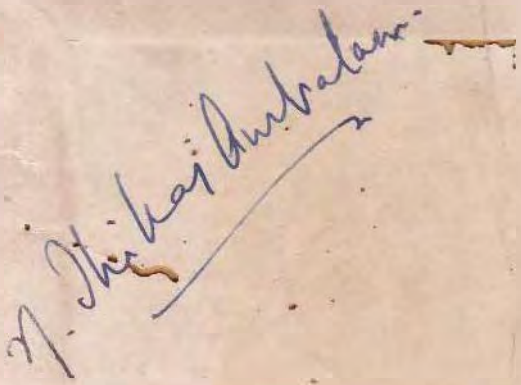
CEYLON HOSPITALS FORMULARY

1959



Colombo.
June 1961.

N. Thillaiambalam

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1959

DEPARTMENT OF HEALTH

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INTRODUCTION

THE Committee for revising the Ceylon Hospitals Pharmacopoeia was appointed in August 1957, by the Hospitals Committee of the Colombo Group of Hospitals at the instance of the Hon'ble the Minister of Health. The Committee found that what was needed was not a mere revision of an obsolete pharmacopoeia but the compilation of an altogether new work which has more appropriately been called Ceylon Hospitals Formulary. Its general pattern follows that of the British National Formulary.

The Committee is grateful to the Secretary of the British Pharmacopoeia Commission for permission to quote titles of drugs from the British Pharmacopoeia (B.P.), and to the Publications Manager of the Pharmaceutical Press for permission to reproduce a number of formulae from the British Pharmaceutical Codex (B. P. C.) and the British National Formulary (B. N. F.). Acknowledgements have been made in the text for material reproduced from these publications.

The preparations and formulae have been arranged on a pharmacological basis. This approach has advantages in hospital practice and in clinical teaching. Each group of drugs is preceded by a short account of their pharmacology written by Professor S. W. Bibile of the Department of Pharmacology, University of Ceylon. The help that he received from the members of his department and from individual specialists in the compilation of these notes is gratefully acknowledged.

It is unlikely that there will be universal agreement with the material presented in the Formulary. The Committee would therefore welcome criticisms and suggestions which may prove useful in future revisions.

The Committee would strongly urge the use of official names both in prescribing and in teaching. The habitual use of proprietary names adds to the prevailing confusion in drug nomenclature. A list of some official and proprietary names is given for the guidance of the prescriber

The doses stated are intended for general guidance and they represent the average range suitable for adults. Unless otherwise stated the oral dose may be repeated three or four times a day. Doses may be increased or decreased according to the needs of the patient.

Since the changeover from the Apothecaries' to the more rational Metric System is likely to take place soon the adoption of the Metric System is recommended wherever possible. Equivalent doses in both systems are given in the text. It is recommended that the symbols ℥ and ℨ be abandoned as they are apt to be misread. Solids should be prescribed in grains (gr.), ounces (oz.), grams (G.) or milligrams (mg.); and liquids in minims (m.), fluid ounces (fl. oz.) or millilitres (ml.). Roman numerals should not be employed. The capital letter G. should be used as the abbreviation for grams to avoid confusion with grains.

PHARMACOLOGICAL CLASSIFICATION

1. DRUGS ACTING ON THE ALIMENTARY SYSTEM

4. CHEMOTHERAPEUTIC DRUGS

5. DRUGS ACTING ON THE GENITO-URINARY SYSTEM

6. HORMONAL SUBSTANCES

13. DRUGS ACTING ON EAR, NOSE AND THROAT

14. DRUGS ACTING ON THE EYE

16. VACCINES

DRUGS ACTING ON THE ALIMENTARY SYSTEM

ANTACIDS

Antacid substances act either as chemical neutralizers or as physical adsorbents of gastric hydrochloric acid.

1. Chemical neutralizers. Sodium bicarbonate acts rapidly, causes eructations and prolonged use may lead to alkalosis. Magnesium and calcium carbonates also give rise to eructations, but not to alkalosis. Since magnesium has a laxative effect and calcium carbonate (chalk) is constipating, it is customary to combine the two. Magnesium oxide is a more effective antacid, does not cause eructations or alkalosis and has a laxative effect.

2. Physical adsorbents. Magnesium trisilicate is converted in the stomach into magnesium chloride and colloidal silica, which adsorbs gastric acid and has a slow and prolonged antacid effect. The magnesium salt has a laxative effect. Aluminium hydroxide acts mainly as an adsorbent and a small portion reacts chemically with gastric acid. It tends to constipate.

Aluminium Hydroxide Mixture, B. P.

Consists of aluminium hydroxide gel., B.P.; it contains Al_2O_3 about 4 per cent. w/w.

Dose : One teaspoonful, suitably diluted, every four hours.

Aluminium Hydroxide Tablets, B.P.

Each tablet contains dried aluminium hydroxide gel. 5 gr. (325 mg.) and peppermint oil 1/20 m. (0·003 ml.).

Dose : 1 to 2 tablets.

Magnesium Trisilicate and Belladonna Mixture

Magnesium Trisilicate	10 gr.	650 mg.
Light Magnesium Carbonate	10 gr.	650 mg.
Sodium Bicarbonate	10 gr.	650 mg.
Tincture of Belladonna	10 m.	0.6 ml.
Peppermint Water	.. to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

Magnesium Trisilicate Compound Powder

Magnesium Trisilicate	10 gr.	650 mg.
Heavy Magnesium Carbonate	10 gr.	650 mg.
Chalk	10 gr.	650 mg.
Sodium Bicarbonate	10 gr.	650 mg.

Dose : One powder in a little water.

Magnesium Trisilicate Mixture

Magnesium Trisilicate	10 gr.	650 mg.
Light Magnesium Carbonate	10 gr.	650 mg.
Sodium Bicarbonate	10 gr.	650 mg.
Syrup	60 m.	4 ml.
Peppermint Water	.. to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

ANTISPASMODICS

These substances reduce the motility of the alimentary tract by inhibiting the action of the vagus. They cause only a small reduction in the output of gastric secretions. Oxyphenonium and propantheline are synthetic preparations which have actions similar to atropine but claimed to have less of the distressing side effects of atropine.

The sedative action of phenobarbitone is useful.

Atropine Injection B. P.

An ampoule contains atropine sulphate 0·6 mg. per ml., or 1/100 gr. per 15 m., in Water for Injection.

Dose : 1/240 to 1/60 gr. (0·25 to 1 milligram) by subcutaneous or intramuscular injection.

Belladonna and Phenobarbitone Tablets, B.N.F.

Each tablet contains Dry Extract of Belladonna 2/5 gr. (25 mg.) and phenobarbitone 3/4 gr. (50 mg.)

Dose : 1 or 2 tablets.

Atropine Methonitrate Solution, B.N.F.

Contains atropine methonitrate 2/3 gr. (about 0·6 per cent.) in alcohol (90 per cent.) to 120 m.

Dose : 2 or 3 minims (0·12 or 0·2 millilitre), *carefully measured*, three or four times daily.

The solution may become concentrated by evaporation of the solvent, and should therefore be kept in tightly closed containers. The aleoholic solution is stable for 12 months.

3 m. contains atropine methonitrate 1/60 gr. (0·2 ml. contains about 1·2 mg.).

Oxyphenonium Tablets

Tablets of oxyphenonium bromide.
5 milligrams

Dose : 5 to 10 milligrams.

Propantheline Tablets, B. P.

Tablets of propantheline bromide.
15 milligrams

Dose : 15 to 75 milligrams daily, in divided doses.

Bitters and Tonics

Soda and Gentian Mixture

Sodium Bicarbonate	10 gr.	650 mg.
Tincture of Gentian	30 m.	2 ml.
Chloroform Water ..	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

Nux Vomica and Acid Mixture, B.P.C.

Tincture of Nux Vomica	10 m.	0·6 ml.
Dilute Hydrochloric Acid	10 m.	0·6 ml.
Chloroform Water..	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

GASTRO-INTESTINAL SEDATIVES

These substances are used for the symptomatic relief of diarrhoea or intestinal colic. Kaolin and chalk act as adsorbents. Opium checks diarrhoea by reducing the secretions and propulsive movements of the alimentary tract and increasing the tone of intestinal muscle and sphincters. The pain of intestinal spasm is relieved by morphine and pethidine by their local actions but more so by their central analgesic effect.

Chalk and Opium Mixture

Prepared Chalk ..	15 gr.	1 G.
Tragacanth in powder	½ gr.	30 mg.
Tincture of Opium	10 m.	0·6 ml.
Compound Tincture of Cardamom	30 m.	2 ml.
Chloroform Water..	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

Carminative Mixture

Sodium Bicarbonate	10 gr.	650 mg.
Aromatic Solution of Ammonia	20 m.	1·3 ml.
Spirit of Chloroform	15 m.	1 ml.
Compound Tincture of Cardamom	30 m.	2 ml.
Peppermint Water	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

INTESTINAL STIMULANTS

Laxatives and purgatives are used to relieve constipation when measures that have been taken to remove its cause (e.g. myxoedema, insufficient food residue in diet) have failed.

Speedy emptying of the bowel is induced by a glycerin suppository or an enema. A more vigorous effect is obtained with saline purgatives like sodium or magnesium sulphate. They are poorly absorbed from the intestine and therefore prevent the reabsorption of intestinal fluid which is hastened into the large intestine and evacuated as a watery stool within an hour or two of taking the purgative.

Liquid paraffin acts mainly as a lubricant and can be used as an occasional laxative to avoid straining at a stool. It is unsuitable for prolonged use because there is interference with the absorption of vitamins A and D, and because of the embarrassment of anal leakage.

The anthracene purgatives cascara and senna contain active anthraquinones which act on the large bowel. When administered at night they produce a soft motion 8 to 12 hours later in the morning. The griping that is sometimes produced is minimized by the addition of an antispasmodic. Aloes produces griping and pelvic congestion and should not be used in pregnancy. Rhubarb has the disadvantage of tending to constipate after its purgative effect is over.

Castor oil produces semifluid stools in 3 to 6 hours and it does so by an irritant action of ricinoleic acid released from the oil in the intestine.

Injections of carbachol or neostigmine increase the peristaltic activity of the intestine and have been used to relieve distension.

Cascara and Belladonna Mixture

Liquid Extract of Cascara Sagrada	60 m.	4 ml.
Tincture of Belladonna	10 m.	0·6 ml.
Chloroform Water	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

Cascara Sagrada Tablets, B.P.

3 gr. (200 milligrams) ; 5 gr. (325 milligrams).

Dose : 2 to 8 grains (130 to 500 milligrams).

Glycerin Suppositories, B.P.

Contain glycerin 70 per cent w/w, prepared in a 30 gr. (2 G.) mould.

Liquid Paraffin and Magnesium Hydroxide Emulsion, B.P.C.

Contains liquid paraffin 25 per cent. v/v in Magnesium Hydroxide Mixture.

Dose : For an adult, 60 to 240 minims (4 to 16 millilitres).
For a child, 60 to 120 minims (4 to 8 millilitres).

Liquid Paraffin, B.P.

Dose : ½ to 1 fluid ounce (8 to 30 millilitres).

Castor Oil, B.P.

Dose : 60 to 240 minims (4 to 16 millilitres).

Magnesium Sulphate Mixture, B.P.C.

Synonym : White Mixture.

Magnesium Sulphate	.. 60 gr.	4 G.
Light Magnesium Carbonate	.. 10 gr.	650 mg.
Peppermint Water	.. to 1 fl. oz.	to 30 ml.

Dose : 1 to 2 fluid ounces (30 to 60 millilitres).

Carbachol Injection, B.P.

Ampoules containing carbachol 0·25 mg. per ml., with 5 per cent. w/v of dextrose, in Water for Injection.

Dose : 0·25 to 0·5 milligram by subcutaneous injection.

Neostigmine Methylsulphate Injection, B.P.

Each ampoule contains neostigmine methylsulphate 0·5 mg. per ml. in Water for Injection.

Dose : 0·5 to 2 milligrams.

ENEMAS AND PREPARATIONS ACTING LOCALLY ON THE RECTUM

Magnesium Sulphate Enema, B.P.C.

Contains magnesium sulphate 3 oz. (50 per cent.) in water to 6 fl. oz.

Dose : 2 to 6 fluid ounces (60 to 180 millilitres), by rectal injection.

Turpentine Enema, B.P.C.

Contains turpentine oil 1 fl. oz. (5 per cent.) in Soap Enema to 20 fl. oz.

Dose : 20 fluid ounces (600 millilitres), by rectal injection.

Magnesium Sulphate and Glycerine Enema

Synonym: Flatus Enema.

Contains 4 fluid ounces each of magnesium sulphate and glycerine.

Benzocaine Compound Ointment, B.P.C.

Contains benzocaine 48 gr. (10 per cent.) in Ointment of Hamamelis and Ointment of Zinc Oxide, equal parts, to 480 gr.

Bismuth Subgallate Compound Suppositories, B.P.C.

Each suppository contains bismuth subgallate 3 gr. (200 mg.), with resorcinol 1 gr., zinc oxide 2 gr. and balsam of Peru 1 m. prepared in a 15 gr. (1 G.) mould.

DIAGNOSTIC AGENT

Histamine Acid Phosphate Injection, B.P.

Ampoules containing histamine acid phosphate 1 mg. per ml. in Water for Injection.

Dose: 0·5 to 1 milligram by subcutaneous injection.

DRUGS ACTING ON THE CARDIOVASCULAR SYSTEM

DRUGS ACTING ON THE HEART

Even in full therapeutic doses digitalis has negligible effects on the output and rate of the normal heart. On the other hand it increases the contractile force and output of the failing heart and slows its rate. The heart is thus able to accept the accumulated venous return and cardiac output is correspondingly increased so that compensation is restored. Digitalis is therefore indicated in low output cardiac failure whatever its cause. It is of little value for types of failure associated with a high output, e.g. anaemia, cor pulmonale or thyrotoxicosis. Because it delays A-V conduction digitalis is of value in the treatment of paroxysmal auricular tachycardia, auricular fibrillation and flutter. In acute carditis of rheumatic fever, diphtheria and pneumonia, digitalis is usually ineffective, and may prove harmful.

Digoxin is a pure glycoside and is therefore of uniform potency. It is rapidly effective, having a maximum action six hours after oral administration; after intravenous injection there is noticeable effect in ten minutes and a maximum effect within two hours. Digitalis folia (powdered leaf) has a slower action so that a maximum effect is observed in 24 to 48 hours. The potency of this preparation is slightly less uniform than that of digoxin. But this is not an important consideration in the therapeutic use of the drug because patients vary widely in their digitalis requirements, so that the amount administered is really determined by the clinical response of each patient. Moreover, digitalis folia is many times cheaper so that it should

be the preparation selected for routine use. Digoxin should be reserved for cases of real urgency where it is necessary to digitalize very rapidly.

Digitalization within 24 to 48 hours can be achieved by giving digitalis folia in three doses of 6 grains each at six-hourly intervals. A more rapid digitalization is achieved by giving digoxin in doses of 1, 1, 0·5 and 0·5 milligrams at six-hourly intervals. In the rare case where even more rapid effects are desired the first milligram of digoxin can be given by slow intravenous injection. After full digitalization it is advisable to withold the drug for the next 24 hours before starting on maintenance doses with digitalis folia.

When there is no urgency a slower digitalization is achieved by giving 9 grains of digitalis folia in divided doses on the first day, 6 grains on the second day and 3 grains on subsequent days until failure is controlled.

The optimum maintenance dose of digitalis is the largest dose which can be tolerated without producing symptoms of toxicity. It is the amount which just balances daily elimination, and usually lies between 1 and 2 grains of digitalis folia. The exact amount must be determined by trial on an individual basis. The first effects of overdosage are anorexia, nausea and headache. The occurrence of coupled beats or bradycardia should lead to a temporary withdrawal of the drug.

Aminophylline by slow intravenous injection is used in acute left ventricular failure (cardiac asthma). It stimulates the myocardium to contract more forcibly, so that left ventricular output is increased and pulmonary oedema is relieved. It relaxes bronchial spasm by a direct action on smooth muscle. If paroxysmal dyspnoea is troublesome at night, aminophylline suppository can be used.

Quinidine and procainamide prolong the refractory period of heart muscle and depress conduction and myocardial excitability. Vagal tone is depressed so that the heart rate is increased. Quinidine is useful in auricular fibrillation of recent onset after the underlying condition has been treated and is usually given in doses of 5 gr. at four-hourly intervals. It is also useful in the prophylaxis and treatment of paroxysmal tachycardia. Procainamide is useful in paroxysmal ventricular tachycardia, particularly when intravenous administration is required in an urgent case. It is also useful in other ventricular arrhythmias.

Digitalis Tablets, B.P.

Synonym : Digitalis Folia Tablets.

1 grain (60 milligrams)

Dose : ½ to 1½ grains (30 to 100 milligrams).

For maintenance, 1 grain of Digitalis Folia is equivalent to approximately 10 minims of Tincture of Digitalis or 0·25 mg. of digoxin.

Digoxin Tablets, B.P.

0·25 milligram.

Dose : Initially, 1 milligram. Maintenance, 0·25 mg. once, twice or thrice daily.

Digoxin Injection, B.P.

An ampoule contains 0·5 mg. of digoxin in 1 ml. of 70 per cent. alcohol.

This should be diluted in 10 ml. of 5 per cent. Dextrose Injection or Sodium Chloride Injection immediately before intravenous injection.

Dose : 0·5 to 1 milligram.

Ouabain Injection, B.P.

An ampoule contains 0·25 mg. (1/240 gr.) in 1 ml., for intravenous injection.

DOSE: 0·25 to 0·5 milligram.

Aminophylline Injection, B.P.

For intravenous injection: ampoules containing aminophylline 250 mg. per 10 ml. (4 gr. per 150 m.), in Water for Injection.

DOSE: 100 to 500 milligrams by slow intravenous injection.

Aminophylline Suppositories

0·5 gram

Procainamide Hydrochloride Injection, B.N.F.

An ampoule contains procainamide hydrochloride 100 mg. per ml., with benzyl alcohol 0·9 per cent. v/v and sodium metabisulphite 0·1 per cent. w/v in Water for Injection.

DOSE: 100 to 500 milligrams by slow intravenous injection, not more than 100 mg. per minute.

Procainamide Hydrochloride Tablets

250 milligrams

DOSE: 1 to 2 grams per day, in divided doses.

Quinidine Tablets, B.P.

Quinidine Sulphate Tablets

5 grains (325 milligrams)

DOSE: 3 to 5 grains (200 to 325 milligrams).

VASOCONSTRICTORS

These substances raise the blood pressure either by stimulating the heart and increasing its output or by producing peripheral vasoconstriction, and sometimes by

both effects. Adrenaline acts mainly by increasing cardiac output. The peripheral resistance is slightly reduced or remains unchanged because its cutaneous and mucosal vasoconstrictor action is balanced by vasodilatation in skeletal muscle. Methylamphetamine has much the same effects but acts for a longer period and increases the heart rate markedly. They are not as suitable for peripheral circulatory failure as noradrenaline and methoxamine, both of which increase the peripheral resistance by causing vasoconstriction almost everywhere except in the coronary vessels. They cause a reflex bradycardia and do not produce cerebral stimulation. Methoxamine can be injected intermittently because its effects last for half to one hour. Noradrenaline is much more powerful but its effect is so short lived that it must be given continuously by intravenous infusion. Fluctuations in the rate of infusion can cause violent fluctuations in blood pressure so that repeated determinations of blood pressure are necessary during an infusion. The infusion should be stopped gradually because an abrupt withdrawal can lead to a sharp fall in blood pressure.

Adrenaline Injection, B. P.

Contains adrenaline acid tartrate, equivalent to adrenaline 1 in 1,000, with sodium metabisulphite and sodium chloride in Water for Injection.

Dose : 0·12 to 0·5 millilitre (2 to 8 minims), by subcutaneous injection.

Methylamphetamine Injection, B. P.

Methylamphetamine Hydrochloride Injection

Ampoules : 30 milligrams in 1·5 millilitres of Water for Injection.

Dose : 10 to 30 milligrams, by intramuscular or intravenous injection.

Methoxamine Injection

Each ampoule contains methoxamine hydrochloride 20 mg. per ml.

Dose: By intramuscular injection, 5 to 20 milligrams.
By intravenous injection, 5 to 10 milligrams.

Noradrenaline Injection

A sterile solution containing noradrenaline bitartrate, 1 mg. of noradrenaline base per ml.

Dose: Usually, 4 ml. (4 mg.) diluted in 1,000 ml. and administered by intravenous drip, the rate being adjusted to maintain the required blood pressure.

VASODILATORS

Vasodilator drugs are used either to produce a local increase in blood flow as in coronary insufficiency and in Raynauds disease, or to produce a generalized vasodilatation for the reduction of arterial blood pressure.

Peripheral vasoconstrictor tone is controlled by the activity of the sympathetic nervous system. An interruption of sympathetic pathways at any point will therefore produce vasodilatation. Drugs which depress sympathetic tone by central action are reserpine, hydrallazine and the veratrum alkaloids. Pentolinium, mecamylamine, pempidine, and trimetaphan interrupt the sympathetic pathway by blocking ganglionic transmission. Adrenergic antagonists like tolazoline, phentolamine and phenoxybenzamine act at the periphery by blocking the effects of the sympathetic transmitter and also by a small direct relaxant effect on blood vessels.

The vasodilators used for peripheral vascular disease are tolazoline and phenoxybenzamine. They are more useful in conditions due to vasospasm like Raynauds disease and

acrocyanosis. In occlusive vascular disease the drugs are useful if there is a large component of increased vasoconstrictor tone. Phenoxybenzamine is generally more effective than tolazoline and it is useful to combine its administration with ganglion blocking drugs. The place of sympathetic denervation by surgery has to be considered when these drugs are used.

Phentolamine is used mainly as a diagnostic agent in suspected phaeochromocytoma and also to control the pressor responses that occur during surgical removal of such a tumor.

Drugs used in the treatment of hypertension are the preparations of Rauwolfia and the ganglion blocking drugs. Veratrum alkaloids are generally unsuitable for a long continued use because side effects are distressing. Rauwolfia and its chief alkaloid reserpine produce hypotension, bradycardia and emotional calm with only minor side effects like nasal congestion, loose stools, lethargy and gain in weight. A few patients suffer from mental depression and this can be dangerous because it is accompanied by suicidal tendencies.

Approximate equipotent doses are 0·25 mg. of reserpine and 4 mg. of Rauwolfia Tablet. Full effects are observed only after they have been in use for about three weeks.

Ganglion blockers are the most powerful of the hypotensive drugs. Unfortunately they block transmission through parasympathetic ganglia as well and cause side-effects such as impaired accommodation, dry mouth, constipation, intestinal distension, difficulty in micturition and impotence. Some of these can be counteracted by giving neostigmine or pilocarpine by mouth. Pentolinium by injection is almost instantaneous in its hypotensive action but inconvenient for prolonged use. By mouth, its absorption is

erratic and tolerance develops rapidly. Mecamylamine and pempidine are suitable for oral administration because they are completely absorbed. Since their effect lasts for nearly 12 hours a satisfactory control of blood pressure is obtained with two doses a day. The initial dose is 2·5 mg. twice daily and this is increased as necessary by amounts not exceeding 2.5 mg. per dose. The aim is to keep the diastolic pressure at 100 when standing. Since the full effect of a daily dose may not be apparent for three days this interval should elapse when changing the dose. Tolerance develops rarely but the side effects can be distressing. Ganglion blockers are contraindicated when there is renal failure or after a recent cerebral or coronary thrombosis.

The combined administration of ganglion blockers and Rauwolfia or reserpine lessens the daily requirement of each, so that there is a reduction of side effects and a smoother control of blood pressure.

Trimetaphan is a ganglion blocking agent which has such a rapid and short action that it permits a minute-to-minute control of blood pressure. It is used for surgical procedures in which a controlled hypotensive technique is indicated.

Coronary vasodilators in common use are trinitrin and pentaerythritol tetranitrate. Trinitrin tablets should not be swallowed but held in the mouth so that absorption takes place from the buccal mucous membrane. It acts in 2 or 3 minutes and its effect lasts for about 45 minutes. The effect of pentaerythritol begins in about 30 minutes and lasts from 4 to 5 hours. It reduces the frequency of anginal attacks and renders them less intense. It does not replace trinitrin which is more suitable for acute attacks.

Amyl Nitrite Vitrellae, B.P.C.

5 minims (0·3 millilitre).

Glyceryl Trinitrate Tablets, B.P.

Synonym: Trinitrin Tablets.

1/130 grain (0·5 milligram).

DOSE: 1/130 to 1/60 gr. (0·5 to 1 milligram).
They should be kept in a cool place, protected from light and in containers which prevent access of moisture.

Nicotinic Acid Tablets, B.P.

50 milligrams.

DOSE: Prophylactic, 15 to 30 milligrams daily.
Therapeutic, 50 to 250 milligrams daily.

Pentaerythritol Tablets

Pentaerythritol Tetranitrate Tablets.

10 milligrams.

DOSE: 10 to 20 milligrams, four times daily.

