London on September 12th. The Indian representative was Dr. V. R. Khanolkar of the Tata Memorial Hospital, Bombay.

New Preparations and Inventions

(1) **Camoform**—Newly introduced by Messrs Parke, Davis & Co., Ltd., Bombay, it is an amoebicidal drug, and effective direct amoebicide. It is a synthetic organic compound described as 6,6, diallyl a-a-bis (di-ethyl-amino) 4,4-bi-o-cresol. In amoebiasis, Camoform acts directly on both the intestinal and the extra-intestinal forms of *Endamoeba histolytica*. Only a short course of treatment is required. Supplied in bottles of 20 x 250 mg. tablets.

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Corrigendum

ANTISEPTIC, September 1955 issue (i) p. 697, Table No. 1. Males—under 21-30 read 15 instead of 13; (ii) p. 698, C: Nutritional anaemia, No. of cases, read 111 instead of 103.

{ 516 }

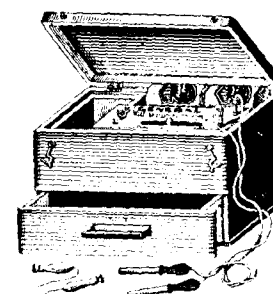
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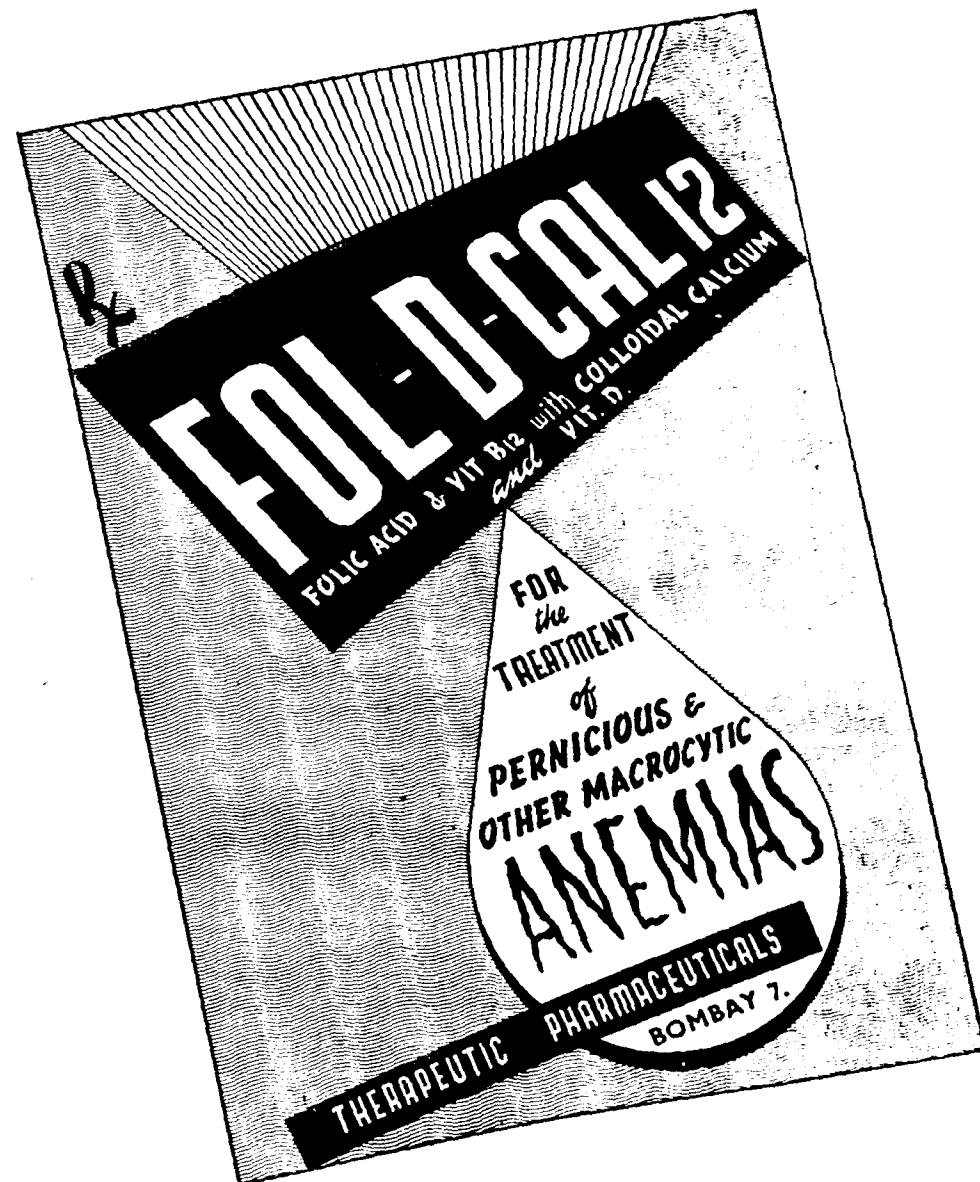
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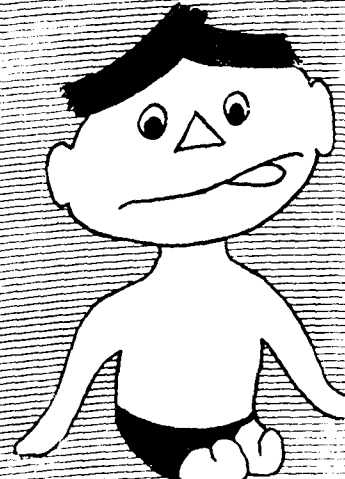


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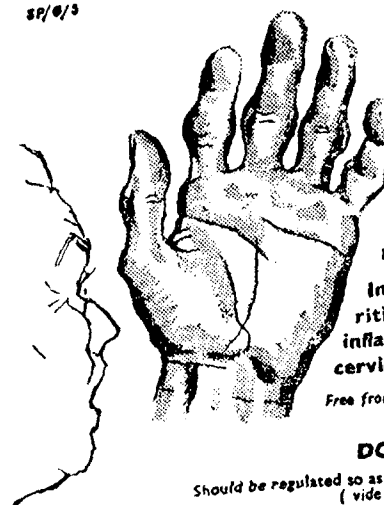
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.. .. 500 mg. 5cc 5-10	Nikathamide Amp. 17cc BOPW (Coramin)	Hyoscine Hydro Brom 1/100 x 1
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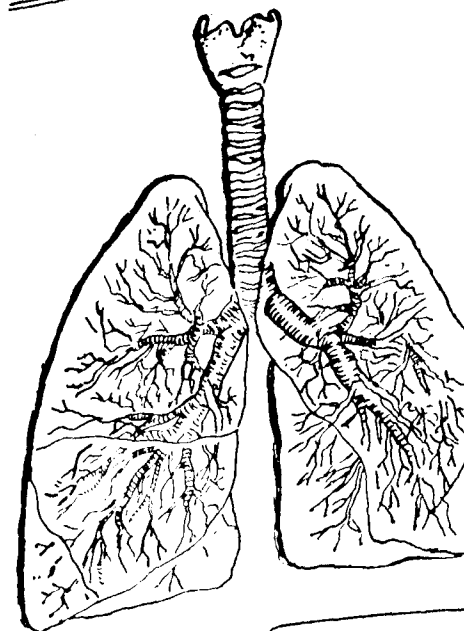
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