Phenoxybenzamine Capsules

10 milligrams.

DOSE: 10 to 30 milligrams, three or four times daily.

Tolazoline Hydrochloride Tablets, B. P.

25 milligrams.

DOSE: 25 to 50 milligrams, four times daily.

Phentolamine Injection

Ampoules containing phentolamine methane sulphonate 5 mg. per ml.

DOSE : 5 milligrams by intravenous injection for phaeochromocytoma test. 5 milligrams by intramuscular or intravenous injection, repeated if necessary during removal of a phaeochromocytoma.

Pentolinium Tablets, B. P.

Pentolinium Tartrate Tablets

40 milligrams.

DOSE : Initially, 10 to 20 milligrams daily, increasing by 20 milligrams daily till the effective dose is found.

Pentolinium Injection

Ampoules containing pentolinium tartrate 5 mg. per ml.
DOSE : An initial single dose of 2·5 milligrams subcutaneously, increasing by 1 milligram till the effective dose is found (usually between 2·5 and 10 mg.)

Mecamylamine Tablets

Mecamylamine hydrochloride tablets

10 milligrams

DOSE : 2·5 to 10 milligrams.

Trimetaphan Injection

250 milligrams in each ampoule

DOSE : Prepared by dissolving in 5 ml. of Water for Injection and then diluting in 250 ml. of Sodium Chloride Injection or Dextrose Injection to give a strength of 1 mg. per ml. The rate of intravenous administration is adjusted to maintain the desired level of hypotension.

Reserpine Tablets, B.P.

0·25 milligram ; 1 milligram.

DOSE : For hypertension, 0·25 to 1 milligram daily.

For psychoses, according to the needs of the patient.

Reserpine Injection

1 milligram per millilitre.

DOSE : For hypertension, 0·25 to 1 milligram daily.

For psychoses according to the needs of the patient.

Rauwolfia Tablets

2 milligrams.

Tablets containing alseroxylon fraction of *Rauwolfia serpentina.*

DOSE : 2 to 4 milligrams.

ANTICOAGULANTS AND THEIR ANTAGONISTS

The object of anticoagulant treatment is to prevent the extension of a vascular thrombosis and to reduce the likelihood of embolism. The drugs in common use are heparin and phenindione.

Heparin prevents the conversion of prothrombin to thrombin as well as the action of thrombin itself. It is used for its immediate anticoagulant effect following thrombosis or embolism until orally administered anticoagulants (e.g. phenindione, ethylbiscoumacetate, warfarin) begin to act. Heparin is best given by intravenous injection in doses of 10,000 Units every six hours. Its action begins in ten minutes. A concentrated solution can be given intramuscularly in doses of 12,000 Units every

twelve hours, but this is not a very satisfactory way of giving it because the anticoagulant effect is not as uniform, the injection is painful and liable to produce a haematoma. Laboratory control is usually unnecessary, but if required, the clotting time is maintained at two or three times that of a normal control. If overdosage leads to haemorrhage it can be instantly controlled by administering 5 ml. of Protamine Sulphate Injection. This amount (50 mg. of protamine sulphate) will neutralize half the injected heparin (10,000 Units).

The first dose of heparin and the first dose of the oral anticoagulant are given at the same time. Phenindione is the most suitable of the oral anticoagulants, and since its effect is evident in thirty-six hours, the administration of heparin is discontinued at the end of this period. Phenindione is given in doses of 100 mg. twice daily on the first day, 50 mg. twice daily on the second day and thereafter the dose is adjusted according to the prothrombin time. The drug acts by decreasing the concentration of factor VII and prothrombin in the blood. The aim is to keep the prothrombin time at twice the normal value which is about 30 seconds, and this corresponds to a prothrombin index of 40 to 50 or a prothrombin concentration of 20 to 30 per cent. Phenindione causes a pink discolouration of urine and this should not be mistaken for haematuria. If haemorrhage does occur (e.g. haematuria, haematemesis or melaena) the anticoagulant effect can be reversed in about 12 hours by giving 20 mg. of vitamin K_1 intravenously or by mouth. This preparation is much more effective than synthetic analogues of vitamin K.

Anticoagulant therapy is used in the management of venous thrombosis, pulmonary embolism, arterial occlusion, retinal vascular thrombosis, auricular fibrillation with embolism and in most cases of myocardial infarction. It

is usually continued for three or four weeks. Anticoagulants are contraindicated in liver disease, renal insufficiency, peptic ulcer, active pulmonary tuberculosis and immediately after surgery.

Heparin Injection, B.P.

5,000 Units per ml. ; 25,000 Units per ml.

DOSE : 6,000 to 12,000 Units by intravenous or intramuscular injection. It should be stored at a temperature not exceeding 20°C.

Phenindione Tablets, B.P.

10 milligrams ; 50 milligrams.

DOSE : Initial dose, 200 to 300 milligrams.

Subsequent doses, 25 to 100 milligrams daily, according to the prothrombin activity of the blood.

Protamine Sulphate Injection, B.P.C.

Ampoules containing protamine sulphate 10 mg. per ml. in Sodium Chloride Injection.

1 mg. of protamine sulphate immediately neutralizes the anticoagulant effect of 100 Units of Heparin.

Vitamin K_1 Capsules

Synonym : Phytomenadione.

10 milligrams.

DOSE : 10 to 20 milligrams.

Vitamin K_1 Injection

Synonym : Phytomenadione

10 milligrams per millilitre ; 5 milligrams per millilitre

DOSE : 10 to 20 milligrams, for intramuscular or intravenous injection.

SCLEROSING AGENTS

Ethanolamine Oleate Injection, B.P.

Contains ethanolamine oleate about 5 per cent. w/v, with benzyl alcohol in Water for Injection.

DOSE : 2 to 5 millilitres (30 to 75 minims), by intravenous injection.

Quinine and Urethane Injection, B.P.

Ampoules containing 12·5 per cent. w/v of quinine hydrochloride and 6·25 per cent. w/v of urethane in Water for Injection.

DOSE : 0·5 to 5 millilitres (8 to 75 m.), by intravenous injection.

DRUGS ACTING ON THE NERVOUS SYSTEM

ANALGESICS AND ANTIPYRETICS

These drugs are used for the symptomatic treatment of pain and fever, and may be classified into the antipyretic analgesics (aspirin), the opium alkaloids and the newer analgesics (pethidine and methadone).

The Antipyretic Analgesics

They relieve pain and reduce the temperature in pyrexial conditions by acting on the central nervous system. Aspirin, or better still, Soluble Aspirin should be the sheet anchor for minor aches and pains and considering the millions that are swallowed each year it is a safe drug. It has also proved its value in rheumatic fever and rheumatoid arthritis. In the former it is probably better than sodium salicylate because the large sodium intake may be undesirable. On an empty stomach aspirin may cause irritation or even superficial erosion of the gastric mucosa. Rarely, asthma or urticaria may be produced in sensitive individuals. When this happens phenacetin can be substituted and it has the advantage of not irritating the gastric mucosa. Paracetamol is the active metabolite of phenacetin and is less toxic.

Sodium salicylate is a less effective and less palatable analgesic than is aspirin. In rheumatic fever the daily requirement is 90 to 180 grains.

Amidopyrine is the most powerful member of this group but it gives rise to agranulocytosis and its use even in combination (e.g. phenylbutazone and amidopyrine) should be abandoned.

Phenylbutazone is rapidly effective in rheumatoid arthritis or osteoarthritis, but with prolonged administration it may become less effective. Moreover, toxic effects are relatively common such as oedema, skin rashes, gastro-intestinal disturbances and depression of bone marrow. Constant supervision is therefore necessary when phenylbutazone is being administered.

Combinations of analgesic drugs are no more effective than an adequate dose of aspirin or phenacetin given alone. The effect of Codeine Compound Tablet depends on its content of aspirin and phenacetin and a tablet is nearly equal to two of aspirin, which probably explains why it works so well. Its codeine content often causes constipation. Dover's powder is a useful preparation and its combination with aspirin enhances its analgesic and antipyretic effect and it is very useful in feverish states associated with painful cough.

Pain is usually accompanied by insomnia and for this condition an analgesic and hypnotic are advantageously combined.

Aspirin Mixture

Synonym : Acetylsalicylic Acid Mixture.

Acetylsalicylic Acid, in fine powder	10 gr.	650 mg.
Compound Powder of Tragacanth	5 gr.	325 mg.
Chloroform Water..	.. to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

Soluble Aspirin Tablets, B.P.

Synonym : Acetylsalicylic Acid Soluble Tablets.

A tablet contains acetylsalicylic acid 5 gr. (325 mg.) with citric acid, calcium carbonate, and saccharin sodium.

Dose : 1 to 3 tablets. The tablets should be allowed to dissolve in water immediately before use.

Aspirin Tablets, B.P.

Synonym : Acetylsalicylic Acid Tablets

5 gr. (325 milligrams)

DOSE : 5 to 15 grains (325 to 1000 milligrams).

Phenacetin Tablets, B.P.

5 grains (325 milligrams)

DOSE : 5 to 10 grains (325 to 650 milligrams).

Codeine Compound Tablets, B.P.

Synonym : Aspirin, Phenacetin and Codeine Tablets.

Each tablet contains codeine phosphate 1/8 gr. (8 mg.) and acetylsalicylic acid and phenacetin, of each, 4 gr. (250 mg.).

DOSE : 1 to 2 tablets.

Phenylbutazone Tablets

100 milligrams ; 200 milligrams

DOSE : 200 to 400 milligrams daily, in divided doses.

Sodium Salicylate Mixture

Sodium Salicylate	10 gr.	650 mg.
Sodium Bicarbonate	5 gr.	325 mg.
Sodium Metabisulphite	¼ gr.	15 mg.
Peppermint Water	to 1 fl. oz.	to 30 ml.

DOSE : 1 fluid ounce (30 millilitres).

Sodium Salicylate Mixture, Strong, B.N.F.

Sodium Salicylate	20 gr.	1·3 G.
Sodium Metabisulphite	¼ gr.	15 mg.
Peppermint Water	to 1 fl. oz.	to 30 ml.

DOSE : 1 fluid ounce (30 millilitres).

Ipecacuanba and Opium Tablets, B.P.

Synonym : Tablets of Dover's Powder.

5 grains (325 milligrams)

Dose : 5 to 10 grains (325 to 650 milligrams).

Tablets of Aspirin and Dover's Powder, B.P.

Each tablet contains acetylsalicylic acid and Powder of Ipecauanha and Opium, of each, 2½ gr. (150 mg.).

Dose : 1 or 2 tablets.

The Opium Alkaloids

Morphine and related substances have, in addition to their analgesic action, a capacity to remove the unpleasant emotional accompaniments of pain like fear and anxiety. It is the additional relief from apprehension which renders morphine of value in haemorrhage, in pain and shock from injuries, in myocardial infarction, cardiac failure and other emergencies. It is used with atropine or hyoscine in premedication to sedate the patient and to reduce bronchial secretions. Very small doses are adequate to depress the cough centre, but codeine is safer in the treatment of an irritant cough. Morphine is a powerful depressant of the respiratory centre and since myxoedematous patients as well as infants and the very old are very sensitive in this respect, it must be administered with caution.

The respiratory depressant effect is of great value in cardiac dyspnoea. It may precipitate coma in liver disease and is lethal is status asthmaticus. It should not be used in convulsive states because it stimulates the spinal cord. Morphine may cause nausea or vomiting and it always constipates. It is a drug of addiction.

Nalorphine is a specific antagonist for morp hine poisoning.

Codeine is a poor analgesic and it is chiefly used to depress the cough centre. It is apt to cause constipation.

Papaveretum consists of a mixture of the purified alkaloids of opium in the same proportion as they occur naturally. The claim that it has fewer side effects than morphine has not been substantiated by clinical trials, and its analgesic potency is not greater than would be expected from its morphine content.

Codeine Phosphate Tablets, B.P.

30 milligrams (½ grain).

DOSE : 10 to 60 milligrams (1/6 to 1 grain).

Morphine and Atropine Injection, B.P.

Ampoules containing morphine sulphate 10 mg. (1/6 gr.) and atropine sulphate 0·6 mg. (1/100 gr.) with sodium metabisulphite in 1 ml. of Water for Injection.

DOSE : 0·5 to 1 millilitre (8 to 15 minims), by subcutaneous or intramuscular injection.

Morphine and Hyoscine Injection, B.N.F.

Synonym : Morphine and Scopolamine Injection.

Ampoules containg morphine sulphate 10 mg. (1/6 gr.) and byoscine hydrobromide 0·4 mg. (1/150 gr.) per ml. of Water for Injection.

DOSE : 0·5 to 1 millilitre (8 to 15 minims), by subcutaneous injection.

Morphine Sulphate Injection, B.P.

Synonym : Morphine Injection.

Ampoules : 10 milligrams (1/6 grain) ; 15 milligrams (¼ grain).

DOSE : 8 to 20 milligrams (1/8 to 1/3 grain) by subcutaneous or intramuscular injection.

Papaveretum Injection, B.P.C.

Ampoules containing papaveretum 20 milligrams (1/3 grain), with phenylmercuric nitrate in 1 ml. of Water for Injection.

DOSE : 0·5 to 1 millilitre by subcutaneous injection.

1 ml. is equivalent in morphine content to 10 mg. (1/6 gr.) of anhydrous morphine.

Papaveretum and Hyoscine Injection

Ampoules containing 40 milligrams (2/3 grain) papaveretum and 0·4 milligrams (1/150 grain) per ml. of Water for Injection.

DOSE : 0·5 to 1 millilitre by subcutaneous injection.

1 ml. is equivalent in morphine content to 20 mg. (1/3 gr.) of anhydrous morphine.

The Newer Analgesics

Pethidine causes less nausea, vomiting or constipation and less respiratory depression than morphine but it causes dizziness, sweating and tachycardia in some patients. for severe pain it is necessary to administer up to 100 milligrams. There is distinct danger of addiction with continued use and it should be guarded against unless there is incurable disease.

Methadone has morphine-like properties but has no sedative effect. It is chiefly used as a potent daytime analgesic for a pateint who wishes to have his pain relieved without falling asleep. Ambulant patients suffer marked dizziness and vomiting. Addiction is a distinct danger. It is contraindicated in obstetric practice because of its depressant effect on the foetus, and is undesirable in children because it has a small margin of safety when so used.

Methadone Injection, B. P.

Methadone Hydrochloride Injection

Ampoules containing a solution of Methadone Hydrochloride, 10 mg. per ml. of Water for Injection.

DOSE : 5 to 10 milligrams by subcutaneous injection.

Methadone Tablets, B. P.

Methadone Hydrochloride Tablets

5 milligrams

DOSE : 5 to 10 milligrams.

Pethidine Injection, B. P.

Pethidine Hydrochloride Injection

Ampoules : 50 milligrams in 1 millilitre ; 100 milligrams in 2 millilitres.

Consists of a solution of pethidine hydrochloride in Water for Injection.

DOSE : 25 to 100 milligrams, by subcutaneous or intramuscular injection ; 25 to 50 milligrams, by intravenous injection.

SPECIFIC REMEDIES

Some painful conditions respond better to specific remedies than to analgesics.

Colchicine is a specific remedy for an acute attack of gout. One tablet is given every hour for four to eight hours. Diarrhoea is an indication for stopping the drug. Aspirin is then given in small doses to prolong remissions. Chronic gout usually responds to full doses of aspirin.

Migraine is relieved by the early administration of ergotamine tartrate, preferably by injection.

Sodium aurothiomalate is given in rheumatoid arthritis. It may give rise to sensitization dermatitis, albuminuria or blood dyscrasias.

Colchicine Tablets, B.P.

0·5 milligram (1/120 grain)

Dose : 0·5 to 1 milligram (1/120 to 1/60 gr.)

The total quantity required for treatment of an acute attack of gout is usually 2 to 8 milligrams.

Ergotamine Tartrate Injection, B.P.

Ampoules containing ergotamine tartrate 0·5 mg. per ml. in Sodium Chloride Injection.

Dose : 0·25 to 0·5 milligram, by subcutaneous or intramuscular injection.

Ergotamine Tartrate Tablets, B.P.

1 milligram.

Dose : 1 to 2 milligrams as a single dose.

Sodium Aurotbiomalate Injection, B. P.

Ampoules containing sodium aurothiomalate 10 mg. per ml. in Water for Injection.

Dose : 10 milligrams increasing, if necessary, gradually to 100 milligrams weekly, by intramuscular injection. The total dose in any one course should usually not exceed 1 gram.

HYPNOTICS

Although little is known about the nature of sleep, there is no doubt regarding its therapeutic value in illness, and a hypnotic for a few nights is a valuable part of treatment. The most important hypnotics are the barbiturates, chloral hydrate and paraldehyde. They have little analgesic effect and cannot be relied upon to produce sleep when there is pain. They should be combined with aspirin when pain is of moderate severity, or combined with opium (e.g. chloral and opium mixture) when pain is severe.

Barbiturates have a wide range of action, and, depending on the barbiturate employed it is possible to produce a mild sedation, sleep or short general anaesthesia. Phenobarbitone is a long acting barbiturate which is very unsuitable for use as a hypnotic. It is useful in those conditions where sedation is a desirable part of treatment as in hyperthyriodism and peptic ulcer ; its anticonvulsant action is made use of in epilepsy. The intermediate acting barbiturates (6 to 8 hours duration) like butobarbitone and amylobarbitone are useful when patients complain of waking during the early hours of the morning. The short acting ones which also have a rapid onset like pentobarbitone (about 6 hours) and quinalbarbitone (about 4 hours) are used when a patient has difficulty in falling asleep. The ultra-short acting ones like thiopentone and thialbarbitone are used as general anaesthetics or for inducing anaesthesia.

Barbiturates should be administered cautiously in patients with liver or kidney disease because most barbiturates are metabolized in the body, chiefly by the liver and part is excreted by the kidney. Barbiturate poisoning occurs in those attempting suicide, and also in people who do not know that alcohol greatly potentiates the effect

of barbiturates. A dose of barbiturate which is sufficient to produce a normal period of sleep may, when taken in conjunction with alcohol, result in prolonged coma. Another danger is from "barbiturate automatism" in which a patient having taken a tablet or two of a barbiturate swallows several tablets a few minutes later without being aware of what he is doing. Patients should therefore be warned not to keep their supply of barbiturates at the bedside. Barbiturates can give rise to addiction. A very small number of sensitive patients may develop a skin rash.

Chloral hydrate produces sleep within half an hour which lasts for about eight hours. There is little "hangover". When pain accompanies insomnia tincture of opium is combined with chloral to provide a useful hypnotic-analgesic mixture. The disagreeable taste of chloral hydrate and its nauseating tendency may be disadavantageous, but it discourages the tendency to continue using the drug. In consequence, habituation and addiction are not problems with chloral hydrate.

Chloral hydrate is a particularly useful hypnotic for children. Its use in conjunction with bromides is irrational if the mixture is to be used as a single-dose hypnotic because it takes some days before a daily administration of bromide can have a sedative effect. The therapeutic action of bromides depends upon the replacement of chloride with bromide ions and this is a slow process.

Paraldehyde imparts an unpleasant disagreeable odour to the breath and is seldom administered by mouth. It is readily absorbed when given rectally or intramuscularly. Its action is fundamentally similar to that of alcohol, but its hypnotic effect is more powerful. The sleep produced is normal and after-effects are few. It has a larger margin

of safety than any other hypnotic. It is chiefly used by intramuscular injection for the control of unmanageable delerious patients and in status epilepticus.

Chloral Mixture, B. N. F.

Chloral Hydrate ..	.. 20 gr.	1·3 G.
Syrup of Orange ..	.. 30 m.	2 ml.
Water ..	.. to 1 fl. oz. to 30	ml.

Dose : 1 fluid ounce (30 millilitres).

Chloral and Opium Mixture

Chloral Hydrate ..	.. 20 gr.	1·3 G.
Tincture of Opium..	.. 15 m.	1 ml.
Syrup of Orange ..	.. 30 m.	2 ml.
Chloroform Water..	.. to 1 fl. oz. to 30	ml.

Dose : 1 fluid ounce (30 millilitres).

Paraldehyde Draught, B. P. C.

Paraldehyde ..	.. 60 m.	4 ml.
Liquid Extract of Liquorice	.. 45 m.	3 ml.
Syrup ..	.. 120 m.	8 ml.
Water ..	.. to 2 fl. oz. to 60	ml.

Dose : 2 fluid ounces (60 millilitres).

Paraldehyde Enema, B. P. C.

Contains paraldehyde 1 fl. oz. with sodium chloride and water to 10 fl. oz.

Dose: 30 to 40 millilitres of the enema (about 1 fl. oz.) per stone of body weight, by rectal injection.

Paraldehyde Injection

Consists of sterile paraldehyde.

Dose : 5 to 10 millilitres by intramuscular injection. It should be stored in well filled bottles with glass stoppers and protected from light. *Paraldehyde deteriorates to acetic acid on keeping. Test with litmus paper and reject if reaction is acid.*

Amylobarbitone Tablets, B. P.

30 milligrams (½ grain) ; 100 milligrams (1½ grains) ;

200 milligrams (3 grains).

Dose : 100 to 200 milligrams (1½ to 3 grains).

Butobarbitone Tablets, B. P.

100 milligrams (1½ grains).

Dose : 100 to 200 milligrams (1½ to 3 grains).

Pentobarbitone Tablets, B. P.

Pentobarbitone Sodium Tablets

30 milligrams (½ grain) 100 milligrams (1½ grains)

Dose : 100 to 200 milligrams (1½ to 3 grains).

Quinalbarbitone Tablets, B. P.

Quinalbarbitone Sodium Tablets

50 milligrams (¾ grain) ; 100 milligrams (1½ grains).

Dose : 100 to 200 milligrams (1½ to 3 grams).

ANTICONVULSANTS

Anticonvulsants are used to control the manifestations of epilepsy. The aim is to design a form of treatment, which will abolish the paroxysmal cerebral discharge without

producing untoward side-effects. A practical program of treatment has to be worked out for each patient with one or a combination of anti-convulsant drugs.

Phenobarbitone is not only very effective but is of low toxicity. The symptoms of overdosage are those of excessive drowsiness. The daily dose ranges from 30 to 200 milligrams (½ to 3 grains); in cases of nocturnal epilepsy the dose at night should be larger than the one in the morning. Methylphenobarbitone has a similar action and is claimed to produce less drowsiness.

Phenytoin sodium and methoin are hydantoin derivatives which have the advantage of causing little drowsiness while raising the convulsive threshold in doses of 100 milligrams two to four times daily. They are mostly of value in grand mal and psychomotor epilepsy and are usually used in combination with phenobarbitone. The possible side-effects are nystagmus, ataxia, skin rashes and hyperplasia of the gums. Methoin occasionally gives rise to leucopenia.

Primidone is allied to phenobarbitone and it is better not to combine them since the two together tend to produce excessive drowsiness. It can be used in combination with phenytoin or troxidone in the treatment of grand mal, focal epilepsy or petit mal. Side-effects are drowsiness, ataxia and occasionally macrocytic anaemia or skin rash. The usual initial dose is 125 milligrams once daily preferably at bedtime. A morning dose of 125 milligrams is then added and the daily dose is increased by similar amounts at weekly intervals until the maximum effect is obtained with a minimum of side-effects.

Troxidone is the most effective drug for petit mal. Unfortunately its toxicity makes it a difficult drug to use. The dose is 0·3 gram three to six times daily depending on

individual clinical response. The principal side-effects are drowsiness and an inability to tolerate bright objects which may require wearing dark glasses. Dizziness and skin reactions may also occur but the serious disorders include nephrosis, hepatitis and blood dyscrasias.

Acetazolamide raises the convulsive threshold probably by causing acidosis. Grand mal, petit mal and psychomotor epilepsy that are resistant to other forms of treatment sometimes respond to acetazolamide, but its efficacy often wanes after two or three months.

It is usual to begin with phenobarbitone no matter what type of epilepsy is present. If phenobarbitone is ineffective, phenytoin sodium is added to it. Resistant grand mal is then usually treated with primidone and later with methoin. Acetazolamide may then be used and at times a combination of any of these drugs. In petit mal the substance given if phenobarbitone has failed is troxidone, either by itself or in combination with primidone or phenytoin. Some children with petit mal are made worse with phenobarbitone, but benefit when treated with amphetamines.

In status epilepticus the best drug for arresting the continuing cerebral discharge is parenteral phenobarbitone at four-hourly intervals. Paraldehyde by intramuscular injection is also effective. Once the status is under control the patient is treated with routine anticonvulsants.

Methoin Tablets, B. P.

100 milligrams

Dose : 50 to 100 milligrams

Phenobarbitone Tablets, B.P.

15 milligrams (¼ grain) ; 30 milligrams (½ grain) ; 60 milligrams (1 grain)

Dose : 30 to 130 milligrams (½ to 2 grains)

Phenobarbitone Sodium Injection, B.P.

Ampoules : 200 milligrams (3 grains) ; 60 milligrams (1 grain)

DOSE : 60 to 200 milligrams (1 to 3 grains), by intravenous or intramuscular injection, as a single dose.

Phenytoin Sodium Tablets, B.P.

Synonym : Diphenylhydantoin Sodium Tablets.

50 milligrams ; 100 milligrams

DOSE : 50 to 100 milligrams (3/4 to 1½ grains).

Primidone Tablets, B.P.

250 milligrams

DOSE : 0·5 to 1·5 G. daily, in divided doses.

Troxidone Capsules, B. P.

Synonym : Trimethadione.

0·3 gram ; 0·1 gram.

DOSE : 1 to 2 grams daily, in divided doses.

Bromethol, B.P.

Freshly prepared solution of bromethol, 2·5 per cent. in distilled water at 40°C.

DOSE : 0·04 ml. per lb. by rectal injection. A second dose may be given after three hours and subsequent doses at six-hourly intervals.

The solution should be tested by adding 0·2 ml. of congo-red indicator to 5 ml. of the solution. Use only if colour is red or orange-red ; discard if colour is blue or purple. Bromethol is inflammable.

DRUGS FOR PARKINSONISM

These drugs are centrally acting muscle relaxants which relieve hyperkinetic and spastic states by inhibiting neurones in the reticular formation in the brain stem and extrapyramidal pathways. Muscular rigidity responds more readily than tremor, but there is considerable individual variation in these responses. Stramonium in sufficiently large doses may sometimes be more effective than the modern preparations. Therefore it is better to start with either Tincture of Stramonium (15 minims thrice daily) or hyoscine hydrobromide (1/200 grain thrice daily) and increase to the limit of tolerance. This may be combined with antihistamines like diphenhydramine or phenindamine at night. If these fail benzhexol will usually be effective and it should be substituted gradually while withdrawing the existing medication. Side-effects of benzhexol are nausea, vomiting, dry mouth, blurred vision and dizziness. If they are severe the dose must be reduced.

Benzhexol Tablets, B. P.

Benzhexol Hydrochloride Tablets.

2 milligrams

Dose : 2 milligrams, increased gradually to 20 milligrams daily, in accordance with the needs of the patient.

Diphenhydramine Capsules, B.P.

Diphenhydramine Hydrochloride Capsules.

25 milligrams ; 50 milligrams.

Dose : 25 to 75 milligrams.

Hyoscine Injection, B. P.

Ampoules containing hyoscine hydrobromide 0·4 mg. per ml. (1/150 gr. per 15 m.) in Water for Injection.

DOSE : 0·3 to 0·6 milligram (1/200 to 1/100 grain) by subcutaneous injection.

Hyoscine Tablets, B. P.

Hyoscine Hydrobromide Tablets

0·3 milligram (1/200 grain).

DOSE : 0·3 to 0·6 milligram (1/200 to 1/100 grain), for an adult. In Parkinsonism, this dose may be increased gradually to the limit of tolerance.

SEDATIVES AND TRANQUILLIZERS

Tranquillizers are used to relieve the anxiety and agitation that is frequently associated with emotional disturbances and mental illness. In contrast to the barbiturates and bromides they cause little clouding of consciousness. Chlorpromazine and reserpine are used in overactive psychotic patients suffering from schizophrenia, melancholia and paranoid conditions. Meprobamate is used in less severe forms of mental illness such as anxiety states and psychoneurotic disorders. It is a mild tranquillizer and has very little toxicity.

Chlorpromazine enables the depressed patient to become alert and sociable, and the anxious or noisy to become tranquil. Apart from this action, chlorpromazine depresses the activity of the hypothalamus and has anti-adrenaline actions, so that with large doses it causes a fall of blood

pressure. It also depresses the vomiting and thermo-regulating mechanisms and enhances the effects of hypnotics, analgesics and anaesthetics. Toxic effects are jaundice agranulocytosis, hypotension and skin reactions.

Chlorpromazine Tablets, B. N. F.

Chlorpromazine Hydrochloride Tablets.

25 milligrams ; 100 milligrams.

DOSE : 75 to 150 milligrams daily, in divided doses.

Chlorpromazine Injection, B. P.

AMPOULES : Chlorpromazine Hydrochloride

50 milligrams in 2 millilitres.

DOSE : 25 to 50 milligrams by deep intramuscular injection.

Potassium Bromide Mixture

Potassium Bromide	.. 15 gr.	1 G.
Liquid Extract of Liquorice	.. 10 m.	0·6 ml.
Chloroform Water	.. to 1 fl. oz.	to 30 ml.

DOSE : 1 fluid ounce (30 millilitres).

Meprobamate Tablets

400 milligrams.

DOSE : 800 to 1600 milligrams daily.

GENERAL ANAESTHETICS

Anaesthetic Ether, B. P.

Chloroform, B. P.

Cyclopropane, B. P.

Nitrous Oxide, B. P.

Ethyl Chloride, B. P.

Trichloroethylene, B. P.

Vinyl Ether, B. P.

Thiopentone Sodium, B. P.

Injection of Thiopentone Sodium.

Dose : 0·1 to 0·5 G by intravenous injection ; should be used immediately after preparation.

LOCAL ANAESTHETICS

Procaine is poorly absorbed from mucous membranes and is therefore used only for infiltration and conduction anaesthesia. Since it produces vasodilatation adrenaline is usually added to reduce the rate of absorption so that the effect is prolonged and toxicity is diminished. Lignocaine in the same concentration as procaine is more powerful and less toxic, and is active by surface application. Adrenaline is added when a very prolonged effect is desired. Amethocaine is well absorbed from mucous membranes and can be used for surface, conduction as well as infiltration anaesthesia. Cinchocaine is used mainly for spinal anaesthesia.

The toxicity of these drugs depends largely on the rate at which they are absorbed and the resulting concentration in blood. Accidental intravenous injections will produce toxicity in a few seconds and toxic amounts absorbed from subcutaneous injections will take half an hour to produce effects. Toxic reactions take the form of a stimulation followed by a depression of the central nervous system and the cardiovascular system. Some patients exhibit hypersensitive reactions which can be dangerous. Certain precautions are recommended in the use of local anaesthetics,

viz. to use dilute solutions, to add adrenaline, to avoid accidental intravenous injection, to premedicate with barbiturates if large amounts are to be used and to rule out hypersensitivity.

Amethocaine and Adrenaline Solution

Solution of amethocaine hydrochloride 1 per cent. w/v and Solution of Adrenaline Hydrochloride 2 per cent. v/v for use as *surface anaesthetic*.

Benzocaine Compound Lozenges, B.P.C.

Each lozenge contains benzocaine 100 mg. (1½ gr.) and menthol 2·7 mg. (1/24 gr.), with borax and sucrose.

Lignocaine and Adrenaliue Injection, B.P.

Contains lignocaine hydrochloride 2 per cent. w/v and Solution of Adrenaline Hydrochloride 1·25 per cent. v/v with sodium chloride and sodium metabisulphite in Water for Injection.

Lignocaine Injection, B. P.

Ampoules: 0·5 per cent.; 1 per cent.; 2 per cent.; 4 per cent. Consists of a solution of lignocaine hydrochloride in Water for Injection.

Lignocaine Jelly

Contains 2 per cent. lignocaine hydrochloride.

Procaine and Adrenaline Injection, B.P.

Contains procaine hydrochloride 2 per cent. w/v and Solution of Adrenaline Hydrochloride 2 per cent. v/v, with sodium chloride, chlorocresol and sodium metabisulphite in Water for Injection.

Procaine Injection

Procaine hydrochloride

0·5 per cent. ; 1 per cent. ; 2 per cent.

Consists of a solution of procaine hydrochloride with sodium chloride and chlorocresol in Water for Injection.

Cinchocaine Injection, Light

Ampoules containing 20 ml. cinchocaine hydrochloride 1 in 1,500 in light spinal solution.

Cinchocaine Injection, Heavy

Ampoules containing 3 ml. cinchocaine hydrochloride 1 in 200 in heavy spinal solution in 6 per cent. glucose.

MUSCLE RELAXANTS

Tubocurarine Injection, B. P.

A sterile solution containing 1 per cent. tubocurarine chloride.

Gallamine Injection, B. P.

A sterile solution containing 4 per cent. gallamine triethiodide.

Suxamethonium Bromide Injection, B. P.

Ampoules of dry, sterile suxamethonium bromide, 60 milligrams per ampoule.

Suxamethonium Chloride Injection, B. P.

A sterile solution containing 50 mg. per ml. of suxamethonium chloride in Water for Injection.

TUBOCURARINE AND GALLAMINE ANTAGONISTS

Neostigmine Injection, *see* page 33

Edrophonium Injection

Ampoules containing Edrophonium chloride 10 mg. per ml.

Dose : 10 milligrams by intravenous injection, and repeated up to a maximum of 30 milligrams.

STIMULANTS

Amphetamine, dexamphetamine and methylamphetamine stimulate the central nervous system and diminish fatigue, hunger and sleepiness. There is a sense of well-being and increased mental alertness usually at the expense of concentration and accuracy. Dexamphetamine produces these effects more smoothly than amphetamine and also has less cardiovascular actions. It is used to diminish appetite when dietary restrictions become intolerable in the control of obesity. The smallest effective dose should be used and the last dose should be given not later than 4 p.m. The drug is also used to combat drowsiness caused by antihistamines and sedative drugs. It is useful in the treatment of narcolepsy. Habituation can occur in some individuals but the drug is relatively easily withdrawn. It is contraindicated in hypertension and coronary disease.

Dexamphetamine Tablets, B. P.

Dexamphetamine Sulphate Tablets

5 milligrams

Dose : 5 to 10 milligrams.

Methylamphetamine Injection, *see* page 39

CHEMOTHERAPEUTIC DRUGS

SULPHONAMIDES AND ANTIBIOTICS

It is regrettable that antibacterial drugs are often used to prevent infection after "clean" surgical operations, for fevers without bacterial cause and even for a common cold, either in a mistaken belief that the drugs are effective in such circumstances or to insure against improbable complications. This kind of misuse carries with it the risk of needlessly exposing the patient to drug sensitization and the risk of disseminating resistant bacteria. Both conditions detract from the future usefulness of the drug. The best insurance against misuse is for the prescriber to know the nature of the condition that is being treated and that it is likely to respond to specific therapy.

It is a great advantage if the causative organism can be determined and cultured so that the bacteriologist can assess its sensitivity to different antibiotics. These steps are essential for the successful treatment of bacterial endocarditis. The organism should at least be identified before treating genital ulcers, urethral and other purulent discharges, meningitis and suspected pulmonary tuberculosis. Bacteriological tests would be unnecessary in diseases like tetanus or erysipelas where a clinical diagnosis would suffice. In many diseases however, it is necessary to assume that the organism is the one commonly responsible for the condition and to select the appropriate remedy, using the patient's response as an indication of the sensitivity of the infecting organism. Patients should continue to receive the drug for at least forty-eight hours after clinical cure has taken place.

Sulphonamides

Although sulphonamides have been largely replaced by antibiotics, they still have definite applications in therapeutics. They are cheap, easily administered and there is a widespread experience of their side effects. Although differences in potency between one sulphonamide and another can be demonstrated in a test tube, such differences are not demonstrable clinically. The choice of a sulphonamide therefore depends on other considerations like efficiency of absorption, rate of excretion, solubility and toxicity.

The most frequent danger in short-term use is their liability to form crystals in the urine. This can be avoided by making the urine alkaline and by giving sufficient liquids, a procedure which should always be adopted with sulphadiazine. Sulphonamides are ineffective in the presence of pus and necrotic tissue.

Sulphadimidine is a potent sulphonamide which gives high blood concentrations when given six-hourly. Toxic effects are uncommon. It is relatively soluble in acid urine, and is probably the best sulphonamide for routine use.

Sulphaguanidine is relatively poorly absorbed and is used in the treatment of bacillary dysentery. Its use should be reserved for circumstances in which low cost is an important consideration.

Phthalylsulphathiazole is even more poorly absorbed and breaks down in the large intestine to produce sulphathiazole in bacteriostatic concentrations. It is used before operations on the large intestine.

Sulphamethoxypyridazine is a new sulphonamide which is so slowly excreted that it requires to be given only

once a day. If clinical trials confirm that it is as effective as the other sulphonamides without being more toxic it is likely to replace them.

Sulphonamides are the drugs of first choice in the following conditions :

1. Acute pyococcal meningitis, especially meningococcal meningitis.
2. Bacillary dysentery.
3. Chancroid.
4. Urinary tract infections due to coliform organisms.
5. Infections of the eye, especially trachoma.

Sulphonamides may be used in haemolytic streptococcal infections and in pneumonia where the infection is not severe.

Sulphonamides should not be used as local antiseptics because they often cause sensitization and are not very effective when so used. Sulphacetamide sodium can be used in superficial infections of the eye.

Dosage : Administration should begin with a loading dose of 2 to 3 G. followed by maintenance doses of 1 to 1·5 G. In urinary tract infections a loading dose of 2 G. can be followed by doses of 1 G. every eight hours.

Penicillin

Penicillin is the cheapest and most widely used antibiotic. The choice of a preparation and its dose depends on the sensitivity of the organism and the nature of the lesion. When organisms are relatively insensitive (staphylococcus, streptococcus viridans) or when they are relatively inaccessible as in bone, skin, vegetations of bacterial endocarditis and lesions walled off by fibrinous barriers, high blood

concentrations of penicillin are required for its penetration into infected tissues. This is achieved by administering large doses of crystalline penicillin. When the organisms are highly sensitive (haemolytic streptococcus, pneumococcus, gonococcus, treponema) or when they are easily accessible the longer acting preparations suffice. Since penicillin diffuses poorly into serous cavities, infections within them require local instillation of penicillin.

The following are the more important preparations of penicillin :

Crystalline penicillin (Benzylpenicillin) by intramuscular injection results in very high blood concentrations but the effect lasts only for a short time. In most infections a dose of 500,000 units twice a day will give satisfactory clinical results. This dose should be doubled in severe infections. Crystalline penicillin is used intrathecally and for injections into serous cavities.

The other injectable preparations of penicillin are relatively insoluble compounds. They must be given by intramuscular injection only and must not be allowed to enter a vein inadvertently. They are slowly absorbed from their injected depot and give rise to prolonged but low blood concentrations. The longer the duration of effect the lower is the blood concentration, and the least soluble preparations are therefore suitable only for highly susceptible infections.

Procaine penicillin gives adequate blood levels for twenty-four hours after an intramuscular injection of 300,000 units.

Fortified procaine penicillin is a combination of crystalline penicillin and procaine penicillin which gives an initial high concentration together with a prolonged effect. It is

a good preparation for routine use and a single daily injection is adequate for most infections. This dose should be doubled in severe infections.

Procaine penicillin with aluminium monostearate (" PAM ") gives adequate blood levels for forty-eight hours after 600,000 units intramuscularly. It is suitable for highly susceptible infections like syphilis.

Benethamine penicillin 300,000 units results in adequate blood levels for seventy-two hours. In combination with more soluble penicillins it is suitable for use in outpatient departments because injections need be given once in three or four days.

Benzathine penicillin is a very long-acting penicillin where a dose of 1·2 million units gives minimal blood levels for four weeks. It should only be administered for highly susceptible organisms like the haemolytic streptococcus in the prevention of rheumatic fever or acute nephritis.

Phenoxymethylpenicillin (Penicillin V) is the best preparation for oral use. It is as effective as crystalline penicillin given intramuscularly in the treatment of haemolytic streptococcal and pneumococcal infections and may be more effective in the treatment of staphylococcal infections. The dosage is 125 mg. (200,000 units) 4-hourly, the last two doses being administered together before retiring. For severe infections this dose should be doubled, and in urgent cases the first dose can be an injection to obtain an effective blood level rapidly. Higher blood levels result if it is administered after meals. The adverse effects consist of a mild diarrhoea or nausea and occasional sensitivity reactions.

Penicillin is usually a safe drug but it causes dangerous reactions into two circumstances. One of them is in intrathecal administration where a dose in excess of

20,000 units results in convulsions. The other danger is the occurrence of sensitization reactions. The initial reactions are a local or generalized urticaria, a feeling of warmth and generalized pruritus, a sense of constriction and pain in the chest, or a serum sickness like disease. They should serve as a serious warning because the administration of penicillin to an already sensitized subject usually results in anaphylactic shock and death. It is therefore wise to ask the patient whether he has reacted to penicillin before injecting the drug. Skin testing is an unreliable indicator of penicillin hypersensitivity.

Streptomycin

The main use of streptomycin is in the treatment of tuberculosis. It is however active against organisms which are not sensitive to pencillin including many gram-negative organisms. Its great defect is the ease and rapidity with which organisms develop resistance to it. As a general rule therefore streptomycin should always be used in combination with other antibacterial agents. In tuberculosis it is combined with PAS or isoniazid ; in bacterial endocardiitis and generalized peritonitis it is combined with penicillin ; in proteus, pyocyaneus or *H.influenzae* infections it is combined with a sulphonamide. In short term use the side-effects are those due to allergy. Continued use of streptomycin leads to vestibular damage resulting in giddiness and ataxia. The condition is usually reversed when the drug is witheld. Dihydrostreptomycin causes auditory damage and the resulting deafness tends to be progressive and permanent. Therefore streptomycin is preferred to dihydrostreptomycin. After oral administration it is so poorly absorbed that high concentrations occur in the intestine. It is used with sulphonamides in intestinal infections, especially resistant shigella infections.

Chloramphenicol

The major disadvantage of this broad-spectrum antibiotic is its liability to cause blood dyscrasias, especially a fatal aplastic anaemia. In view of this dangerous toxicity it should be reserved for the treatment of salmonella infections, influenzal meningitis and serious infections due to staphylococci insensitive to other antibiotics. In typhoid fever the drug should be administered for ten to fourteen days in order to prevent relapses.

The Tetracyclines

The three members of this family are tetracycline and its two derivatives chlortetracycline ("aureomycin") and oxytetracycline ("terramycin"). Their range of antibacterial activity is essentially the same, and this includes a wide range of gram-positive and gram-negative bacteria and a few of the larger viruses. Their chief place is in the treatment of infections not responding to sulphonamides or penicillin. Certain differences in bacterial sensitivity to these agents have been described. For example, oxytetracycline is the most effective against pyocyaneus, chlortetracycline against staphylococci and streptococci, and tetracycline against proteus, shigella and coliform organisms. But these differences are not very great.

The standard dose is 250 mg. six-hourly ; a dose of 2 grams daily should not be exceeded because blood levels do not rise proportionately. The tetracyclines are liable to cause nausea, vomiting, diarrhoea or sore tongue, and prolonged use may lead to monilial infections of the mouth, anus vagina or lung. A particularly dangerous complication of prolonged use is the replacement of the normal intestinal flora by staphylococci resistant to most chemotherapeutic agents. A cholera-like syndrome called

antibiotic enterocolitis then supervenes and is often fatal. Superinfection by monilia is less serious unless it involves the lungs. Tetracycline is less likely to cause alimentary side effects than its derivatives.

Erythromycin

It has a range of activity similar to that of penicillin. The Haemophilus organisms and the rickettsiae are also sensitive to it. Side effects are few but bacteria develop resistance to it rather rapidly. It is best reserved for the treatment of staphylococcal infections proved by laboratory tests to be insensitive to other antibiotics. It is also given to diphtheria carriers when penicillin has failed to eradicate the organisms. It is given orally in doses up to 2 grams a day in adults.

Neomycin, Bacitracin and Polymyxin

These antibiotics have the great advantage of not causing sensitization reactions when applied externally. They are non-irritating, powerfully bactericidal, and rarely lead to the development of resistant strains. Neomycin has the broadest spectrum of all antibiotics. Bacitracin has a spectrum of activity similar to that of penicillin. Both are poorly absorbed from the alimentary canal and are used in intestinal infections. Parenteral administration is followed by damage to the kidney. Polymyxin B is the antibiotic of choice in infections due to *Ps. pyocyaneus*, and can be given by intramuscular injection.

Spiramycin, Novobiocin and Oleandomycin

These antibiotics are effective against Gram-positive bacteria and therefore resemble penicillin in their range of activity although they are not as potent as penicillin. They

may have a place in the treatment of staphylococcal infections resistant to other antibiotics, and are being clinically assessed at the moment.

INDICATIONS FOR ANTIBIOTIC THERAPY

Penicillin is the antibiotic with the fewest side effects and should usually be the first choice. The use of sulphonamides in the treatment of mild coccal infections should not be forgotten. Treatment with antibiotics should not be continued if there is no clinical response. The topical use of antibiotics is liable to cause sensitization dermatitis. Neomycin, bacitracin or polymyxin B are excellent for topical use.

Antibiotics in combination are used, (*a*) in the treatment of mixed infections, *e.g.* penicillin and streptomycin in peritonitis or lung abscess, (*b*) in order to prevent the emergence of resistant bacteria *e.g.* streptomycin and isoniazid in tuberculosis and (*c*) to obtain synergistic effects. Penicillin, streptomycin, neomycin, bacitracin polymyxin, novobiocin and oleandomycin may be grouped together because a combination of any two from this group usually results in synergistic effects. Chloramphenicol and the tetracyclines when combined usually result in simple additive effects so that an adequate dose of one is as effective as a combination. A combination of drugs drawn from both groups may result in antagonistic effects and such combinations are inadvisable unless their effects have been studied bacteriologically.

The following suggestions may be useful when administering antibacterial drugs in some common conditions.

Staphylococcal infections--Crystalline Penicillin, at least 1 million Units twice daily. If there is no response, chlortetracycline and then erythromycin.

Pneumococcal and haemolytic streptococcal infections—Fortified Procaine Penicillin 400,000 Units daily.

Meningitis due to pyococcal organisms—Sulphadiazine plus 1 million Units Crystalline Penicillin twice daily and 10,000 Units penicillin intrathecally daily, until C.S.F. is normal.

Influenzal meningitis—Chloramphenicol.

Pertussis—A tetracycline if symptoms have been present for not more than one week.

Bacterial endocarditis—*Streptococcus viridans*, 2 to 4 million Units penicillin and 2 G. streptomycin daily, for 6 weeks.

Streptococcus faecalis—10 million Units penicillin and 2 G. streptomycin, daily.

Typhoid fever—Chloramphenicol, 1·5 G. daily for 5 days and 1 G. daily for 7 days.

Shigellae—Sulphadimidine or Sulphaguanidine. If there is no response, a tetracycline. In some infections oral streptomycin and a sulphonamide.

Coli-aerogenes group—A Sulphonamide. If there is no response, a tetracycline.

Klebsiella—A tetracycline.

Proteus—Sulphonamide plus streptomycin. If there is no response, a tetracycline.

Ps. pyocyaneus—Oxytetracycline or polymyxin or both.

Brucella—Tetracycline 2 G. daily for 2 or 4 weeks plus streptomycin for 2 weeks.

Peritonitis—Penicillin and streptomycin, or intravenous chlortetracycline.

Clostridia—Penicillin in large doses.

Corynebacterium diphtheriae—Penicillin in large doses, failing which a tetracycline or erythromycin.

Pasteurella pestis—Sulphonamide plus streptomycin.

B. anthracis—Penicillin in large doses.

Actinomyces—Sulphonamide and penicillin in large doses.

Rickettsiae—A tetracycline.

Gonorrhoea—600,000 Units of PAM.

Chancroid—A sulphonamide for seven days.

NOTE ON ANTISYPHILITIC DRUGS

Treponema pallidum is highly sensitive to penicillin and resistance to it has not yet developed. Syphilis is therefore treated with a long-acting preparation of penicillin like procaine penicillin with aluminium monostearate (PAM). Other long-acting preparations like benetbamine or benzathine penicillin are probably as effective, but since PAM is commonly used, the doses given below refer to this preparation.

In early syphilis (less than four years duration) a high initial dose of 2·4 million Units has the advantage of rendering a patient non-infectious. After an interval of four or five days, treatment is continued by giving 600,000 Units on alternate days until a total of 6 million Units has been administered. The patient should be followed up for at least two years. If retreatment becomes necessary 600,000 Units is given on alternate days for 15 injections.

In late syphilis (neurosyphilis, cardiovascular syphilis or gumma) the patient requires specialist attention. His penicillin requirement is 9 to 12 million Units of PAM and he must be followed up for at least two years.

Early congenital syphilis (children below two years) is treated with 3 million Units of PAM in ten divided doses administered on alternate days. In late congenital syphilis the response to treatment is generally unsatisfactory and it is advisable to obtain the advice of a specialist for these cases.

Syphilis in pregnancy is treated with 600,000 Units of PAM on alternate days for ten injections. Follow up tests are necessary every month until delivery.

Patients who have become hypersensitive to penicillin are treated with one of the tetracyclines. The daily dose is 60 mg. per kilogram for eight days. Arsenicals and bismuth are unnecessary in the treatment of syphilis in pregnancy, early acquired syphilis, and congenital syphilis, and, being toxic drugs should be abandoned.

(Further information from the Superintendent, Anti-V.D. Campaign).

NOTE ON ANTITUBERCULOUS DRUGS

The standard antituberculous drugs and their recommended doses are :

Streptomycin, 1 G. daily.

Isoniazid, 100 mg. twice or thrice daily.

Sodium p-aminosalicylate (PAS), 12 G. daily, in divided doses.

Since the use of a single chemotherapeutic agent in tuberculosis invariably results in the emergence of resistant tubercle bacilli, the drugs must always be used in combination. The administration of two drugs to which the organisms are sensitive excludes the possibility of resistant strains emerging. However it is advisable to initiate

treatment with all three standard drugs pending the results of sensitivity tests because a very small but important proportion of new tuberculous patients are infected by organisms which are resistant to one of the standard drugs. If the organisms are found to be sensitive to all three drugs, either streptomycin or PAS is withdrawn.

It is necessary to ensure that the recommended doses are taken by the patient otherwise there is a significant risk of resistant strains emerging. This is particularly important in the first few weeks when the bacterial population is high and the risk of resistant mutants correspondingly greater. In patients over 40 years, daily streptomycin increases the danger of eigth nerve disturbances, so that streptomycin is given thrice weekly with daily isoniazid andPAS.

Chemotherapy must be given uninterruptedly for at least a year after sputum conversion, cavity closure or operation whichever is the latest. Severe cases require treatment for at least two years.

In any combination isoniazid is the first choice because of its efficiency, freedom from toxicity and easy penetration into tissues, particularly the cerebrospinal fluid. Side effects are infrequent, the minor ones being restlessness, insomnia, tremor and difficulty in micturition; more serious is a peripheral neuropathy, often manifested by burning feelings in the limbs which occurs with doses exceeding 200 mg. a day. It can be prevented by administering 50 mg. of pyridoxine daily or, better still, the whole B-complex. Allergic reactions are exceedingly rare. In epileptic subjects isoniazid may increase the frequency of seizures.

PAS causes gastric upset and diarrhoea which are frequent but seldom intolerable. It may be helpful to start with a reduced dosage and increase it over a week to the full

dose. Sensitivity reactions with fever, rash and lymphadenopathy can be severe and if the drug is continued the patient can become gravely ill. Less commonly there is enlargement of the thyroid with myxoedematous features.

When there is resistance to two of the standard drugs, the third one may be used in combination with one of the less effective antituberculous drugs like oxytetracycline, pyrazioamide, viomycin or cycloserine. Toxic reactions to pyrazinamide (principally hepatitis) and cycloserine (psychoses and convulsions) may be dangerous. Since the effectiveness of these drugs may be temporary, any additional measures indicated for controlling the disease including surgery should be considered. Surgical intervention also becomes necessary when after a period of chemotherapy it is felt that medical treatment alone is unlikely to lead to complete healing. There is evidence that the use of corticosteroids in selected cases results in more rapid improvement and better survival. The decision to use antituberculous drugs other than the standard ones, to intervene surgically or to use corticosteroids must only be made with the advice of specialists.

Sulphadimidine Tablets, B.P.

0·5 gram

Dose : Initial dose, 2 to 3 grams. Subsequent doses, 1 to 1½ grams every six hours.

Sulphadiazine Tablets, B.P.

0·5 gram

Dose : Initial dose, 2 to 3 grams. Subsequent doses, 1 to 1½ grams every four hours.

Sulphaguanidine Tablets, B.P.

0·5 gram

Dose : Initial dose 3 grams. Subsequent doses, 2 grams every four or six hours.

Phthalylsulphathiazole Tablets, B.P.

0·5 gram

Dose : 10 to 15 grams daily in divided doses.

Penicillin Injection, B.P.

Synonyms : Benzylpenicillin ; Crystalline Penicillin.

Benzylpenicillin in sterile containers ; and ampoules containing Water for Injection.

Dose : 250,000 to 1,000,000 Units two or four times daily. When a solution has been made it should be used within 4 days after preparation, and should be kept during this period at a temperature not exceeding 4°C.

Fortified Procaine Penicillin Injection, B.P.

Procaine penicillin 300,000 Units and Benzylpenicillin 100,000 Units in sterile containers, and Water for Injection to make a suspension.

Dose : To be determined in accordance with the needs of the patient and administered by intramuscular injection only. This injection should be used within four days after preparation, and should be kept during this period at a temperature not exceeding 4°C.

Fortified Benethamine Penicillin Injection

A combination containing not less than 500,000 Units Benethamine Penicillin, 250,000 Units Procaine penicillin and 500,000 Units Benzylpenicillin in sterile containers, and Water for Injection to make a suspension.

DOSE: To be determined in accordance with the needs of the patient and administered by intramuscular injection, usually once in three days.

Phenoxymethylpenicillin Tablets B.P.

Synonym : Penicillin V Tablets.

60 milligrams ; 125 milligrams ; 250 milligrams.

DOSE : 125 to 250 milligrams every four hours.

Procaine Penicillin with Aluminium Monostearate Injection

Procaine penicillin 300,000 Units per ml. in oil with aluminium monostearate.

DOSE : To be determined in accordance with the needs of the patient and administered by intramuscular injection.

Penicillin and Streptomycin Injection

Fortified Procaine Penicillin and Streptomycin Sulphate in sterile containers, and Water for Injection to make a suspension containing benzylpenicillin 100,000 Units, procaine penicillin 300,000 Units and streptomycin base 0·5 G. per 2 ml.

DOSE : To be determined in accordance with the needs of the patient and administered by intramuscular injection.

Streptomycin Injection, B. P.

Streptomycin Sulphate in sterile containers and Water for Injection.

Dose : The equivalent of 1 gram of streptomycin base daily, by intramuscular injection.

Chloramphenicol Capsules, B.P.

250 milligrams.

Dose : Adults, 1·5 to 3 grams daily, in divided doses. Children, 50 milligrams per kilogram of body weight daily in divided doses.

Chloramphenicol Injection

Microcrystalline chloramphenicol for intramuscular injection, or chloramphenicol succinate for intramuscular or intravenous injection, in sterile containers.

Dose : 500 milligrams every six hours.

Chlortetracycline Capsules, B.P.

Chlortetracycline Hydrochloride Capsules.

50 milligrams ; 250 milligrams.

Dose : Adults, 1 to 3 grams daily, in divided doses. Children, 5 to 15 milligrams per pound of body weight daily, in divided doses.

Chlortetracycline Injection, B.P.

Chlortetracycline hydrochloride suitably buffered in sterile containers, for intravenous use only. It should be diluted to a concentration of 1 mg. per ml. with Sodium Chloride Injection or 5 per cent. Dextrose Solution and administered slowly.

Dose : 500 milligrams.

Oxytetracycline Capsules

Oxytetracycline Hydrochloride Capsules.

50 milligrams ; 250 milligrams.

Dose : Adults 1 to 3 grams daily, in divided doses ; children 5 to 15 milligrams per pound of body weight daily, in divided doses.

Oxytetracycline Injection, Intramuscular

Oxytetracycline hydrochloride 100 milligrams with buffer, in sterile containers, for intramuscular injection only.

Dose : 200 to 400 milligrams daily, in divided doses of 100 mg. at 6 or 12 hourly intervals.

When a solution is made for injection, concentration should not exceed 50 mg. per ml. The solution should be used within five days after preparation, and should be kept during this period at a temperature not exceeding 4°C.

Oxytetracycline Injection, Intravenous

Oxytetracycline hydrochloride with buffers in sterile containers for intravenous injection. It should be diluted to a concentration of 1 mg. per ml. with Sodium Chloride Injection or 5 per cent. Dextrose Solution and administered slowly.

Dose : 500 milligrams.

Tetracycline Capsules, B.P.

Tetracycline Hydrochloride Capsules

50 milligrams ; 250 milligrams.

Dose : Adults, 1 to 3 grams daily, in divided doses.

For children, 5 to 15 milligrams per pound of body weight daily, in divided doses.

Tetracycline Injection, Intramuscular

Tetracycline hydrochloride 100 milligrams in sterile containers, for intramuscular injection only.

Dose : 200 to 400 milligrams daily, in divided doses of 100 milligrams at 8 to 12 hourly intervals.

The concentration of the solution for injection should not exceed 50 mg. per ml.

Tetracycline Injection, Intravenous

Tetracycline hydrochloride with buffers in sterile containers for intravenous injection. It should be diluted to a concentration of 1 mg. per ml. with Sodium Chloride Injection or 5 per cent. Dextrose Solution and administered slowly.

Dose : 500 milligrams.

Erythromycin Tablets, B.P.

100 milligrams.

Dose : 200 to 500 milligrams every 6 hours.

Polymyxin Injection

Polymyxin B Sulphate 500,000 Units in sterile containers.

Dose : 500,000 Units every 6 or 8 hours by intramuscular injection ; 50,000 to 100,000 Units, daily, by intrathecal injection.

Polymyxin and Bacitracin Ointment

An ointment containing polymyxin 10,000 Units and Bacitracin 500 Units per gram.

Isoniazid Tablets, B.P.

50 milligrams

DOSE : 100 to 300 milligrams, daily in divided doses.

Sodium Aminosalicylate Tablets, B.P.

0·5 grams

DOSE : 10 to 15 grams daily, in divided doses.

Dapsone Tablets, B.P.

25 or 50 milligrams

DOSE : Initial dose, 25 to 50 mg. twice weekly, increasing by 50 to 100 mg. every month to a maximum of 0·2 to 0·4 G. twice weekly.

ANTIMALARIAL DRUGS

Antimalarial drugs are used for the treatment of clinical attacks, for the radical cure of infections and for prophylaxis.

Treatment of Overt Malaria

Schizonticidal drugs (suppressants) are those which eradicate erythrocytic parasites and therefore suppress the clinical attacks of malaria. Chloroquine and amodiaquine are the most powerful schizonticidal drugs available. Patients not previously exposed to infection (non-immunes) are treated for three days with one of these drugs.

Patients who live in endemic areas and have been previously exposed to infection (partial-immunes) require only a single dose of chloroquine or amodiaquine to control a clinical attack of malaria. Since these drugs occasionally cause nausea or vomiting it is better to administer them after meals.

For the emergency treatment of malignant tertian malaria quinine should be injected. Chloroquine could also be used by intramuscular or intravenous injection.

Proguanil and pyrimethamine act slowly and should not be used as schizonticides.

Radical Cure

Late tissue forms (exo-erythrocytic parasites) of *P. vivax* and *P. malariae* are unaffected by schizonticidal drugs. Since they persist in the liver they feed the erythrocytic cycle and give rise to relapses. A radical cure is obtained by destroying the exo-crytbrocytic parasites with prhnaquine. Primaquine is also effective against gametocytes of *P. falciparum* and is therefore used to destroy them and prevent the spread of infection.

In the case of *P. falciparum* the tissue forms disappear after the erythrocytic phase is established. Schizonticidal drugs alone will therefore bring about a radical cure in malignant tertian malaria, but it is useful to administer primaqnine for five days in order to eliminate gametocytes.

The course of primaquine usually follows treatment with schizonticidal drugs. It should be given after dinner in a single dose. It sometimes causes haemolysis and a brownish discolouration of urine is the first indication of such an effect. The drug should be discontinued if this happens.

Prophylaxis

Clinical attacks may be prevented by the administration of a schizonticide (chloroquine or amodiaquine) once a week, or by the administration of proguanil or pyrimethamine which are not only schizonticidal but also destroy the pre-erythrocytic forms of *P. falciparum* before the erythrocytes are invaded (causal prophylaxis). Prophylaxis should be started a day before entry into an endemic area and continued for a month after leaving the area.

Proguanil and pyrimethamine inhibit sporogony in the mosquito when the source of gametocytes are persons who have received these drugs. They are sometimes used in antimalaria campaigns for their sporonticidal effect.

Amodiaquine Hydrochloride Tablets, B.P.

200 milligrams amodiaquine base.

Dose : For schizonticidal effect in non-immunes. Adults, 3 tablets initially, followed by 2 tablets daily for two days ; 5 to 15 years, 2 tablets initially, and 1 tablet daily for two days ; under 5 years, 1 tablet initially and ½ tablet daily for two days.

For schizonticidal effect in partial-immunes. Adults, 3 tablets in one dose ; 5 to 15 years, 2 tablets in one dose ; under 5 years, 1 tablet.

For prophylaxis. Adults, 2 tablets once a week.

Chloroquine Tablets

Tablets of Chloroquine Phosphate, B. P. or Chloroquine Sulphate, B. P. Each tablet contains 150 mg. chloroquine base.

Dose : For schizonticidal effect in non-immunes. Adults, 4 tablets initially, followed by 2 tablets in six hours and then 2 tablets daily for two days.

For schizonticidal effect in partial-immunes. Adults, 4 tablets in one dose.

For prophylaxis. 2 tablets once a week for adults.

Between 5 and 15 years, half the adult dose ; under 5 years, quarter the adult dose.

Chloroquine Injection

Ampoules containing Chloroquine Sulphate Injection, B.P. or Chloroquine Phosphate Injection, B. P. equivalent to 200 milligrams chloroquine baso per 5 ml.

DOSE : 200 milligrams chloroquine base by intramuscular injection, or diluted with 500 ml. Sodium Chloride Injection by intravenous drip infusion over a period of one hour. For a child, the equivalent of 2·5 mg. chloroquine base per lb.

Primaquine Phosphate Tablets, B.P.

7·5 milligrams primaquine base

DOSE : For radical cure of *P. vivax* and *P. malariae* infections. Adults, 15 milligrams primaquine base (2 tablets) daily, for fourteen days.

For gametocidal effect in *P. falciparum*. Adults, 15 milligrams primaquine base (2 tablets) daily for five days.

Between 10 and 15 years, half adult dose ; 4 to 9 years, quarter the adult dose ; under 4 years, one-eighth adult dose.

Quinine Dihydrochloride Injection, B.P.

Ampoules containing quinine dihydrochloride, 325 milligrams per millilitre (5 grains in 15 minims) of Water for Injection.

DOSE : 325 to 650 milligrams (5 to 10 grains) by slow intravenous injection after diluting with at least ten times its volume of Sodium Chloride Injection.

Pyrimethamine Tablets, B.P.

25 milligrams

DOSE : For prophylaxis, 25 milligrams once a week.

ANTIAMOEBIC DRUGS

The best drug for the control of acute amoebiasis is emetine hydrochloride. The daily dose is 2/3 grain (40 mg.) given by deep subcutaneous injection for six days. Injections of emetine alone will not eradicate an intestinal infection. In order to eliminate amoebae from the intestinal lumen and from its surface it is necessary to supplement injections of emetine with a ten-day course of treatment with one of the following drugs :—

Emetine bismuth iodide	
Iodinated oxyquinolines :	chiniofon (iodohydroxyquinoline) diiodohydroxyquinoline iodochlorhydroxyquinoline
Organic arsenicals :	carbarsone bismuth glycolyllarsanilate
Tetracyclines :	chlortetracycline oxytetracycline

These drugs are also used in the treatment of chronic intestinal amoebiasis. The availability of so many remedies for this condition indicates that none is outstandingly effective. Emetine bismuth iodide is probably the most effective of the orally administered drugs. The three iodinated oxyquinolines are equal in their effectiveness and since they are poorly absorbed from the intestine they have only mild side-effects. Chiniofon can be given as an enema as well as by mouth. The organic arsenicals are as effective as the iodinated oxyquinolines. Three preparations of dichloroacetamide have been introduced recently and are being clinically assessed.

The tetracyclines act chiefly by altering the intestinal bacterial flora so that conditions become unfavourable for the survival of amoebae. They also have a weak

amoebicidal action. In view of the danger of resistant staphylococci developing it is better to reserve the tetracyclines for patients who do not respond to treatment with other antiamoebic drugs.

Hepatic amoebiasis is best treated with injections of emetine followed by 600 mg. of chloroquine base daily, for six days. Carbarsone should not be administered when there is hepatic amoebiasis.

Emetine Hydrochloride Injection

Ampoules containing emetine hydrochloride 40 mg. per ml. (2/3 gr. per 15 m.) in Water for Injection.

DOSE : 30 to 60 milligrams (½ to 1 grain) daily, by deep subcutaneous injection.

Emetine and Bismuth Iodide Tablets

3 grains (200 milligrams).

DOSE : 60 to 200 milligrams (1 to 3 grains) daily.

Carbarsone Tablets, B. P.

250 milligrams (4 grains).

DOSE : 130 to 250 milligrams (2 to 4 grains) twice daily for ten days.

Chiniofon, B. P.

Synonym : Iodohydroxyquinoline.

DOSE : 0·1 to 0·5 gram by mouth. 1 to 5 grams by rectal injection.

Chloroquine Tablets, *see* page. 92

Dilodohydroxyquinoline Tablets, B. P.

0·3 gram.

Dose : 1 to 2 grams daily.

Iodochlorhydroxyquinoline Tablets

0·25 grams.

Dose : 1 to 2 grams daily.

ANTHELMINTIC DRUGS

Tapeworms take about ten weeks to grow from scolex to the point where the host passes segments ; thus, the efficacy of treatment can be ascertained by examining stools for segments about twelve weeks after administering a drug. A quicker but more laborious method is to determine whether the head of the worm is to be found in the stools soon after treatment.

Mepacrine acts by causing the scolex to detach from the intestinal wall. Since 1 gram administered as a single dose causes vomiting, it should be suspended in milk and given in 100 milligram amounts every five minutes until the full dose has been given. Alternatively it can be given all at once through a duodenal tube. This is followed by a saline purgative. The diet must be restricted to liquids for two days preceding mepacrine and a saline purgative administered the evening before.

Dichlorophen kills *Taenia saginata* and the worm is thereafter digested. Since the stools contain disintegrated segments it is not possible to search for the scolex. Dietary restrictions and subsequent purgation are unnecessary. The drug has negligible toxic effects.

Roundworm infestation is treated with piperazine which is practically devoid of toxic effects. It has a narcotic effect on the worms, impairing their hold on the intestinal wall and enabling normal bowel movements to eliminate them. The drug is administered in a single dose before the evening meal. A purgative next morning is unnecessary unless the patient is habitually constipated. Treatment can be repeated on the next day if necessary. The side effects are a mild drowsiness or dizziness which may be ignored.

Threadworm infestation is also treated with piperazine. The life cycle of the worm takes about two weeks so that the drug is given for one week and repeated after an interval of a week. The whole family should be treated to prevent re-infestation.

Hookworms are eliminated with tetrachloroethylene. It is a fat soluble substance and if fats and alcohol are avoided on the day of treatment, only a negligible amount of the drug is absorbed. It has now been demonstrated that when the drug is administered without subsequent purgation there is less shock to the patient, less toxicity and a more effective removal of worms. Even patients with severe anaemia can be safely treated with a full dose (0·05 ml/lb. and not 3 ml. as recommended in the past) if purgation is not employed. After a drink of glucose or sweetened tea in the morning the drug is administered in a lump of sugar or with jaggery. This would expel most of the worms but if their removal has been incomplete, treatment can be repeated at intervals of four days. The toxic effects are mild and may consist of headache, nausea, dizziness or drowsiness. The drug should not be administered if the patient also has roundworms until they have first been eliminated with piperazine.

Filarial infestation is treated with diethylcarbamazine which probably acts by promoting phagocytosis of filariae

and microfilariae by macrophages. A massive destruction of parasites may lead to reactions of an allergic nature such as urticaria, arthralgia, backache, fever and headache which are relieved by aspirin and antihistamines. The dose is 100 milligrams daily for ten days which is repeated on two further occasions at intervals of a fortnight.

Diethylcarbamazine is also used in the treatment of tropical eosinophilia. The dose is 900 milligrams (18 tablets) daily, in three divided doses for five days.

Mepacrine Hydrochloride Tablets, B.P.

50 milligrams ; 100 milligrams.

DOSE : As an anthelmintic, 1 gram.

Dichlorophen Tablets

0·5 gram

DOSE : 3 grams in one day, given in three divided doses.

Piperazine Adipate Tablets, B.P.

300 milligrams equivalent to 250 milligrams of piperazine hydrate.

DOSE : For roundworms, 4 grams.

For threadworms, 1 gram twice daily for one week.

Piperazine Citrate Elixir, B. P.C.

Contains piperazine citrate, equivalent to 500 milligrams of piperazine hydrate in 4 millilitres (60 minims) with colouring and flavouring agents.

DOSE : For roundworms, 30 millilitres (1 fluid ounce).

For threadworms, 8 millilitres (120 minims) twice daily for one week.

Tetrachloroethylene, B.P.

DOSE : 4 to 6 millilitres (60 to 90 minims)

Diethylcarbamazine Citrate Tablets, B.P.

50 milligrams

DOSE : 100 to 1,000 milligrams daily.

DRUGS ACTING ON THE GENITO-URINARY SYSTEM

URINARY ANTISEPTICS

The sulphonamides and antibiotics which attain high concentrations in urine have completely replaced the older urinary antiseptics. Their administration should be continued for at least two days after the urine has become sterile or at least free of pus cells. Since the commonest urinary infecting organisms are the coli-aerogenes group, a sulphonamide is the drug of first choice. The irritating effect of highly acid urine is relieved by giving potassium citrate at frequent intervals until the urine is alkaline. If rapid improvement does not occur with a sulphonamide it is probable that the infecting organism is insensitive to it. It is advisable that further treatment be guided by the results of bacteriological examination.

Streptomycin is effective against almost every organism responsible for urinary tract infections, but it should never be used alone because resistant strains emerge very rapidly. It is combined with sulphonamides in proteus infections, and also in pyocyaneus infections though less effectively. In combination with penicillin it is very effective in *Streptococcus faecalis* and staphylococcal iufections. The tetracyclines are effective against coliform organisms resistant to sulphonamides, and also against proteus, *Streptococcus faecalis* and staphylococci. Chloramphenicol is very effective in almost all urinary infections, but it should not be used on account of its toxicity unless the organisms are resistant to all other drugs. Pyocyaneus infections are best treated with polymyxin or with polymyxin and oxytetracycline in combination.

Nitrofurantoin is a new chemotherapeutic agent of low toxicity which is effective against members of the coliform group, proteus, *Streptococcus faecalis* and staphylococci. It is highly concentrated in urine after oral administration and should be given with meals to reduce nausea and vomiting.

Cases of urinary tract infections which relapse should be investigated for obstructive lesions of the urinary system.

Sulphadimidine Tablets, *see* page 84.

Penicillin Injection, *see* page 85.

Procaine Penicillin Injection, *see* page 85.

Penicillin and Streptomycin Injection, *see* page 86.

Oxytetracycline Capsules, *see* page 88.

Chlortetracycline Capsules, *see* page 87.

Tetracycline Capsules, *see* page 88.

Chloramphenicol Capsules, *see* page 87.

Nitrofurantoin Tablets

50 milligrams.

Dose: 100 to 200 milligrams every six to eight hours.

Potassium Citrate Mixture

Potassium Citrate	30 gr.	2 G.
Citric Acid	10 gr.	650 mg.
Tincture of Ginger	30 m.	2 ml.
Chloroform Water	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

Potassium Citrate and Hyoscyamus Mixture

Potassium Citrate	30 gr.	2 G.
Citric Acid	10 gr.	650 mg.
Tincture of Hyoscyamus	30 m.	2 ml.
Tincture of Ginger..	30 m.	2 ml.
Chloroform Water	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

DIURETICS

Diuretics are used chiefly in cardiac, hepatic and nephrotic oedema in order to promote the excretion or prevent the accumulation of oedema fluid. Since oedema fluid is composed largely of water, sodium and chloride, the really effective diuretics act by depressing the reabsorption of these constituents in renal tubules so that salt and water are lost from the body. Mersalyl is the most powerful of the mercurial diuretics. It impedes the tubular reabsorption of chloride ions, which are excreted in increased amounts, taking with them sodium ions and water. Its effect is enhanced by the administration of 7½ grains of ammonium chloride two hours before the mersalyl injection. Mersalyl should not be given intravenously because sudden death from cardiac toxicity is not uncommon. It should not be used in acute nephritis. Unresponsiveness to mersalyl is sometimes due to poor glomerular filtration as in congestive cardiac failure. Aminophylline increases

renal blood flow and thereby potentiates the effects of mersalyl if given in a dose of 0·5 G. intravenously two hours after the injection of mersalyl. Oral mercurials like chlormerodrin are less potent and apt to induce colic and diarrhoea, but they can be used to prevent recurrence of oedema in those patients who do not suffer gastrointestinal upset.

Chlorothiazide is the most potent of oral diuretics, being as effective as injected mersalyl. Moreover, it is often effective in patients not responding to mersalyl and is outstandingly free from toxicity. The usual dose is 0·5 G. twice daily; in severe cases this dose is doubled. For maintenance, 0·5 to 1 G. is given daily for three days in the week. Like mersalyl it increases urinary loss of chloride. It also enhances potassium excretion which is probably due to its mild carbonic-anhydrase inhibitory action. Potassium depletion is prevented by giving 15 grains of potassium chloride thrice daily during chlorothiazide administration.

If an oedematous patient on rigid salt restriction is treated too vigorously with diuretics he can become dehydrated and depicted of salt resulting in anorexia, weakness, apathy and mental confusion. This is easily corrected by giving sodium and potassium chloride by mouth.

Acetazolamide depresses tubular reabsorption of bicarbonate by inhibiting carbonic-anhydrase activity. Its diuretic effect is feeble and unpredictable.

Ammonium Chloride Mixture, B.P.C.

Ammonium Chloride	.. 15 gr.	1 G.
Aromatic Solution of Ammonia	.. 10 m.	0·6 ml.
Liquid Extract of Liquorice	.. 15 m.	1 ml.
Water ..	.. to 1 fl. oz.	to 30 ml.

DOSE: 1 fluid ounce (30 millilitres).

Ammonium Chloride Tablets, B.P.C.

7½ grains (500 milligrams)

Enteric-coated tablets will be dispensed.

Dose : For acidifying urine, up to eight 7½ grain tablets.

Aminophylline Injection, *see* page 38.

Mersalyl Injection, B.P.

Contains the sodium salt of mersalyl acid 10 per cent. w/v and theophylline 5 per cent. w/v in Water for Injection.

Dose : 0·5 to 2 millilitres, by intramuscular injection.

Acetazolamide Tablets, B.P.

250 milligrams

Dose : 250 to 500 milligrams.

Chlorothiazide Tablets

0·5 gram

Dose : 0·5 to 1 gram.

OXYTOCIC DRUGS

Oxytocic drugs stimulate uterine contractions and the commonly used ones are obtained from the posterior pituitary gland and from ergot. In general the oestrogens increase and progesterone decreases the sensitivity of the uterus to oxytocic drugs.

Posterior pituitary extract contains two active principles : an oxytocic factor and a vasopressor-antidiuretic factor which are available separately for therapeutic use. Early in pregnancy pituitary extract has very little effect on the intact uterus and causes contraction only if the uterus is aborting or if it is being emptied surgically. In early

pregnancy the effect of vasopressin is probably greater and more constant than that of oxytocin. In the later months oxytocin is more effective than vasopressin. During labour and in the early puerperium the uterine response to oxytocin is greater still. The administration of oxytocin by drip infusion requires expert supervision. These substances have two principal dangers : uterine rupture during advanced pregnancy or labour which can usually be avoided by restricting any single dose to 2 units ; pituitary shock which is thought to be due to coronary spasm which is most likely to occur if a second dose is given within half an hour of the first and less liable to occur with oxytocin than with pituitary extract.

The most active oxytocic alkaloid from ergot is ergometrine which is more powerful and has longer lasting effects than oxytocin. It causes contraction of the body as well as the cervix of the uterus and is therefore unsuitable for inducing labour. It is preferred to oxytocin for controlling post-partum haemorrhage. The action of ergometrine begins 4 to 8 minutes after oral administration, 3 to 4 minutes after intramuscular injection and in less than a minute after intravenous injection. Its action lasts for over an hour. Ergot and its alkaloids do not hasten puerperal uterine involution although it is mistakenly given for this purpose.

In excessive doses all oxytocic drugs cause incomplete uterine relaxation, delayed labour, foetal asphyxia premature separation of the placenta and sometimes rupture of the uterus.

Ergometrine Tablets, B.P.

0·5 milligrams

Tablets containing ergometrine maleate.

Dose : 0·5 to 1 milligram.

Ergometrine Injection, B.P.

Ampoules containing ergometrine maleate 0·5 mg. per ml. in Water for Injection.

Dose : 0·25 to 1 milligram, by intramuscular injection ;
0·125 to 0·5 milligram, by intravenous injection.

Oxytocin Injection, B.P.

Consists of an aqueous solution containing the oxytocic principle prepared from the posterior lobe of the mammalian pituitary body, or by synthesis.

Dose : 2 to 5 units, by subcutaneous or intramuscular injection.

It should be kept at as low a temperature as possible above its freezing point.

Pituitary Injection, B.P.C.

Synonyms : Posterior Pituitary Extract.

Consists of a sterile aqueous extract of the posterior lobe of the mammalian pituitary body. It contains 10 units (oxytocic) per ml.

Dose : 0·2 to 0·5 millilitre (3 to 8 minims), equivalent to 2 to 5 units, by subcutaneous or intramuscular injection.

It should be kept at as low a temperature as possible above its freezing-point.

DRUGS ACTING LOCALLY ON THE VAGINA

Chloroxylenol Irrigation, B.P.C.

Consists of one tablespoonful of Solution of Chloroxylenol mixed with one pint of warm water.

Lactic Acid Irrigation, B.P.C.

Consists of one teaspoonful of lactic acid mixed with one pint of warm water.

Lactic Acid Pessaries, B.P.C.

Pessaries each containing lactic acid 5 per cent. w/w in Suppositories of Glycerin mass and prepared in a 120 gr. (8 G.) mould.

Crystal Violet Jelly

Synonym : Gentian Violet Jelly.

Consists of Crystal Violet 2 per cent. in tragacanth jelly with preservatives.

Crystal Violet Paint

Synonym : Gentian Violet Paint.

Consists of a 2 per cent. solution of Crystal Violet.

Stilboestrol Pessaries, B.P.C.

Pessaries each containing stilboestrol 0·5 mg. and propylene glycol 0·07 mL in Suppositories of Glycerin mass and prepared in a 4 G. mould.

Chiniofon, B.P., *see* page 95.

Phenylmercuric Dinaphthylmethane Disulphonate Pessaries 0·04 per cent.

HORMONAL SUBSTANCES

FEMALE SEX HORMONES

Oestrogens are responsible for the development of female secondary sex characters and cause essentially proliferative changes. They cause proliferation of the endometrium, cornification of the vaginal mucosa, proliferation of mammary ductal elements and powerfully suppress the secretion of pituitary gonadotrophic hormones.

The natural oestrogens are esters of oestradiol which are administered by intramuscular injection. Oestradiol monobenzoate is effective for three days after injection, whereas the cyclopentylpropionate and valerianate esters are effective for up to three weeks. The indications for employing them are limited because the orally administered synthetic oestrogens are effective in all circumstances. The relative potency of oestrogens has been established in the human being. The comparative figures of dosage by oral administration are as follows :—

Stilboestrol 1 mg. ; dienoestrol 5 mg. ; ethinyloestradiol 0·05 mg. ; conjugated equine oestrogen 2·5 mg.

Oestradiol monobenzoate, 5 mg. twice weekly is equivalent to 1 or 2 mg. of stilboestrol given daily. Oestrogens are available as pessaries for local action on the vaginal mucosa.

Although a large number of conditions are treated with oestrogens they are most successfully used in the menopausal syndrome, senile vaginitis, inhibition of lactation, metropathic bleeding and in gonadal agenesis.

Menopausal symptoms are controlled with small doses (0·1 to 1 mg.) of stilboestrol or its equivalent daily. The dose is the lowest that will control the flushes and this

is in the region of 0·25 mg. daily. Treatment should be discontinued every six weeks for ten days ; slight withdrawal bleeding may occur. Combinations of oestrogen and androgen have no significant advantage over stilboestrol alone. Kraurosis vulvae and senile vaginitis respond to oestrogen, preferably by topical application.

In certain gynaecological disorders like gonadal agenesis or amenorrhoea, and also in acne, a moderate dose (1 to 3 mg.) of stilbocstrol is given daily. In amenorrhoea, stilboestrol for 10 to 14 days, or oestrogen and progesterone for 3 to 5 days induces withdrawal bleeding but this seldom leads to establishment of regular ovulatory cycles. Ovulation is inhibited by giving 2 mg. stilboestrol daily for 14 days commencing within the first five days of the cycle. This may relieve spasmodic dysmenorrhoea by halting luteinization and progesterone secretion.

High doses (5 to 15 mg.) of stilboestrol are used to stop uterine bleeding, to inhibit lactation and in carcinoma of the breast and prostate. High doses suppress pituitary activity so effectively that the consequent ovarian deficiency renders the endometrium atrophic and bleeding does not occur ("superthreshold amenorrhoea"). Bleeding in metropathia haemorrhagica can be arrested by giving 5 mg. stilboestrol every 2 waking hours until bleeding is appreciably reduced. This must be tapered off by giving smaller doses over a period of two weeks to prevent brisk withdrawal bleeding. Ethisterone should be administered before the next three periods ; withdrawal bleeding will occur on each occasion and regular ovulatory cycles may become established thereafter.

High doses of oestrogen suppress prolactin secretion thereby inhibiting lactogenesis. Stilboestrol, 15 mg. on the first day is reduced to 10 mg. on the third day and to 5 mg.

on the fifth day, and treatment is suspended on the seventh day. It is more difficult to relieve breast engorgement once lactation has become established.

Toxic effects consist chiefly of nausea and vomiting which occur most frequently with stilboestrol and less commonly with ethinyloestradiol. They are rare with dienoestrol and absent with natural oestrogens like conjugated equine oestrogen. Toxic effects are never experienced during pregnancy and the puerperium, and men complain of them less often than women. Prolonged administration in moderate doses can cause uterine haemorrhage while it is being given ("break-through bleeding") or a few days after it is stopped ("withdrawal bleeding"). High doses cause tenderness of the breasts and salt and water retention.

Progesterone is given by intramuscular injection. Ethisterone which has one-fifth the activity of progesterone is given by mouth. The effectiveness of these substances in the treatment of threatened or recurrent abortion has not been substantiated. They are used in the treatment of premenstrual tension, and in conjunction with oestrogens in regulating the menstrual cycle and in metropathic bleeding.

Stilboestrol Tablets, B.P.

0·5 milligram ; 1 milligram ; 5 milligram

Dose : 0·1 to 5 milligrams daily.

Ethinyloestradiol Tablets, B.P.

0·02 milligrams ; 0·05 milligrams

Dose : 0·01 to 0·1 milligram daily.

Oestradiol Monobenzoate Injection

5 mg. per ml.

Dose : 1 to 5 milligrams.

Stilboestrol Pessaries, *see* page 106

Progesterone Injection, B. P.

Ampoules containing progesterone 10 mg. per ml. in ethyl oleate or other suitable ester.

DOSE : 5 to 20 milligrams daily, by intramuscular injection.

Ethisterone, Tablets B.P.

25 milligrams

DOSE : 25 to 100 milligrams daily.

MALE SEX HORMONES

The commonly used androgens are testosterone propionate and methyltestosterone. For most purposes an adequate dosage is 25 mg. of testosterone propionate intramuscularly three times a week, or 25 mg. of methyltestosterone by mouth daily or on alternate days. Androgens with a prolonged action are testosterone isobutyrate, testosterone phenyl propionate and testosterone oenanthate. An adequate dose is 250 mg. every month or six weeks.

Androgens are most effective when used in androgen deficiency in the male, less so when they are used to antagonize female sex hormones and least when used for their protein anabolic action. Replacement therapy in primary male hypogonadism (eunuchoidism and castration) yields excellent results. Secondary hypogonadism associated with pituitary failure (dwarfism and Simmond's disease) may respond to treatment with gonadotrophins but better effects are obtained with androgens. Androgens depress spermatogenesis in normal men but this is reversible. They have been used without success in senility, arteriosclerosis and psychoses of men in late life. Androgens increase libido more powerfully than female sex hormones and have been used in the treatment of female frigidity.

Menorrhagia associated with a proliferative type of endometrium or metropathia haemorrhagica is effectively controlled by administering androgen in combination with large doses of progesterone or ethisterone for three or four days. Aberrant endometrial tissue shrinks under the influence of androgens when administered for the two weeks preceding menstruation. Large doses (100 mg. testosterone propionate thrice weekly, or up to 100 mg. methyltestosterone daily) cause rapid relief of pain, increase in appetite and gain in weight in inoperable carcinoma of the breast. However, objective improvement is slight and average survival is only lengthened by about three months.

Closely related steroids have been prepared recently which have weak androgenic effects but in which the protein anabolic activity remains. Examples are methylandrostenediol, methylandrostanolone and the nortestosterone compounds (nandrolone and norethandrolone). They have a slow effect in senile osteoporosis and doubtful effects in trauma, nephrosis and in premature infants. Their anabolic (or anti-catabolic) effect may be of value in acute renal failure.

Complications of androgen therapy are masculinization in the female, salt and water retention, premature closure of epiphyses and a reversible suppression of spermatogenesis. Methyltestosterone may occasionally cause jaundice. Carcinoma of the prostate and of the male breast are absolute contraindications for their use because the conditions are aggravated.

Methyltestosterone Tablets, B.P.

5 milligrams ; 25 milligrams

Dose : 25 to 50 milligrams for men. 5 to 20 milligrams for women.

Testosterone Propioaate Injection, B.P.

Ampoules containing 10 mg. per ml. in ethyl oleate or other suitable ester.

Dose : 5 to 25 milligrams daily, by intramuscular injection.

DRUGS IN DIABETES MELLITUS

Insulin lowers blood sugar by increasing its storage as liver and muscle glycogen and by increasing its utilization in tissues. These effects are associated with a more complete oxidation of fats and amino-acids and a diminished utilization of fats and proteins.

Soluble insulin and the insulin zinc suspensions would meet almost all clinical requirements. Soluble insulin is indicated in severe diabetes and in diabetic emergencies with ketosis. When given subcutaneously its maximum effect occurs in three hours and lasts for about eight hours. After intravenous injection a maximum effect occurs in half to one hour. Lente insulin being a mixture of amorphous and crystalline insulins has two peaks of activity, the amorphous component having its maximum effect in about four hours and the crystalline component in about nine hours. It is a suitable preparation for maintaining periods of normoglycaemia for twenty-four hours without precipitating hypoglycaemia. Soluble insulin cannot be combined with the insulin zinc suspensions.

It is not essential to use insulin in all cases of diabetes. In mild cases, particularly in the middle aged obese type, the condition is often controlled by dietetic restriction alone. If glycosuria cannot be controlled in this way, or if the fasting blood sugar is over 300 mg. per cent. and particularly if intractable pruritus is present in a female, it becomes necessary to use insulin. When operative

procedures are intended or in the presence of infection the diabetic state must be efficiently controlled to facilitate healing.

Insulin may occasionally cause local or generalized allergic reactions. A local reaction often subsides after about five days, or it may be averted by using another type of insulin. If reactions persist it would be necessary to use highly purified insulins or to denature the insulin before the injection or even to desensitize the patient. Subcutaneous fat atrophy occurs at the site of injection in some patients, and a lipomatous swelling occurs in others and these are usually due to injections being given repeatedly at the same spot. Insulin hypoglycaemia gives rise to weakness, sweating, tremor, apprehension and mental confusion. They disappear within five or ten minutes of taking some sugar. More severe cases would require glucose intravenously.

Tolbutamide is an oral hypoglycaemic agent which often controls hyperglycaemia in the middle-aged or elderly obese diabetics by means of an action which is different to that of insulin. It is likely to be successful in those patients who have developed diabetes after the age of 40, who do not develop ketosis easily, whose fasting blood sugar is below 300 mg. per cent. and whose daily insulin requirements do not exceed 40 units. Obesity should be corrected first and tolbutamide administered only if the patient still remains hyperglycaemic. It should never be used in severe cases and in diabetic emergencies.

A maximum effect is obtained within four to six hours of administering tolbutamide orally and the effect is over in about ten hours. The initial dose is 0·5 G. twice daily, to be taken before breakfast and tea. This may be increased to 1 G. twice or three times a day as necessary.

Any further increase in dosage does not usually give significantly better results. Toxic effects are mild and consist of nausea, vomiting, anorexia or headache. With continued treatment there is usually a gain in weight and if this is excessive the drug may have to be stopped. Patients occasionally develop resistance to the drug during treatment.

Insulin Injection, B. P.

Synonym : Soluble Insulin.

Consists of a solution of insulin containing 40 or 80 Units per ml.

Insulin Zinc Suspension, Amorphous, **B. P.**

Synonym : Insulin Semilente.

Consists of a suspension of amorphous insulin with zinc chloride, containing 40 or 80 Units per ml.

Insulin Zinc Suspension, Crystalline, B. P.

Synonym : Insulin Ultralente.

Consists of a suspension of crystalline insulin with zinc chloride containing, 40 or 80 Units per ml.

Insulin Zinc Suspension, B. P.

Synonym : Insulin Lente.

Consists of a mixture of three volumes of Insulin Semilente and seven volumes of Insulin Ultralente and contains 40 or 80 Units per ml.

Tolbutamide Tablets

0·5 gram.

DOSE : 0·5 to 3 grams daily, in divided doses.

THYROID AND ANITTHYROID DRUGS

The thyroid gland secretes thyroxine and l-triiodothyronine (liothyronine), the latter being the rapidly active component of the thyroid hormone. Preparations of thyroid hormone available for clinical use are thyroid extract, thyroxine and liothyronine. All of them have the same actions but differ in potency and speed of action. Liothyronine in a dose of 20 micrograms is as potent as 0·1 mg. of thyroxine or 1 grain of thyroid extract. It takes two to four weeks for thyroid extract or thyroxine to exert their full effects, whereas the effect of liothyronine is discernible in a few hours and obvious in two days, but is of short duration.

The clearest indication for administering thyroid is hypothyroidism. It may sometimes be successful in hyperexophthalmos or exophthalmic ophthalmoplegia by suppressing the output of thyrotrophin, but its use in infertility, primary amenorrhoea or simple obesity without evidence of hypothyroidism is unjustified.

Thyroid extract is more uniformly absorbed and cheaper than thyroxine and is therefore preferred for routine use. In cretinism the largest dose short of thyrotoxic symptoms (irritability, diarrhoea, tachycardia) is administered. During the first fortnight 1/8 grain of thyroid extract is given daily, and increments by this amount are made at fortnightly intervals until the optimum dose is reached. In juvenile myxoedema the initial daily dose is ¼ grain of thyroid extract. The amount required at puberty may be as much as 10 grains. In adult myxoedema the restoration of the patient to normal should be a gradual process and the dose is the smallest which will keep the patient free of hypothyroid symptoms. The more severe the myxoedema the smaller is the required dosage and it is always better to err on the side of underdosage. It is usual to begin

with ½ grain of thyroid extract daily and increase it at fortnightly intervals until full replacement therapy is achieved. This will be around 3 grains of thyroid extract daily.

Liothyronine is used when extremely rapid effects are required as in myxoedematous madness which may present as an acute psychotic episode, in myxodema coma and perhaps in the initial treatment of cretinism. The appearance of angina during treatment of such patients is an indication to lower the dose immediately. Liothyronine should not be used for maintenance treatment.

Antithyroid drugs can act by preventing the uptake of iodide by the gland (potassium perchlorate) or by preventing the iodination of tyrosine (carbimazole). When these essential steps in the manufacture of thyroid hormone are blocked there is a fall in the output of thyroid hormone. This in turn leads to an increase in the output of thyrotrophin which causes hyperplasia and increased vascularity of the thyroid gland. Glandular hyperplasia can be temporarily reversed by administering iodine (Lugol's Solution), which acts probably by depressing thyrotrophin output. Radioactive iodine has an antithyroid effect because it is selectively concentrated in the gland and its radiations destroy thyroid tissue.

The initial dose of carbimazole is high and this is reduced at fortnightly intervals until a suitable maintenance dose is determined. Enlargement of lymph nodes and salivary glands may occur but this disappears with continued treatment. The dangerous toxic effects are agranulocytosis, drug fever and rashes.

Thyroid Tablets, B. P.

Synonym : Thyroid Extract.

½ grain (30 milligrams) ; 1 grain (60 milligrams).

Dose : ½ to 4 grains (30 to 250 milligrams), daily.

Liothyronine Tablets

20 micrograms.

Dose : 20 to 100 micrograms daily, in divided doses.

Carbimazole Tablets, B. P.

5 milligrams.

Dose : Initial dose, 20 to 40 milligrams daily, in divided doses.

Maintenance dose, 5 to 15 milligrams daily.

Iodine Solution Aqueous, B. P.

Synonym : Lugol's Solution.

Contains iodine 5 per cent. w/v and potassium iodide 10 percent. w/v in water.

Dose : 5 to 15 minims (0·3 to 1 millilitre) in water or milk.

ADRENOCORTICAL HORMONES AND ALLIED SUBSTANCES

The hormones secreted by the human adrenal cortex are hydrocortisone and aldosterone and small quantities of sex hormones. The administration of corticotrophin is followed by an increased output of hydrocortisone but not of aldosterone. Unfortunately the secretory response to administered corticotrophin is variable and diminishes with continued use ; moreover, corticotrophin is rapidly inactivated in the body so that frequent injections are necessary. Therefore corticotrophin has been largely replaced in therapeutics by the adrenal steroids cortisone, hydrocortisone and their analogues prednisone, prednisolone, triamcinolone, dexamethasone and fludrocortisone which produce all the effects desired in therapeutics when given by mouth. Corticotrophin is

clearly useful in the diagnosis of adrenocortical insufficiency because it causes a measurable increase in urinary corticosteroids if there is functioning adrenocortical tissue.

Hydrocortisone is about 20 per cent. more potent than cortisone, but in all other respects their systemic actions are similar. By their glucocorticoid action they raise blood sugar, so that more insulin is required in a diabetic. With large doses there is increased protein breakdown and an inhibition of fibroblastosis leading to delayed healing of wounds, perforation or bleeding of peptic ulcers, a suppression of inflammatory reactions, retarded growth in the young and osteoporosis in the old. The anti-inflammatory effect is made use of in therapeutics for a variety of conditions. The general manifestations of infection like fever, malaise and toxaemia are also suppressed while the infection keeps spreading. They have a powerful anti-allergic effect.

By their mineralocorticoid effect they cause retention of sodium and water and loss of potassium. These effects are undesirable in hypertension and cardiac failure.

Administered cortisone and hydrocortisone suppress the output of corticotrophin from the anterior pituitary which in turn leads to atrophy of the adrenal cortex. If administration is stopped abruptly the amount of endogenously produced hormone is inadequate and there is a return of symptoms. If glandular atrophy is severe the patient is liable to succumb to acute adrenal failure. Prolonged treatment with large doses would also result in a Cushingoid deposition of fat, acne, amenorrhoea, hirsutism, spontaneous bruising or psychological disturbances. These side effects are likely to occur in prolonged use with daily doses exceeding 75 mg. of cortisone or 15 mg. of prednisone.

Cortisone acetate is more rapidly absorbed after oral administration than after intramuscular injection, although the effects of an injection last much longer. Hydrocortisone acetate is so slowly absorbed after oral and intramuscular administration that it is not administered as such. It is preferred for local use on the skin, eye and in joints because cortisone is relatively ineffective when so used. Hydrocortisone (free alcohol) given orally is more rapidly absorbed and also more rapidly eliminated than cortisone acetate. Hydrocortisone hemisuccinate is suitable for intravenous administration when rapid effects are desired as in adrenal crisis or to meet acute stress in adrenocortical insufficiency. It is rapidly eliminated from the body so that it must be supplemented by oral or intramuscular cortisone acetate.

Prednisone has the same effects as prednisolone so that they are freely interchangeable for systemic use. For local use on skin, eye and in joints, prednisolone like hydrocortisone is effective whereas prednisone like cortisone is not. Since they are about five times as potent as cortisone they are given in one-fifth the dose for anti-inflammatory effect. At this equivalent dosage they cause less sodium retention and potassium loss than cortisone and hydrocortisone, and are therefore preferred when there is hypertension or cardiac failure, or when very high dosage is necessary as in status asthmaticus or in the suppression of certain neoplastic conditions. They are unsuitable for replacement therapy.

Triamcinolone has a slightly greater anti-inflammatory effect than prednisone so that 4 mg. of the former has about the same potency as 5 mg. of the latter. It has very little mineralocorticoid activity. It is particularly useful in psoriasis which responds poorly to all other steroids. It causes side effects like headache, dizziness, nausea and loss of weight.

Dexamethasone is about ten times as potent as prednisone in its anti-inflammatory effect but has less glucocorticoid effects. Its mineralocorticoid effect is negligible.

Although aldosterone is the natural mineralocorticoid hormone it is not yet in therapeutic use. Instead, there is deoxycortone acetate (DOCA) by injection or implantation, deoxycortone trimethylacetate (DCTMA) by injection and fludrocortisone by mouth. Since they have powerful sodium retaining effects overdosage leads to hypertension. Fludrocortisone is effective by external application, and, like hydrocortisone has an antipruritic effect.

The clearest indication for using cortisone acetate is adrenocortical insufficiency as in Addison's disease, after bilateral adrenalectomy or secondary to hypopituitarism. The physiological requirement of cortisone is about 25 mg. a day, which must be increased to over 100 mg. when conditions of stress supervene like infections or surgical operations. In addition to cortisone these patients require DOCA or DCTMA for full correction of electrolyte imbalance.

In the adreno-genital syndrome due to hyperplasia only small doses of cortisone are required. It is used to suppress corticotrophin output and thereby reduce the excessive production of adrenal androgens which characterizes this condition.

A variety of conditions without adrenocortical insufficiency are treated with much larger doses of corticosteroids. In most instances prednisone or prednisolone is preferred to cortisone or hydrocortisone. The principal diseases which may be benefited are :

Allergic conditions—status asthmaticus and acute drug sensitivities after the usual measures have failed.

Arthritic conditions—ankylosing spondylitis, rheumatic fever, rheumatoid arthritis, osteoarthritis and Still's disease. Hydrocortisone acetate may be given intra-articularly in osteoarthritis and rheumatoid arthritis, and injected locally in soft tissue lesions like tennis elbow, non-infective bursitis and tenosynovitis.

Blood diseases—acquired haemolytic anaemia, acute lymphatic leukaemia, agranulocytosis and idiopathic thrombocytopenic purpura.

Collagen diseases—disseminated lupus erythematosus, polyarteritis nodosa and acute dermatomyositis.

Skin diseases—allergic dermatitis, atopic dermatitis, contact dermatitis and eczema which have an allergic or hypersensitivity background. They respond to orally administered steroids or local application of hydrocortisone. In pemphigus and exfoliative dermatitis cortisone may be life-saving.

Metabolic diseases—acute gout and idiopathic hypoglycaemia.

Nervous diseases—acute polyneuritis, retrobulbar neuritis, toxic encephalitis.

Renal conditions—the nephrotic syndrome.

Eye diseases—*see* page 151

When used in these conditions it must be appreciated that the drugs do not cure disease but submerge its manifestations, so that unless the disease has run its course there will be a relapse when the drug is stopped. When a prolonged administration is contemplated the possible beneficial effects must be carefully weighed against their dangerous side effects. The corticosteroids are particularly useful in high doses for a short period to resolve a medical emergency such as status asthmaticus ; their routine use in chronic asthma is unjustified.

It is usual to give high initial doses of 100 to 400 mg. cortisone daily to obtain a full response, and then gradually reduce to a dose not exceeding 75 mg. daily in order to avoid side effects even if there is only partial control of the disease. Withdrawal of systemic cortisone therapy should be gradual, over a period of two weeks. With prolonged therapy the patient should receive a high protein, low-sodium diet and 3 G. of potassium chloride daily. Side effects do not occur with external applications.

Cortisone Injection, B. P.

Vials of a suspension containing cortisone acetate 25 mg. per ml. in Sodium Chloride Injection.

Dose : 50 to 200 milligrams daily, in single or divided doses, by intramuscular injection.

Cortisone Tablets, B. P.

Cortisone Acetate Tablets

25 milligrams.

Dose : 50 to 200 milligrams daily ; for replacement therapy, 12·5 to 50 milligrams daily.

Hydrocortisone Injection

Ampoules of hydrocortisone hemisuccinate sodium equivalent to 100 mg. of hydrocortisone. For intravenous injection only.

Hydrocortisone Acetate Injection, B. P.

Vials of a suspension containing hydrocortisone acetate 25 mg. per ml. in Sodium Chloride Injection.

Dose : 5 to 50 milligrams by intra-articular injection.

Hydrocortisone Ointment, B. P.

5 grams.

Contains hydrocortisone 1 per cent. in wool fat 10 per cent. in white soft paraffin.

Prednisone Tablets, B. P.

1 milligram ; 5 milligrams.

DOSE : 10 to 50 milligrams daily, in divided doses.

Prednisolone Tablets, B. P.

1 milligram ; 5 milligrams.

DOSE : 10 to 50 milligrams daily, in divided doses.

Deoxycortone Injection, B. P.

Ampoules containing deoxycortone acetate 5 mg. per ml. in ethyl oleate or other suitable ester.

DOSE : 2 to 5 milligrams daily by intramuscular injection.

Deoxycortone Trimethylacetate Injection

DOSE : 25 to 75 mg. by intramuscular injection every four weeks.

Fludrocortisone Tablets

DOSE : For replacement therapy 0·1 to 0·2 mg. daily, with cortisone.

ANTIHISTAMINE DRUGS

Antihistamine drugs are used to antagonize the effects of histamine which is responsible for the principal manifestations of allergy. The action of histamine on the permeability of capillaries in skin and mucous membranes is more effectively antagonized than its action on smooth muscle. Thus skin reactions and allergic rhinitis respond better to antihistsminesthan bronchial asthma. Since antihistamines do not remove the cause of the allergic reaction they will afford symptomatic relief until the underlying cause has been removed.

The antihistamines are well absorbed from the alimentary tract so that parenteral administration is seldom necessary. Intramuscular injection is much safer than intravenous, because a sudden high blood concentration of the drug may weaken cardiac contractions. With most antihistamines the effects of an oral dose last for about six hours so that they are given three or four times a day. Chlorcyclizine acts for about twelve hours and promethazine for nearly twenty-four hours.

The side-effects of antihistamines are dryness of the mouth, blurring of vision, drowsiness and dizziness. The degree of sedation varies with the different compounds. Phenindamine, chlorcyclizine, antazoline and thenalidine are amongst the least sedative ones ; mepyramine, dimenhydrinate and bromazine are moderately sedative ; diphenhydramine and promethazine are highly sedative. Patients under antihistamine treatment should therefore be prevented from driving cars, tending complex machinery or undertaking work which requires them to be continuously alert. Amphetamine sulphate (5 milligrams) in the morning and at midday will counteract drowsiness.

Antihistamines are effective in the treatment of allergic rhinitis, angioneurotic oedema, urticaria and certain itching dermatoses. They are useful in anaphylactic reactions. In serum sickness disease the rash and irritation of the skin is relieved but not the arthralgia and pyrexia. They have poor effects in bronchial asthma. When applied locally in the form of ointments and creams they have an antipruritic and local anaesthetic effect, but it is unwise to use them for this purpose because they produce sensitization phenomena.

Nausea and vomiting due to motion-sickness or associated with pregnancy are effectively controlled by administering antihistamines like cyclizine, or antihistamines with chlorotheophylline like dimenhydrinate.

Two other drugs used for controlling allergic reactions are adrenaline and cortisone. Adrenaline by subcutaneous injection is the most rapidly effective of all antiallergic drugs. Cortisone and analogous preparations modify the response of the tissues to antigen-antibody reactions. They are administered in high dosage, and because of the dangers involved they should be reserved for the emergency treatment of severe allergic reactions after other measures have failed.

Phenindamine Tablets, B.P.

Phenindamine Tartrate Tablets.

25 milligrams

Dose : 25 to 50 milligrams.

Promethazine Hydrochloride Tablets, B.P.

10 milligrams ; 25 milligrams

Dose : 25 to 75 milligrams daily.

Promethazine Elixir

An Elixir containing Promethazine Hydrochloride 5 mg. per 4 ml. (60 m.).

DOSE : 5 to 25 milligrams.

Mepyramine Tablets, B. P.

Mepyramine Maleate Tablets

50 milligrams ; 100 milligrams

DOSE : 300 to 800 milligrams daily, in divided doses.

Mepyramine Syrup

Contains 25 mg. per 4 ml. (60 m.)

Mepyramine Injection

Ampoules containing Mepyramine Maleate 25 mg. per ml.

DOSE : 50 to 100 milligrams by intramuscular injection.

Dimenhydrinate Tablets, B.N.F.

50 milligrams

DOSE : 25 to 50 milligrams.

Diphenhydramine Capsules, *see* page 64.

DRUGS ACTING ON BLOOD CORPUSCLES

ERYTHROPOIETIC DRUGS

For purposes of treatment, anaemias may be classified as iron deficiency anaemias, megaloblastic anaemias and haemolytic anaemias.

Iron Deficiency Anaemias

The daily requirement of iron for adults would be 5 mg. for a male, 10 mg. for a female and about 15 mg. in pregnancy and lactation. It is advisable to give small quantities of medicinal iron in pregnancy and lactation, and also when menstrual losses are severe.

Iron deficiency anaemias are microcytic and have a low colour index. The most reliable indication for administering medicinal iron is a M.C.H.C. below 30 per cent. Iron-deficiency anaemia may result from nutritional inadequacy of iron-containing foods, from defective absorption or from repeated blood loss. In these patients the body stores of iron are seriously depleted so that iron must be given not only to correct anaemia but also to replenish stores. Although the amount of iron absorbed is variable it is approximately proportional to the dose, and it is generally agreed that anaemic patients should receive at least 200 mg. of ferrous iron daily. There is no justification for adding traces of copper, manganese or cobalt because any diet would supply an excess of these substances.

Efficient iron therapy should raise haemoglobin by 1 per cent. per day. Ferrous carbonate as Blaud's pill is unreliable because it hardens with keeping and is likely to traverse the alimentary canal without being absorbed.

Ferrous sulphate, ferrous gluconate and ferrous succinate are suitable for oral use, and all three are equally effective. Since ferrous sulphate is suitable for the majority of patients and is the cheapest of these preparations it should always be prescribed in the first instance. Gastrointestinal disturbances due to iron can be reduced by taking the tablets with meals, and by starting with a third of the required dose and increasing it gradually. If ferrous sulphate cannot be tolerated the gluconate or succinate can be given because they cause fewer side-effects. Three tablets of ferrous sulphate, or six tablets of ferrous gluconate or succinate would supply the 200 mg. of iron required daily in iron-deficiency anaemia. Treatment should be continued for six weeks after haemoglobin has returned to normal in order to build up the iron stores in the body.

Parenteral iron is indicated when there is interference with absorption of oral iron, or in late pregnancy when a rapid result is required. Treatment is begun with 25 to 50 mg. of iron and increased to 100 mg. daily. The total dosage is calculated on the basis that 25 mg. of iron is required for each 1 per cent. deficiency of haemoglobin plus an additional 50 per cent. of this amount to replenish stores. This can also be calculated by using the formula, $9w + \frac{w}{6}(100 - Hb\%) =$ mg. of iron. w = weight in lbs. Hb % = observed Hb. %. Intravenous iron may give rise to reactions, and accidental injection into subcutaneous tissues causes local irritation. Intramuscular preparations cause fewer side-effects.

Megaloblastic Anaemias

There is no justification today for the use of liver extract. Apart from its active principles, folic acid and cyanocobalamin it does not contain additional haemopoietic factors. Comparative trials have shown that cyanocobalamin is

of no value for premature babies, general lassitude or diabetic neuropathy. Cyanocobalamin is the drug of choice for Addisonian pernicious anaemia which is pratically non-existent in this country. In some instances a non-Addisonian megaloblastic anaemia may be due to lack of cyanocobalamin, but the majority of megaloblastic anaemias of pregnancy, infancy, nutritional and malabsorption syndromes, as well as sprue are adequately treated with folic acid. The initial dose is 10 mg. a day, which is reduced to 5 mg. when the condition has improved. Iron may be indicated in these cases in addition to folic acid.

In malnutrition or malabsorption, vitamin and protein deficiencies may contribute to anaemia, and these require appropriate treatment to supplement specific anti-anaemic therapy.

Ferrous Gluconate Tablets, B.P.

5 grains (325 milligrams), sugar coated.

DOSE : 5 to 10 grains (325 to 650 milligrams).

Ferrous Sulphate Tablets, B.P.

Exsiccated Ferrous Sulphate Tablets

3 grains (200 milligrams)

DOSE : 1 to 3 grains (60 to 200 milligrams).

Saccharated Oxide of Iron Injection

20 milligrams per ml. of elemental iron.

DOSE : Initially 1 ml. first day, 2 ml. the second day, and then 5 ml. at suitable intervals. By slow intravenous injection only. Do not mix with saline or other electrolytes.

Iron Dextran Complex Injection

Ampoules containing 50 mg. of elemental iron per ml.

DOSE : 1 to 5 ml. by deep intramuscular injection.

Cyanocobalamin Injection, B.P.

Synonym : Vitamin B_{12} Injection.

Ampoules containing anhydrous cyanocobalamin 50 micrograms per ml. in Water for Injection.

Dose : Initially 250 micrograms twice weekly by intramuscular injection ; maintenance dose 100 to 250 micrograms every two or three weeks.

Folic Acid Tablets, B.P.

5 milligrams

Dose : 5 to 20 milligrams daily.

CYTOTOXIC DRUGS

Cytotoxic drugs are used in the palliative treatment of leukaemias and Hodgkin's disease. The place of radiotherapy in the management of the patient must be considered before resorting to drugs. The drugs are potentially dangerous in that the dose required to obtain a response is close to that which damages bone marrow.

The classes of compounds are :

1. The alkylating agents, mustine, tretamine, chlorambucil and busulphan. Their effects resemble those of ionizing radiation.
2. The Antimetabolites, aminopteriu and mercaptopurine. They damage cells by "competition" with normal cell metabolites, and development of resistance to antimetabolites by neoplastic cells is common.

Acute Leukaemias are best treated with very high doses of cortical steroids together with mercatopurine. When resistance develops to mercaptopurine, aminopterin could be used.

Chronic Leukaemias—for myeloid leukaemia, busulphan or tretamine. Mercaptopurine should be used only when other agents can no longer be employed because resistance to it develops rather quickly.

For lymphoid Leukaemia, tretamine, chlorambucil or mustine. Chlorambucil has fewest side effects.

Polycythaemia Vera—Pyrimethamine (25 mg. daily at first, and then at weekly intervals for maintenance) can be used as an alternative to radioactive phosphorus.

Hodgkin's Disease—First treatment is radiotherapy. Mustine and tretamine are the most satisfactory drugs. Cortical steroids are valuable in the terminal stages.

Mustine Hydrochloride Injection, B.P.

Synonym: Nitrogen mustard.

Ampoules containing 10 mg. of mustine hydrochloride, to be dissolved in Sodium Chloride Injection and given intravenously.

DOSE: 0·1 mg. per kg. daily, for 4 days. Maximum single dose 8 mg.

Tretamine Tablets

Synonym: Triethylene melamine tablets.

2·5 milligrams

DOSE: 0·1 mg. per kg. daily.

Chlorambucil Tablets

2 milligrams

DOSE: 0·2 mg. per kg. daily.

Busulphan Tablets

2 milligrams

Dose : 0·06 mg. per kg. daily.

Mercaptopurine Tablets

50 milligrams

Dose : 2·5 mg. per kg. daily.

VITAMINS

The best safeguard against vitamin deficiency is the consumption of an adequate and balanced diet. Vitamin requirements are increased in pregnancy and lactation, and children require relatively large amounts to cope with rapid growth.

Gross vitamin deficiency which can arise from inadequate intake or imperfect absorption causes recognizable syndromes like pellagra, scurvy or beri-beri. If a person receives just sufficient vitamins to prevent obvious symptoms he may not be completely healthy and states of subclinical vitamin deficiency have been described. But the symptomatology is so vague that it is doubtful whether such a diagnosis can be made. Moreover, the symptoms bear a striking resemblance to those seen in psychogenic disorders and, consequently, vitamins are used indiscriminately as expensive placebos or as general "tonics".

The daily requirements of vitamins A and D are 2500 and 400 units respectively. These requirements are doubled in pregnancy and lactation. When there is overt deficiency as in keratomalacia, the initial dose must be high, e.g. 100,000 units of Vitamin A by injection. Vitamin D (Calciferol) in high dosage is used in the treatment of lupus vulgaris. If doses exceeding 100,000 units of vitamin A or 150,000 units of vitamin D are administered daily for several months, symptoms of toxicity appear. With vitamin A they consist of anorexia, irritability and cortical hyperostoses, and with vitamin D there is calcification of soft tissues. In the absence of deficiency, vitamin A does not protect against the common cold and other respiratory infections.

The daily requirements of B vitamins are as follows : aneurine 1 to 2 mg., riboflavine 2 mg., nicotinic acid 10 to 20 mg., pantothenic acid about 5 mg., and pyridoxine about 2 mg. They are water-soluble and when large doses are administered the tissues become saturated within a few days even in deficiency. Thereafter, doses exceeding normal requirements are almost quantitatively lost in urine and faeces. The same applies to the water-soluble vitamin C, the daily requirement of which is about 30 mg. When intake is low or absorption is imperfect the body is rapidly depleted of water-soluble vitamins so that they should be administered in febrile conditions, inanition, repeated vomiting, chronic diarrhoea and chronic undernutrition. Comparative trials have shown that an excess of vitamin C does not increase a persons ability to resist infections nor protect against the common cold.

Vitamin K_1 is essential, possibly as a co-enzyme for the synthesis of prothrombin by the liver. If liver function is normal a hypoprotbrombinaemia due to lack of this vitamin is corrected by the oral administration of acetomenaphthone, a synthetic compound with vitamin K activity. When there is defective absorption as in obstructive jaundice or chronic diarrhoea it is necessary to inject the vitamin. Hypoprothrombinaemia due to oral anticoagulant drugs is most effectively reversed with the natural substance vitamin K_1. Infants should not receive more than 2 mg. because higher doses are likely to cause haemolytic anaemia.

Shark Liver Oil

Contains not less than 60,000 Units of vitamin A and not less than 150 Units of vitamin D per 4 ml. (60 minims).

Cod-Liver Oil Emulsion, B. P.

Contains cod-liver oil 50 per cent v/v and therefore not less than 1,125 Units of vitamin A and not less than 158 Units of vitamin D per 4 ml. (60 minims).

Dose : 120 to 360 minims (8 to 24 millilitres) daily, in divided doses.

30 to 60 minims (2 to 4 millilitres) for a child.

Vitamin A Injection

Ampoules containing not less than 100,000 Units vitamin A per ml. for intramuscular injection.

Calciferol Tablets, B. P.

Each sugar-coated tablet contains Calciferol (vitamin D_2) 1·25 mg., equivalent to 50,000 Units of antirachitic activity.

Dose : 0·125 to 1·25 milligrams, equivalent to 5,000 to 50,000 Units daily.

Calcium with Vitamin D Tablets, B. P. C.

Each tablet contains calcium sodium lactate 7½ gr. (500 mg.), calcium phosphate 2½ gr. (160 mg.) and calciferol 1/4800 gr. (0·0135 mg.), equivalent to approximately 500 Units of antirachitic activity.

Dose : 1 to 2 tablets daily.

Ancurine Tablets, B. P.

Synonyms : Vitamin B_1 Tablets ; Thiamine Hydrochloride Tablets.

3 milligrams ; 25 milligrams.

Dose : Prophylactic, 2 to 5 milligrams daily ; Therapeutic 20 to 50 milligrams daily.

Aneurine Injection, B. P.

Synonyms : Vitamin B_1 Injection ; Thiamine Hydrochloride Injection. Each ampoule contains Aneurine Hydrochloride 25 mg. per ml. in Water for Injection.

Dose : 20 to 50 milligrams, by subcutaneous or intramuscular injection.

Nicotinic Acid Tablets, *see* page. 43.

Nicotinamide Injection, B. P.

Synonym : Niacinamide Injection.

Each ampoule contains 50 mg. per ml. in Water for Injection.

Dose : 50 to 250 milligrams daily.

Riboflavine Tablets, B. P.

3 milligrams.

Dose : Prophylactic, 1 to 4 milligrams daily. Therapeutic, 5 to 10 milligrams daily.

Pyridoxine Tablets

50 milligrams.

Dose : Therapeutic, 50 milligrams daily.

Pyridoxine Injection

Each ampoule contains pyridoxine hydrochloride, 50 mg. in 2 ml.

Dose : Therapeutic, 50 milligrams.

Vitamin B Complex Tablets

Each tablet contains not less than the following : aneurine hydrochloride 1 mg., riboflavine 1 mg. and nicotinamide 10 mg.

Dose : Prophylactic, 1 or 2 tablets daily.

Vitamin B Complex Tablets, Strong

Each tablet contains not less than the following : aneurine hydrochloride 5 mg., riboflavine 2 mg., nicotinamide 20 mg. and pyridoxine 2 mg.

Dose : 1 to 2 tablets, thrice daily.

Ascorbic Acid Tablets, B. P.

Synonym : Vitamin C Tablets.

50 milligrams ; 100 milligrams.

Dose : Prophylactic, 25 to 75 milligrams ; Therapeutic 200 to 500 milligrams.

Ascorbic Acid Injection

Ampoules : 100 milligrams.

Acetomenaphthone Tablets, B. P.

5 milligrams.

Dose : 2 to 10 milligrams.

Vitamin K_1, *see* page. 47.

Multiple Vitamin Tablets

Each tablet contains not less than the following : Vitamin A 2,500 Units, aneurine hydrochloride 1 mg., riboflavine 1 mg., nicotinamide 10 mg., ascorbic acid 25 mg. and antirachitic activity (Vitamin D) 300 Units.

Dose : 1 or 2 capsules daily.

CALCIUM

The daily requirement of calcium is about 1 gram for an adult and 2 grams in pregnancy and lactation. Calcium lactate, gluconate or phosphate are suitable for oral use. They are given with vitamin D to supplement calcium intake in pregnancy, and are also used in the treatment of rickets and osteomalacia. Calcium gluconate can be given intravenously or intramuscularly in the treatment of acute hypocalcaemic tetany, and also to protect the heart against the toxic effects of potassium in acute renal failure. Intravenous injections of calcium must be given very slowly. Parenteral calcium is dangerous in digitalized patients. The administration of calcium in allergic conditions and in haemorrhagic diseases is without foundation.

Calcium Lactate Tablets, B.P.

5 grains (325 milligrams)

Dose : 15 to 60 grains (1 to 4 grams).

Calcium Gluconate Injection, B.P.

Contains calcium 0·9 per cent. w/v, equivalent to about 10 per cent. w/v of calcium gluconate, in Water for Injection.

Dose : 10 to 20 millilitres by intravenous or intramuscular injection.

Calcium with Vitamin D Tablets, *see* page 135.

ELECTROLYTE SOLUTIONS AND PLASMA SUBSTITUTES

These solutions are given by intravenous infusion in order to correct severe distortions in the volume and composition of extracellular fluid. Strong solutions of dextrose (25 or 50 per cent.) are used in hypoglycaemic coma, in cerebral oedema and as a means of administering intravenous carbohydrate with a minimum of fluid. Dextrose Injection (5 per cent.) is approximately isotonic with body fluids and it is used to correct pure water depletion. But clinical dehydration that occurs in diarrhoea, vomiting or diabetic coma is accompanied by loss of salt as well as water with disturbances in acid-base balance. The administration of normal saline (or normal saline with 5 per cent dextrose for supplying calories) is adequate for most purposes. It is specially useful in vomiting which causes a disproportionate loss of chloride resulting in alkalosis. In infants the saline solution should be half or quarter the normal strength. Excessive amounts of normal saline increase extracellular chloride disproportionately leading to acidosis. Moreover this solution does not replace other electrolytes like potassium and calcium which are also lost in clinical dehydration. The solution which bears the closest resemblance to extracellular fluid in electrolyte composition is Hartmann's solution, so that replacement of electrolytes with it is more complete than with other solutions. It is also suitable when there is metabolic acidosis. In more severe acidosis sodium lactate is administered ; the lactate ion is metabolized so that the sodium ion combines with bicarbonate to increase plasma bicarbonate.

Darrow's solution contains a high concentration of potassium (35 m.Eq./L). It is used when potassium depletion is severe and the safest way of administering it is by mouth. Potassium should be administered only after the patient has been rehydrated, and provided there is no oliguria or bradycardia. Intravenous administration of potassium can be dangerous ; if it is given by this route the rate of injection should not exceed 35 m. Eq. in a litre in threehours.

	Concentration in milliequivalents per litre					
	Sodium	*Potassium*	*Calcium*	*Chloride*	*Bicarbonate*	*Lactate*
Extracellular fluid	142	5	5	103	27	—
Normal Saline	154	—	—	154	—	—
1/6 M-Lactate	169	—	—	—	—	169
Hartmann's	126	5	4	111	—	23
Darrow's	120	35	—	104	—	50
Young Coconut water	5	49	12	63	—	—

Both Hartmann's and Darrow's solution can be prepared for oral administration in the dispensary. Coconut water could also be administered orally, and with suitable precautions even intravenously. It has a very high content of potassium but is poor in sodium and chloride ions.

Dextran and polyvidone are composed of large molecules and remain longer than electrolyte solutions in the circulation. They are used as substitutes for plasma when it is necessary to increase the circulatory volume. Dextran is antigenic on rare occasions. Polyvidone may cause rouleaux formation so that blood for direct compatibility tests should be withdrawn before injecting polyvidone.

Protein hydrolysates for intravenous injection are useful when illness interferes with the absorption of sufficient proteins and there is negative nitrogen balance. They are not meant to be used as plasma expanders. A second administration may give rise to anaphylactic reactions.

Dextrose Injection, B.P.

Solution containing dextrose 5 per cent. or 25 per cent. or 50 per cent. w/v in Water for Injection.

Sodium Chloride Injection, B.P.

Synonym : Normal Saline Solution.

Contains sodium chloride 0·9 per cent. w/v in Water for Injection.

Dextrose-Saline Injection

Solution containing dextrose 5 per cent. w/v, and sodium chloride 0·9 per cent. w/v in Water for Injection.

Dextrose-Saline Injection for Infants

Synonym : Dextrose and half-normal saline solution.

Solution containing dextrose 5 per cent. w/v and sodium chloride 0·45 per cent. w/v in Water for Injection.

Sodium Lactate Injection

Contains Sodium Lactate 1·9 per cent. w/v (1/6 M-solution) in Water for Injection.

Sodium Lactate Compound Injection, B.P.

Synonyms : Hartmann's Solution ; Ringer-Lactate Solution.

Contains sodium lactate about 0·26 per cent. w/v, sodium chloride 0·6 per cent. w/v and potassium chloride and hydrated calcium chloride, of each, 0·04 per cent. w/v in Water for Injection.

Darrow's Solution

Contains sodium lactate 0·59 per cent. w/v, sodium chloride 0·4 per cent. w/v and potassium chloride 0·26 per cent. w/v in Water for Injection.

Dextran Injection, B.P.

A 6 per cent. solution of dextran in 0·9 per cent. w/v solution of sodium chloride, suitable for intravenous injection.

Dextran Injection, Salt Free

A 10 per cent. solution of dextran in 5 per cent. w/v solution of dextrose, suitable for intravenous injection.

Polyvidone Injection

A 3·5 per cent. solution of polyvidone in isotonic electrolyte solution, suitable for intravenous injection.

Protein Hydrolysate Injection

Consists of amino-acids obtained by hydrolysis of biologically complete protein, with glucose 5 per cent. w/v, suitable for intravenous injection.

DRUGS ACTING ON THE RESPIRATORY SYSTEM

COUGH SEDATIVES AND EXPECTORANTS

There are three types of preparations used in the symptomatic treatment of cough : the cough sedatives, the expectorants and the antispasmodic drugs.

The dry and painful cough which characterizes the early stages of upper respiratory tract infection is relieved by means of cough sedatives which act by depressing the cough centre. Codeine is the safest of these drugs but it causes constipation. Pholcodine is effective and has the advantage of not constipating. Both drugs are usually administered in syrup which has a soothing effect on the pharynx. Morphine is administered as Camphorated Tincture of Opium or as Dover's Powder for cough sedation. The most powerful cough sedatives are methadone and diamorphine, but their continued use could easily lead to addiction.

Expectorants are used to increase bronchial secretions so that viscid sputum may be liquefied and coughed up more easily. Ammonium chloride, ammonium bicarbonate and ipecacuanha are emetic drugs which in subemetic doses are said to increase bronchial secretions reflexly. Potassium iodide is also claimed to increase bronchial secretions by another mechanism. There is much doubt as to whether in the usual dosage these drugs increase bronchial secretions in man.

There are simpler and more effective measures by which the expulsion of sputum can be facilitated. Inhalations of steam or aerosol detergent solutions are effective in reducing the viscosity of bronchial secretions. It is

customary to medicate steam with menthol or benzoin inhalation. Hot drinks and sodium chloride compound mixture are also effective.

Antispasmodic drugs for relaxing bronchi are used chiefly in the treatment of bronchial asthma. They are also of value in bronchospasm associated with bronchitis. Cough sedatives should not be used in an asthmatic attack because the patient can suffocate from plugs of tough mucus in the bronchioles. Relief of bronchial spasm makes expectoration easier. Medihaler Iso Forte (Riker) or Sublingual tablets – Aleo ephrine "

Adrenaline is the most rapidly effective drug in acute bronchial asthma. Five minims of a 1 in 1000 solution is injected subcutaneously, or for more rapid effect intramuscularly ; it must never be permitted to enter a vein. If three or four injections at half-hourly intervals or injections at the rate of 1 minim a minute have failed to control an acute attack, aminophyllioe should be given intravenously and repeated if necessary after four hours. It is only after these measures have failed or if the condition steadily worsens that it is justified to use adrenocortical steroids. Isoprenaline and ephedrine are used to prevent attacks in chronic asthma. Ephedrine causes cerebral stimulation and is therefore combined with a barbiturate.

Stimulant Cough Mixture

Ammonium Bicarbonate	5 gr.	325 mg.
Tincture of Ipecacuanha	5 m.	0·3 ml.
Aromatic Spirit of Ammonia	15 m.	1 ml.
Syrup of Tolu	60 m.	4 ml.
Chloroform Water	to 1 fl. oz. to	30 ml.

DOSE : 1 fluid ounce (30 millilitres).

Sedative Cough Mixture

Potassium Citrate	15 gr.	1 G.
Sodium Citrate	15 gr.	1 G.
Camphorated Tincture of Opium	30 m.	2 ml.
Chloroform Water	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce (30 millilitres).

Syrup of Codeine Phosphate, B.P.C.

Contains 0·5 per cent. of codeine phosphate.

Dose : 30 to 120 minims (2 to 8 millilitres).

Sodium Chloride Compound Mixture

Sodium Bicarbonate	10 gr.	650 mg.
Sodium Chloride	3 gr.	200 mg.
Spirit of Chloroform	5 m.	0·3 ml.
Anise Water	to 1 fl. oz.	to 30 ml.

Dose : 1 fluid ounce in a tumblerful of hot water to be taken twice a day in sips.

Benzoin Inhalation, B.P.C.

Contains benzoin 45 gr. (about 10 per cent.) and prepared storax 30 gr. (about 7 per cent.) in industrial methylated spirit to 1 fl. oz.

Menthol Inhalation

Contains menthol 20 gr. (about 5 per cent) in industrial methylated spirit to 1 fl. oz.

Ephedrine Tablets, B.P.

Ephedrine Hydrochloride Tablets

¼ grain (15 milligrams) ½ grain (30 milligrams).

Dose : ¼ to 1 grain (15 to 60 milligrams).

Ephedrine Compound Powder

Ephedrine Hydrochloride ..	⅓ gr.	20mg.
Amylobarbitone	½ gr.	30 mg.
Aminophylline	2 gr.	130 mg.

DOSE : One powder when necessary.

Isoprenaline Tablets, B.P.

Isoprenaline Sulphate Tablets

10 milligrams

DOSE : 5 to 20 milligrams.

Adrenaline Injection, *see* page 39.

Aminophylline Injection, *see* page 38.

Aminophylline Tablets, B. P.

100 milligrams

DOSE : 100 to 500 milligrams.

RESPIRATORY STIMULANTS

These preparations stimulate the respiratory centre and are useful in cases of narcotic poisoning. Nalorphine is a specific antagonist to morphine, pethidine and methadone. Bemegride is used in barbiturate poisoning. Amiphenazole like picrotoxin is a powerful stimulant of the respiratory centre and will cause convulsions in slight overdosage. Nikethamide is much safer in this respect and is preferably given by intravenous injection. None of these drugs has an effect on the heart and are ineffective by oral administration. Aminophylline is a powerful respiratory stimulant by intravenous injection and is effective in Cheyne-Stokes breathing.

Nikethamide should not be given in convulsive states.

Nalorphine Injection, B.P.

Nalorphine Hydrobromide Injection

Ampoules containing nalorphine hydrobromide 10 mg. per ml. in Water for Injection.

Dose : 5 to 10 milligrams, by intravenous injection for the treatment of poisoning by morphine or its substitutes.

Nikethamide Injection, B.P.

Contains nikethamide 25 per cent. w/v in Water for Injection.

Dose : 1 to 4 millilitres, by subcutaneous, intramuscular or intravenous injection.

Amiphenazole Injection

Ampoules containing dry, sterile amiphenazole hydrochloride 30 mg. or 300 mg. Prepared immediately before use with Water for Injection to give a concentration of 15 mg. per ml.

Dose : According to the needs of the patient.

Bemegride Injection

Bemegride 0·5 per cent. w/v in Sodium Chloride Injection.

Dose : According to the needs of the patient.

DRUGS ACTING ON EAR, NOSE AND THROAT

Sodium bicarbonate is used to facilitate the removal of wax from the ear. Aluminium acetate is used as an astringent when there are multiple furuncles. Flavine and glycerine is also used for furuncles as an antiseptic. The best antiseptic for the external ear is chloramphenicol either as drops or as a powder for insufflation. When there is pyocyaneus infection the best remedy is polymyxin. Infections of the middle ear are treated by systemic rather than local administration of drugs.

Lozenges containing local anaesthetics are used to relieve painful swallowing.

Alkaline nasal solution is used for the removal of mucus. Vasoconstrictors like adrenaline and ephedrine are sometimes used to relieve nasal congestion in a common cold, but the relief obtained is transient and probably not of much value. They are useful for shrinking congested mucosa that is obstructing drainage from infected nasal sinuses. A 1 in 1000 adrenaline spray is of value for oedema of the larynx.

As far as possible it is better to avoid the local use of preparations containing sulphonamides or antibiotics other than polymyxin or neomycin because there is a danger of sensitization.

Sodium Bicarbonate Ear-Drops, B. P. C.

Contains sodium bicarbonate 10 gr. (about 5 per cent.), with glycerin and water to ½ fl. oz.

Aluminium Acetate Ear-Drops

Synonym : Burow's Solution.

Consists of Solution of Aluminium Acetate, B. P. C., about 13 per cent. w/v.

Boric Acid Ear-Drops, B. P. C.

Contains boric acid 4 gr. (about 2 per cent.), with industrial methylated spirit and water to ½ fl. oz.

Flavine and Glycerine Ear-Drops

Chloramphenicol Ear-Drops, B. N. F.

Contains chloramphenicol 5 per cent. w/v in propylene glycol.

Chloramphenicol as Dry Powder

For insufflation.

Polymyxin Ear-Drops

Contains 10,000 Units of Polymyxin B Sulphate per ml. of acidified propylene glycol.

Alkaline Nasal Solution-Tablets, B. P.C.

Each solution-tablet contains sodium bicarbonate and borax, of each, 5 gr. (325 mg.) and thymol 1/20 gr. (3 mg.).

Directions for use : One tablet to be dissolved in 4 tablespoonfuls (2 fl. oz.) of warm water before use.

Ephedrine Nasal Drops, B. P. C.

Contains ephedrine hydrochloride 2 gr. (about 1 per cent.) and chlorbutol 1 gr. (about 0·5 per cent.), with sodium chloride and water to 1/2 fl. oz.

DRUGS ACTING ON THE EYE

LOTIONS, OINTMENTS AND DROPS

The simplest preparation for removing conjunctival discharge is sodium chloride lotion. Sodium bicarbonate lotion is useful for the removal of crusts from eye lashes in blepharitis and for neutralizing acid that has contaminated the eye. Boric acid and borax rarely kill pathogenic bacteria even in saturated solutions.

Ethylmorphine drops are used for treating corneal opacities although there is very little effect. Zinc sulphate is an astringent which has mild antiseptic effects, and mercuric oxide is less astringent but has better antiseptic properties.

The treatment of paraocular infections like orbital cellulitis is by systemic administration of antibiotics. Surface infections like conjunctivitis are treated by the application of antibiotic drops or ointment. Drops have to be instilled at frequent intervals because they are easily washed away by lachrymal secretions. Ointments have a more prolonged effect. Sulphacetamide is useful for preventing infections of the eye after injuries and in the treatment of trachoma. Preparations of penicillin are used in pneumococcal and staphylococcal infections. Streptomycin is used in Kochs-Weeks, Influenzal and Morax-Axenfeld infections and also against the tubercle bacillus. A combination of penicillin and streptomycin would be effective against all these organisms. If organisms are resistant to these antibiotics a broad spectrum antibiotic like chloramphenicol or one of the tetracyclines can be used. Neomycin is the most effective of them all because it has the widest range of antibiotic activity and organisms do not readily become resistant to it. Polymyxin is the

most effective antibiotic against pyocyaneus infection. When there is deep-seated infection involving tissues within the eye itself, topical application or systemic administration does not result in the antibiotic penetrating into intraocular fluids in concentration sufficient for therapeutic effect. This is achieved by the subconjunctival injection of concentrated solutions. Penicillin, streptomycin, polymyxin and neomycin are suitable for such use. Antibiotics can give rise to sensitization effects like conjunctival irritation, erythema, oedema of the eyelids or eruptions on the skin surrounding the eyes. Neomycin, polymyxin and bacitracin do not usually give rise to these effects.

Hydrocortisone and related steroids are administered as drops or ointment, by subconjunctival or retrobulbar injection, or by mouth. They suppress inflammatory reactions like exudation and fibroblastic proliferation and thus prevent the formation of adhesions and scars. By doing so they permit the spread of infections, so that steroids must always be used in combination with specific antibacterial drugs. Hydrocortisone is used in the treatment of certain acute inflammatory eye diseases, allergic conjunctivitis and sympathetic ophthalmia.

Fluorescein is used to demarcate the area of a corneal abrasion or ulcer because areas denuded of epithelium take on a greenish stain.

Solution for Eye-drops contains methyl and propyl hydroxybenzoate which act as preservatives and inhibit the growth of microorganisms.

Sodium Chloride Eye Lotion, B.P.C.

Contains sodium chloride 48 gr. (about 1·8 per cent.) in purified water to 6 fl. oz.

To be diluted with an equal quantity of warm water.

Sodium Bicarbonate Eye Lotion, B.P.C.

Synonym : Factory Eye-drops No. 2.

Contains sodium bicarbonate 90 gr. (about 3·4 per cent.) in purified water to 6 fl. oz.

Antazoline Compound Eye-Drops, B.N.F.

Contains antazoline hydrochloride 0·5 per cent. w/v, naphazoline nitrate 0·025 per cent. w/v and sodium chloride 0·8 per cent. w/v in Solution for Eye-drops.

Ethylmorphine Eye-Drops

Contains ethylmorphine hydrochloride 2 per cent. w/v and sodium chloride 0·6 per cent. in Solution for Eye-drops.

Penicillin Eye-Drops, B.P.C.

Contains benzylpenicillin 2500 units per ml., with sodium citrate 0·5 per cent. w/v in Solution for Eye-drops.

It should be used within 4 days and stored in a cool place.

Penicillin Eye Ointment, B.P.

Contains benzylpenicillin 2000 units per G.

Penicillin Eye Ointment, Strong

Contains benzylpenicillin 40,000 units, with liquid paraffin 3 gr. and white soft paraffin 56 gr.

Strength : 10,000 units per G.

Streptomycin Eye-Drops, B.N.F.

Contains streptomycin sulphate 0·25 per cent. w/v and sodium chloride 0·87 per cent. w/v in Solution for Eye-drops.

Streptomycin Eye Ointment

Contains streptomycin sulphate 0·1 gram per G.

Penicillin and Streptomycin Eye Ointment

Contains benzylpenicillin 2,000 units and streptomycin sulphate 10 mg. per G. of base.

Sulphacetamide Eye-Drops, B.P.C.

Contains sulphacetamide sodium 10 per cent. w/v in Solution for Eye-drops.

Sulphacetamide Eye-Drops, Strong, B.P.C.

Contains sulphacetamide sodium 30 per cent. w/v in Solution for Eye-drops.

Sulphacetamide Eye Ointment, B.P.

Contains sulphacetamide sodium 6 per cent.

Zinc Sulphate Eye-Drops, B.P.C.

Contains zinc sulphate 0·25 per cent. w/v and sodium chloride 0·85 per cent. w/v in purified water.

Zinc Sulphate and Adrenaline Eye-Drops

Mercuric Oxide Eye Ointment, B.P.

Contains yellow mercuric oxide 1 per cent.

Hydrocortisone Eye-Drops, B.N.F.

A buffered isotonic suspension containing hydrocortisone acetate 1 per cent. w/v.

Hydrocortisone Eye Ointment

Contains hydrocortisone acetate 1 per cent. in a suitable basis such as B.P.C. Eye Ointment Basis.

Hydrocortisone Acetate Injection, *see* page 122.

Neomycin and Hydrocortisone Eye Ointment

Contains neomycin sulphate 5 mg. and hydrocortisone acetate 15 mg. per G. of ointment.

Neomycin Eye Ointment

Contains neomycin sulphate 5 mg. per G. of base.

Fluorescein Eye-Drops

Fluorescein sodium 2 per cent. w/v and sodium chloride 0·33 per cent. w/v in Solution for Eye-drops.

MYDRIATICS AND MIOTICS

The commonly used mydriatics act by blocking parasympathetic effects. There is dilatation of the pupil, paralysis of accommodation and a rise in intraocular pressure. Atropine is the most powerful and because of its prolonged effect is used for therapeutic purposes. In iridocyclitis it prevents iritic adhesions by dilating the pupil and relieves pain by relaxing ciliary muscles. Because of its extreme effects, atropine must be used with caution especially in the older age groups where there is danger of precipitating an attack of glaucoma. Homatropine has a less poweful and less prolonged effect. It is therefore used to dilate the pupil for diagnostic purposes. Lachesine is a mild mydriatic which is used in cases which have become sensitized to substances of the atropine group. The action of atropine is antagonized, at least partially by physostigmine or pilocarpine.

Sympathomimetic substances like adrenaline and cocaine dilate the pupil.

For clinical purposes miosis is achieved by means of drugs which cause parasympathetic stimulation. There is pupillary constriction, spasm of the ciliary muscles and a decrease in intraocular pressure. Physostigmine (escrine) is a powerful miotic which is used in the acute phase of glaucoma. Pilocarpine is less powerful and is used when prolonged administration is necessary. The oral administration of acetazolamide reduces intraocular tension but the effect wanes with continued use.

Atropine Sulphate Eye-Drops, B.P.C.

Contain atropine sulphate 1 per cent. w/v and sodium chloride 0·75 per cent. w/v in Solution for Eye-drops.

Atropine Eye-Drops, Oily, B.P.C.

Contain atropine 1 per cent. w/v in castor oil.

Atropine Eye Ointment, B.P.

Contains atropine sulphate 1 per cent.

Homatropine Eye-drops, B.P.C.

Contain homatropine hydrobromide 2 per cent. w/v and sodium chloride 0·57 per cent. w/v in Solution for Eye-drops.

Cocaine and Homatropine Eye-drops, B.P.C.

Contain cocaine hydrochloride 1 per cent. w/v, homatropine hydrobromide 2 per cent. w/v and sodium chloride 0·4 per cent. w/v in Solution for Eye-drops.

Cocaine and Homatropine Eye-drops, Oily, B.P.C.

Contain cocaine and homatropine, of each, 2 per cent. w/v in castor oil.

Lachesine Eye-drops, B.P.C.

Contain lachesine chloride 1 per cent. w/v sodium chloride 0·75 per cent. w/v in Solution for Eye-drops.

Physostigmine Eye-drops, B.P.C.

Synonym: Eserine Eye-drops.

Contain physostigmine salicylate 0·5 per cent. w/v, sodium chloride 0·8 per cent. w/v and sodium metabisulphite 0·04 per cent. w/v in Solution for Eye-drops.

Physostigmine Eye-drops, Strong

Synonym: Eserine Eye-drops, Strong.

Contains physostigmine salicylate 2 per cent. w/v, sodium chloride 0·5 per cent. w/v and sodium metabisulphite 0·04 per cent. w/v in Solution for Eye-drops.

Physostigmine Eye-drops, Oily, B.N.F.

Synonym: Eserine Eye-drops, Oily.

Contain physostigmine 1 per cent. w/v in castor oil.

Physostigmine Eye-Ointment, B.N.F.

Synonym: Eserine Ointment.

Contains physostigmine salicylate 0·125 per cent. in B.P.C. Eye Ointment Basis.

Pilocarpine Eye-drops, B.P.C.

Contain pilocarpine nitrate 1 per cent. w/v and sodium chloride 0·69 per cent. w/v in Solution for Eye-drops.

Neostigmine Eye-drops

Neostigmine methyl sulphate 3 per cent. w/v and sodium chloride 0·3 per cent. w/v in Solution for Eye-drops.

LOCAL ANAESTHETICS

Cocaine is a powerful local anaesthetic. It also dilates the pupil and dries the cornea. The stronger solution is used for major surgery of the eye and when greater pupillary dilatation is required. Amethocaine does not dilate the pupil nor dry the cornea and is particularly useful when anaesthesia is necessary for instrumental tonometry.

Cocaine Eye-drops, B.P.C.

Contain cocaine hydrochloride 2 per cent. w/v and sodium chloride 0·6 per cent. w/v in Solution for Eye-drops.

Cocaine Eye-drops, Strong

Contain cocaine hydrochloride 4 per cent. w/v and sodium chloride 0·25 per cent. w/v in Solution for Eye-drops.

Amethocaine Eye-drops, B.P.C.

Contain amethocaine hydrochloride 1 per cent. w/v and sodium chloride 0·69 per cent. w/v in Solution for Eye-drops.

DRUGS ACTING ON SKIN

SEDATIVE APPLICATIONS

Wet Dressings are useful for acute and subacute inflammations, especially when there is inflammatory oedema or weeping eruptions. They cleanse, cool and soothe, and permit drainage of exudate. The most suitable preparations in acute inflammation are Aluminium Acetate Lotion, Lead Lotion, Silver Nitrate Lotion and Sodium Chloride Lotion. In an emergency, boiled cooled milk may be used. Coal Tar and Lead Lotion is suitable for subacute, but not for acute lesions.

Cloth (soft old linen) is folded to form a multi-layered strip of suitable size, is dipped in the solution, wrung out so as to leave it wet but not dripping and then applied. Gauze is unsuitable because it tends to stick and lint is inferior to cloth. Loose bandaging may be used to keep the dressing in place. It is kept moist by frequent wetting with the solution and changed every few hours. If it has stuck it should be well wetted before removal. Any detritus left on the skin should be swabbed away with the solution.

Local baths (soaks) may be used instead of wet dressing for certain parts such as hands and feet. Potassium Permanganate Solution is excellent for this purpose. They may be used morning and evening for half an hour at a time and some other form of therapy used for the rest of the day.

Aluminium Acetate Lotion, B.N.F.

Contains Solution of Aluminium Acetate 240 m. (5 per cent.) in water to 10 fl. oz.

Coal Tar and Lead Lotion, B.N.F.

Contains Solution of Coal Tar and Strong Solution of Lead Subacetate, of each, 120 m. (about 3 per cent.) in purified water to 8 fl. oz.

Lead Lotion, B.P.C.

Contains Strong Solution of Lead Subacetate 96 m. (about 2 per cent.) in purified water to 10 fl. oz.

Potassium Permanganate Solution, B.N.F.

Contains potassium permanganate 4 gr. (about 0·1 per cent.) in water to 8 fl. oz.

Directions for use : One part to be diluted with five parts of water.

Silver Nitrate Lotion, B.N.F.

Contains silver nitrate 20 gr. (about 0·5 per cent.) in purified water to 10 fl. oz.

Sodium Chloride Solution, B.N.F.

Synonym : Normal Saline.

Contains sodium chloride 16 gr. (about 0·9 per cent.) in purified water to 4 fl. oz.

Shake Lotions are soothing and can serve as vehicles for medicaments. They may be used for acute inflammations which are not too severe, e.g. for eczemas once the weeping has ceased and for erythematous and papular dermatoses.

The lotion is agitated, poured into a saucer and applied on the skin with a pledget of cotton wool or with a brush. It dries on the skin leaving a white powdery deposit. Usually two or more applications are made daily and the

deposit from previous applications need not be removed. Too thick a layer of powder, however, should not be allowed to accumulate and gentle swabbing with coconut oil or olive oil is a convenient method of removing the deposit. Shake lotions have the disadvantage of being cosmetically inelegant and of producing excessive drying in intertriginous areas.

Calamine Lotion, B.P.

Contains calamine 15 per cent. w/v, zinc oxide 5 per cent. w/v, glycerin 5 per cent. v/v, with bentonite, sodium citrate, and liquefied phenol in water. This lotion contains phenol about 0·42 per cent. w/v.

Calamine Lotion, Oily, B.P.C.

Contains calamine 5 per cent. w/v, with wool fat, oleic acid, arachis oil and Solution of Calcium Hydroxide.

Pastes contain a high proportion of powders in a greasy base. Since they are not easily absorbed from the skin, the effect of the ingredients is considerably reduced. Unlike ointments they adhere well to the skin, absorb sweat and are less macerating and heating. Zinc paste is useful for the subacute and chronic stages of eczema.

A paste is applied directly on the skin and dusted over with talc or covered with linen which has been liberally spread with paste. The skin is cleansed gently with a bland oil once or twice a day.

Zinc Oxide Compound Paste, B.P.

Synonym : Zinc Paste.

Contains zinc oxide and starch, of each, 25 per cent. in white soft paraffin.

Creams are thin emulsions of oil and water which exert a cooling effect as the water evaporates and because exudates are freely absorbed by them they permit drainage. The presence of emulsifying agents in creams allows an increased absorption of medicaments by the skin so that creams are good vehicles for active substances. Creams are suitable for subacute and chronic skin lesions, but are not recommended for weeping eruptions or ulcers. They are easy to apply and remove (an important consideration for hairy parts) and penetrate the skin and soften it. Hydrous ointment is useful as a night cream for dry skins.

Calamine Cream, B.N.F.

Contains calamine 40 gr. (about 4 per cent.) and zinc oxide 30 gr. (about 3 per cent.), with emulsifying wax 40 gr., arachis oil 385 gr. and water to 960 gr.

Hydrous Ointment, B.P.

Consists of a water-in-oil emulsion of water 50 per cent. w/w in Wool Alcohols Ointment.

Zinc Oxide Cream, B.P.

Contains zinc oxide 32 per cent. w/w, with oleic acid, arachis oil, wool fat and Solution of Calcium Hydroxide.

Ointments are prepared with greasy bases and since they do not mix with water are unsuitable for exudative lesions where drainage is required. They are used for subacute and chronic lesions as they soften crusts and bring medicaments, especially fat-soluble ones into intimate contact with the skin. If penetration of the epidermis is required, Hydrous Wool Fat Ointment is preferable. Ointments are inconvenient on hairy regions and they can be removed with oil.

Calamine Ointment, B.P.C.

Contains calamine 80 gr. (16·7 per cent.) in white soft paraffin to 480 gr.

Hydrous Wool Fat Ointment, B.N.F.

Contains equal parts of hydrous wool fat and yellow soft paraffin.

Zinc Oxide Ointment, B.P.

Synonym : Zinc Ointment.

Contains zinc oxide 15 per cent. in Simple Ointment.

Dusting-Powders are mild, cooling, drying and soothing. They are used for non-exudative acute lesions, for protecting skin folds from excessive friction and for hyperidrosis.

Boric Talc Dusting-Powder, B.P.C.

Contains boric acid 5 per cent. starch 10 per cent. and sterilized purified talc.

Salicylic Acid Compound Dusting-Powder, B.P.C.

Contains salicylic acid 3 per cent. boric acid 5 per cent. and sterilized purified talc.

Zinc Oxide Compound Dusting-Powder, B.P.C.

Contains zinc oxide 25 per cent., boric acid 5 per cent., starch 35 per cent. and sterilized purified talc.

Zinc Oxide, Starch and Talc Dusting-Powder, B.P.C.

Contains zinc oxide and starch of each, 25 per cent. and sterilized purified talc.

ANTIPRURITICS

Wet dressings and lotions have a non-specific antipruritic action by virtue of their cooling and soothing effect. Active medicaments with specific antipruritic effect may be added to shake lotions or creams. Examples are phenol 0·5 to 2·5 per cent. menthol 0·2 to 1 per cent. and camphor 0·2 to 5 per cent. Crotamiton preparations are more powerful. Antihistamines have an antipruritic effect on local application but may give rise to sensitization. They may be given by mouth as adjuvant therapy.

Preparations of hydrocortisone have a powerful antipruritic effect and are especially useful when there is an allergic component as in eczema, contact dermatitis and ano-genital pruritus. They are harmless and do not sensitize, but symptoms often recur when treatment stops. They should not be applied to infected dermatoses unless combined with an antibiotic. Lotions, creams and ointments of hydrocortisone contain 0·5 to 2·5 per cent. of the substance. Fludrocortisone being more potent is used in a strength of 0·1 per cent.

Calamine Lotion, B.P., *see* page 160.

Crotamiton Cream

Contains crotamiton 10 per cent. in a non-greasy basis.

Lead and Spirit Lotion, B.P.C.

Contains Strong Solution of Lead Subacetate 120 m. (2·5 per cent.) and industrial methylated spirit 570 m. (about 12 per cent.) in purified water to 10 fl. oz.

Hydrocortisone Ointment, *see* page 123.

STIMULATING APPLICATIONS

This is a miscellaneous group of substances which act as stimulants to local circulation or as keratolytics and used in certain subacute and chronic conditions. Ammoniated Mercury and Coal Tar Ointment is used for subacute seborrhoeic and eczematous lesions, lichen planus &c. It may be used with the addition of salicylic acid if a strong keratolytic action is desired. Podophyllin Compound Paint is useful for venereal warts ; care must be taken to prevent accidental contamination of the eyes. Sulphurated Potash and Zinc Lotion may be used for oily seborrhoea and acne vulgaris, the lotion being rubbed in so that penetration occurs into the follicles. Zinc Oxide and Coal Tar Paste is valuable for chronic eczema.

Ammoniated Mercury and Coal Tar Ointment, B.P.C.

Contains ammoniated mercury 12 gr. (2·5 per cent.) and Solution of Coal Tar 33 m. (6·25 per cent.) in yellow soft paraffin to 480 gr.

Ammoniated Mercury, Coal Tar and Salicylic Acid Ointment, B.N.F.

Contains salicylic acid 10 gr. (about 2 per cent.) in Ammoniated Mercury and Coal Tar Ointment to 480 gr.

Balsam of Peru Compound Ointment, B.N.F.

Contains balsam of Peru 30 gr. (6·25 per cent.), liquefied phenol 10 m. (about 2 per cent.) and camphor 5 gr. (about 1 per cent.) in hydrous wool fat 120 gr., and yellow soft paraffin to 480 gr.

Podophyllin Compound Paint, B.N.F.

Contains podophyllum resin 8 gr. (about 15 per cent.) in Compound Tincture of Benzoin to 60 m.

Sulphurated Potash and Zinc Lotion, B.N.F.

Contains sulphurated potash and zinc sulphate, of each, 80 gr. (about 4·6 per cent.) in Camphor Water to 4 fl. oz.

Zinc Oxide and Coal Tar Paste, B.P.C.

Contains zinc oxide and coal tar, of each, 30 gr. (6·25 per cent.) and starch 180 gr. (37·5 per cent.) in yellow soft paraffin to 480 gr.

Zinc Oxide and Ichthammol Cream, B.P.C.

Contains ichthammol 50 gr. (about 5 per cent.), with cetostearyl alcohol, wool fat and Zinc Oxide Cream to 960 gr.

ANTISEPTIC APPLICATIONS

Antibiotics are admirable antiseptics when applied locally, especially in emulsified bases. Penicillin, streptomycin and sulphonamides must not be used on the skin as they are very apt to induce sensitization. Ammoniated Mercury Ointment is valuable in mild pyococcal infections, but its greasy base renders it unsuitable for exudative lesions. Brilliant Green and Crystal Violet Paint is useful for localised infections including impetigo and boils. Prolonged use should be avoided because they can be intensely irritant. Cetrimide is an excellent bland antiseptic which only rarely causes sensitization. Copper and Zinc Sulphates Lotion is astringent and only midly antiseptic. It is useful as a wet dressing in folliculitis, sycosis and herpes simplex.

Ammoniated Mercury Ointment, B.P.

Contains ammoniated mercury 2·5 per cent. in Simple Ointment.

Brilliant Green and Crystal Violet Paint, B.P.C.

Contains brilliant green and crystal violet, of each 2 gr. (0·5 per cent.), with industrial methylated spirit and water to 1 fl. oz.

Cetrimide Cream, B.N.F.

Contains cetrimide 2½ gr. (about 0·5 per cent.), with cetostearyl alcohol 24 gr., liquid paraffin 240 gr. and purified water to 480 gr.

Copper and Zinc Sulphates Lotion, B.P.C.

Contains copper sulphate 8 gr. (about 1 per cent.) and zinc sulphate 12 gr. (about 1·4 per cent.) in Camphor Water to 2 fl. oz.

Crystal Violet Paint

Synonym : Gentian Violet Paint.

Contains crystal violet 4 gr. (about 1 per cent.) in water to 1 fl. oz.

Proflavine Cream, B.P.C.

Contains proflavine hemisulphate 1 gr. (about 0·1 per cent.), with chlorocresol, yellow beeswax, wool fat, water and liquid paraffin to 960 gr.

Zinc Sulphate Lotion, B.P.C.

Synonym : Red Lotion

Contains zinc sulphate 44 gr. (1 per cent.) with Solution of Amaranth and water to 10 fl. oz.

ANTIPARASITICS

Sulphur Ointment is a traditional and effective remedy for scabies but is being replaced by Benzyl Benzoate Application which is a more efficient and less irritant acaricide.

A single thorough application is sufficient for most cases. A second application can be made after a week if necessary. Crotamiton Cream is also an efficient acaricide. Dicophane Application is used for pediculosis. Dicophane Dusting-powder may be dusted into clothes when it is suspected that a skin lesion is due to insect bites (e.g. papular urticaria in children).

Benzyl Benzoate Application, B.P.

Contains benzyl benzoate 25 per cent. w/v, with emulsifying wax and water.

Directions for use : To be applied with a brush over the whole body, omitting the head.

Crotamiton Cream, *see* page 163.

Dicophane Application, B.P.C.

Synonym : DDT Application.

Contains dicophane 17½ gr. (2 per cent.) with emulsifying wax, xylene, citronella oil and water to 2 fl. oz.

Directions for use : Rub about one tablespoonful with the fingers into the hair and roots of the hair. Do not wash the head during the next twenty-four hours.

Dicophane Dusting-Powder, B.N.F.

Synonym : DDT Dusting-powder.

Contains dicophane and calcium carbonate, of each, 10 per cent. and light kaolin.

Sulphur Ointment, B.P.

Contains sublimed sulphur 10 per cent. in Simple Ointment prepared with white soft paraffin.

FUNGICIDES

Fungicides should not be applied if there is secondary coccal infection until this has been brought under control first. Very severe fungus inflammation should be allayed with wet dressings or starch poultices or Gentian Violet Paint before using fungicides. Boric Acid Compound Ointment is especially suitable for dry scaly lesions and may be rubbed in once or twice daily. Magenta Paint is cleaner and easier to use. For the first application it may be diluted with an equal volume of water and used once daily. A dusting-powder containing salicylic acid may be applied over the painted area if desired.

Benzoic Acid Compound Ointment, B.P.C.

Synonym : Whitfield's Ointment.

Contains benzoic acid 29 gr. (6 per cent.) and salicylic acid 14½ gr. (3 per cent.) in Emulsifying Ointment to 480 gr.

Magenta Paint, B.P.C.

Synonym : Castellani's Paint.

Contains magenta 1¾ gr. (0·4 per cent.) and phenol 17½ gr. (4 per cent.), with boric acid, resorcinol, acetone, industrial methylated spirit and water to 1 fl. oz. It should be protected from light.

KERATOLYTICS

Keratolytics soften the horny layer of the skin and reduce its thickness, and are therefore indicated in chronic scaling or thickened lesions, especially psoriasis. Salicylic Acid Ointment is useful for dandruff and psoriasis of the scalp. Resorcinol and Sulphur Paste applied at night and washed off in the morning is useful for acne vulgaris. Dithranol

is a powerful keratolytic and causes irritation of the skin. Because it is especially irritant to the eyes it should not be used on the scalp for fear of accidentally contaminating the eyes.

Dithranol Ointment, B.P.

Contains dithranol 0·1 per cent. in yellow soft paraffin.

Resorcinol and Sulphur Paste, B.P.C.

Contains resorcinol and precipitated sulphur, of each 30 gr. (6·25 per cent.) and zinc oxide 180 gr. (37·5 per cent.) in Emulsifying Ointment to 480 gr.

Salicylic Acid Ointment, B.P.

Contains salicylic acid 2 per cent. in Wool Alcohols Ointment.

Salicylic Acid Paste with Dithranol, B.N.F.

Contains dithranol 2½ gr. (about 0·5 per cent.) in Zinc Oxide and Salicylic Acid Paste to 480 gr.

Zinc Oxide and Salicylic Acid Dusting-Powder, B.P.C.

Contains zinc oxide 192 gr. (20 per cent.), salicylic acid 48 gr. (5 per cent.) and starch to 960 gr.

Zinc Oxide and Salicylic Acid Paste, B.P.

Synonym : Lassar's Paste.

Contains zinc oxide 24 per cent. and salicylic acid 2 per cent. with starch in white soft paraffin.

CLEANSING AGENTS

They are used for removing fatty ointments from the skin, as degreasing agents in oily seborrhoea and as a shampoo for seborrhoeic scalps. Cetrimide Solution and Soap Spirit are useful in removing crusts as in impetigo.

Cetrimide Solution

Contains cetrimide 1 per cent. w/v in purified water.

Detergent Application, B.N.F.

An oil-in-water emulsion prepared with emulsifying wax 52 gr. (about 1·5 per cent.), yellow soft paraffin 35 gr. (1 per cent.), arachis oil 80 m. (about 2 per cent.), methylhydroxybenzoate 2 gr. (about 0·05 per cent.) and water to 8 fl. oz.

Soap Spirit, B.P.C.

Contains soft soap 65 per cent. w/v in industrial methylated spirit.

DESICCANTS AND PROTECTIVES

Protective substances, e.g. Aluminium Compound Paste, prevent maceration of the skin around colostomies &c. Dusting-powders could also be used as protectives. Titanium Dioxide Paste may be used for drying up small exudative areas.

Aluminium Compound Paste, B.P.C.

Contains aluminium powder 96 gr. (20 per cent.) and zinc oxide and liquid paraffin, of each, 192 gr. (40 per cent.)

Flexible Collodion, B.P.

Synonym : Collodion.

Contains pyroxylin, colophony, castor oil, industrial methylated spirit and solvent ether.

Titanium Dioxide Paste, B.N.F.

Contains titanium dioxide 96 gr. (20 per cent.), zinc oxide 120 gr. (25 per cent.), kaolin 48 gr. (10 per cent.) and red precipitated ferric oxide 9½ gr., with glycerin 72 gr., chlorocresol ½ gr. and water to 480 gr.

VEHICLES

Emulsifying Ointment, B.P.

Contains emulsifying wax 30 per cent. with white soft paraffin and liquid paraffin.

Hydrous Ointment, *see* page 161.

COUNTER-IRRITANTS

Counter-irritation can be produced by physical and chemical methods. By producing irritation of the skin these substances are able to alleviate superficial or deep seated pain. They are used for painful lesions of muscles, tendons and joints. They all act through the same essential mechanism and differ in the intensity and duration of their action. Turpentine Liniment and Strong Solution of Iodine are capable of producing excessive irritation and blistering.

Camphor Liniment, B.P.

Synonym : Camphorated Oil.

Contains camphor 20 per cent. w/w in arachis oil.

Iodine Solution, Strong, B.P.

Contains iodine 10 per cent. w/v and potassium iodide 6 per cent. w/v in alcoholic solution.

Kaolin Poultice, B.P.

Contains heavy kaolin, boric acid, methyl salicylate, peppermint oil, thymol and glycerin.

Methyl Salicylate Ointment, Dilute, B.N.F.

Contains Methyl Salicylate Ointment 120 gr. (25 per cent.) in Hydrous Wool Fat Ointment to 480 gr.

Turpentine Liniment, B.P.

Contains turpentine oil about 65 per cent. v/v and camphor 5 per cent. w/v, with soft soap and water.

SURGICAL ANTISEPTICS

The bacterial population of the skin consists of "transients" on the surface and "residents" in the crevices, pores and hair follicles. The transients are easily removed by washing with soap and water. The residents, mostly non-pathogenic, are difficult to destroy. Virtual disinfection of the skin is achieved within 30 seconds by a single application of Tincture of Iodine.

Cetrimide is a cationic detergent and a good antiseptic. Its activity is destroyed by anionic detergents like soap which must therefore be completely washed off before cetrimide is used. When applied to the skin it forms an imperceptible film which remains for about three hours destroying organisms as they are flushed out from the pores by perspiration. Like most antiseptics its activity is reduced by organic matter (blood, serum, pus) and has a weak action against *Ps. pyocyanea.* Chlorhexidine has a wide bactericidal spectrum that includes *Ps. pyocyanea,* and its excellent antiseptic action is only very slightly reduced by the presence of organic matter. Being non-irritant it is suitable for use in obstetrics and for bladder irrigations. It can be used in combination with antibiotics. Cetrimide and chlorhexidine together provide a powerful combination of antiseptic and detergent properties. Chloroxylenol is useful in obstetrics and skin disinfection. Alcohol has its maximum effectiveness in a concentration of 70 per cent. by weight. It should not be applied to open skin wounds. Proflavine is effective against a wide range of organisms and is unaffected by organic matter and is therefore a good dressing for wounds. The antiseptic activity of hydrogen peroxide and potassium permanganate is seriously reduced by the presence of organic matter.

None of the antiseptics mentioned can be relied upon to kill spores rapidly. Undiluted lysol kills spores and is excellent for sterilizing sharp instruments.

Cetrimide, B.P.

For seborrhoea of the scalp, 3 per cent. aqueous solution as shampoo.

For rapid skin disinfection, 1 per cent. solution in 70 per cent. alcohol.

For pre-operative "scrub-up", 1 per cent. aqueous solution.

For wounds and burns, 0·5 per cent. aqueous solution or cream.

For storage of sterile instruments, 0·1 per cent. aqueous solution with sodium nitrite 0·4 per cent. to prevent rusting.

Chlorhexidine

For obstetric use, 1 per cent. chlorhexidine cream.

For wounds and burns, 1 per cent. as cream or as dusting powder.

For bladder irrigations, 1 in 5,000 aqueous solution.

Chlorhexidine and Cetrimide Solution

Contains chlorhexidine 1·5 per cent. w/v and cetrimide 15 per cent. w/v.

1 : 20 dilution in 70 per cent. alcohol : for rapid disinfection of instruments and appliances (2 minutes soak) and for storage of clinical thermometers.

1 : 30 dilution in 70 per cent. alcohol : for pre-operative disinfection of skin.

1 : 100 aqueous solution : for wounds, burns and rinsing hands.

1 : 200 aqueous solution : for disinfection of hospital equipment (utensils, soiled linen &c.), for spraying wards and for storage of sterile instruments (with sodium nitrite 0·4 per cent. added to prevent rusting).

1 : 800 aqueous solution : for vaginal douche.

Chloroxylenol Solution, B.P.

Contains chloroxylenol 5 per cent. w/v, with terpineol, in an alcoholic saponaceous solvent.

Iodine Solution, Weak, B.P.

Synonym : Tincture of Iodine.

Contains iodine and potassium iodide, of each, 2·5 per cent. w/v in alcoholic solution.

Lysol, B.P.

Contains 50 per cent. v/v of Cresol.

Solution of Hydrogen Peroxide, B.P.

Potassium Permanganate, B.P.

Proflavine Solution

Contains proflavine hemisulphate 0·1 per cent. w/v in purified water.

Surgical Spirit, B.P.C.

VACCINES

A single injection of vaccine (toxoid, bacterial or viral) gives a basal immunity and in some way "educates" the body so that a second injection produces large amounts of antibody rapidly. Even though the active immunity produced is slowly lost the potential immunity (acquired power of rapid antibody production) remains for many years and usually for life. In such a person, active immunity is capable of rapid restoration to its original level by means of a booster injection. A booster injection will confer adequate immunity only if it is given within a specified period after full primary immunization or after the last booster. For details consult the table on vaccines.

Reactions to vaccine consist of localized swelling and tenderness, and constitutional disturbances like malaise, fever and headache. They are mild in children under five but their severity increases with age. Treatment is with aspirin.

Administration. Vaccines are given by intramuscular or deep-subcutaneous injection. It is impossible to measure small doses accurately in a large syringe (e.g. T.A.B. vaccine in children), and severe general reactions have occurred in children during mass immunization because they have received excessive doses. A fresh syringe and needle

should ideally be used for every injection because there is a risk of accidental infection if the needle only is changed between injections. In children with an allergic diathesis it is advisable to start with a trial dose of 0·1 ml. subcutaneously and give the remainder in similar amounts if reactions are severe or in one injection if no reactions occur.

Vaccines should be stored at between 2° and 10°C. Storage at or below freezing point is harmful. The ampoule should be shaken well before the material is taken into the syringe.

Preparation	*Primary Immunization*	*Booster*	*Comments*
Smallpox Vaccine	Preferably at the age of three months, by multiple pressure or abrasion method.	Usually every three years, but annually for hospital staff dealing with smallpox, and immediately for all contacts regardless of recent revaccination.	Primary vaccination during infancy is associated with less severe reactions and less likelihood of post-vaccinal encephalomyelitis than in later years.
Diphtheria, Tetanus and Pertussis Vaccine (DTP)	From the fourth month onwards (or one month after smallpox vaccination). Three doses of 1 ml. at intervals of one month.	1 ml. at two years and again at school entry (five years). An earlier booster of combined or specific antigen upon exposure to diphtheria or pertussis, or after injury.	If pertussis or diphtheria vaccine alone have been given earlier, use the other two vaccines and not all three for primary immunization. Thereafter, all three vaccines can be used for booster injections. Such inconvenience is obviated by using triple vaccine from the start of immunization in infancy. It is unnecessary to give pertussis vaccine after the fifth year and diphtheria vaccine after the tenth year.
Pertussis Vaccine	First injection 1 ml. (0·5 ml. under one month), followed by two further injections of 1 ml. separated by intervals of one month.	1 ml. at three years.	

Preparation		*Primary Immunization*	*Booster*		*Comments*
Tetanus Vaccine		Two doses of 1 ml. separated by four to six weeks, followed by 1 ml. six to twelve months later.	1 ml. every five years. An earlier booster on exposure to infection, if eighteen months have elapsed since last dose of primary course or last booster.		Injections of any kind, especially alum containing vaccines should be avoided when there is epidemic prevalence of poliomyelitis. TAF or FT should be used under such circumstances if diphtheria prophylaxis is urgent.
Diphtheria Vaccines	PTAP	Two doses of 0·5 ml. separated by one month. PTAP is suitable for children below eight years.	0·2ml.	Diptheria boosters are necessary at two years, at school entry and at ten years. An earlier booster is given on exposure to infection if twelve months have elapsed since completion of primary course or last booster.	Although adequate immunity is achieved almost immediately after a booster, it may take a few weeks for this to happen after primary immunization. In a non-immunized person, immediate protective immunity can be conferred only by administering appropriate serum.
	FT	Two doses of 1 ml. separated by one month. FT is used for children below eight years when it is desirable to avoid alum containing vaccines.	1ml		*See section on antitoxic sera.*
	TAF	Three doses of 1 ml. separated by intervals of one month. TAF causes less reactions and is suitable for all children over eight years.	1 ml.		Since doses recommended in tables are for British preparations and may not apply to products from other countries.

Poliomyelitis Vaccine	From seventh month onwards. Two doses of 1 ml. separated by two to six weeks, followed by 1 ml. seven months later.	Not yet known.	consult manufacturer's instructions.
B.C.G	0·1 ml. intradermally, if tuberculin skin test is negative.	Check tuberculin skin test six to eight weeks later and repeat if negative.	Do not administer simultaneously with smallpox vaccine.
Cholera Vaccine	0·5 ml. followed by 1 ml. seven to ten days later.	1 ml. within six months of last immunization. After six months, repeat full primary course.	
T.A.B. Vaccine	*Either* 0·5 ml. followed by 1 ml. seven to ten days later, *or* 0·25 ml. followed by 0·5 ml. seven to ten days later, and a further 0·5 ml. after six months.	0·5 ml. every year, especially for those exposed to infection. If two years have elapsed without a booster, a full primary course must be repeated.	The primary course of three injections is recommended for persons who are likely to have severe reactions (in debility, malnutrition &c.). This confers better immunity than the two injection method. For children, 0·004 ml. and 0·008 ml. per lb. correspond to the adult doses of 0·5 and 1 ml.

Preparation	*Administration*		
		1 per cent. vaccine	*5 per cent vaccine*
Rabies Vaccine (The effects and toxicity of the 5 per cent vaccine are being assessed at the General Hospital, Colombo at the moment).	1. For licks ; indirect infections; very superficial scratches (which have not drawn blood) on all parts of the body except the head, face, neck and fingers.	5 ml. (3 ml. under three years) daily for fourteen consecutive days.	2 ml. daily for seven consecutive days.
	2. For licks on fresh cuts or abrasions ; bites and scratches on all parts of the body except head, face and neck which have definitely drawn blood, excluding multiple injuries and lacerated wounds.	5 ml. (3 ml. under three years) daily for eighteen to twenty-one consecutive days.	5 ml. (3 ml. under 70 lbs) daily for fourteen consecutive days.
	3. For all injuries of head, face and neck ; bites on fingers which are lacerated or penetrating ; multiple injuries and lacerated wounds on all parts of the body.	5 ml. (3 ml. under three years) daily for twenty-one consecutive days. *Note :* For additional protection administer by perimmune serum.	5 ml. daily for eighteen to twenty-one consecutive days.

ANTITOXIC SERA

Storage. At an optimal temperature of 2° to 4° C. full potency is retained until date of expiry. At room temperature deterioration is about 25 per cent. per year. Protect from extremes of heat during transport by carrying in a vacuum flask.

Serum Reactions. General reactions are of two types:—

1. Anaphylactic shock, an immediate reaction with dyspnoea and circulatory collapse which may prove rapidly fatal. Reactions occuring over half an hour after serum (sweating, feeling of warmth, wheezing, substernal oppression, pruritus or urticaria) are usually less serious.

2. Serum sickness, with pyrexia, urticaria, joint pains and lymphadenopathy occurring about ten days after serum. Accelerated serum sickness occurs after four days and has the same clinical picture.

A local reaction (Arthus phenomenon) with intense oedema and haemorrhage and sometimes sloughing of tissues at the site of injection. This is rare and usually occurs in those who have received serum previously at the same site.

Prevention of Serum Reactions. Patients who have received serum previously, and especially allergic subjects (asthma, allergic rhinitis, infantile eczema, food allergy) are likely to suffer reactions. Since many patients do not know whether they have received serum previously, it is safer to test for sensitivity with a trial dose subcutaneously in all persons. The purpose of the test is to introduce

serum into the general circulation slowly and provoke mild anaphylactic reactions in a sensitive subject. Intradermal, conjunctival and scratch tests are unreliable.

1. In a non-allergic person give 0·2 ml. serum *subcutaneously* and observe for half an hour. If there is no evidence of any *general reaction* (trial doses are not given for observing local reactions) the full dose can be given. If there is a general reaction, continue with a course of trial injections, 0·2 ml. subcutaneously every half hour until the full dose has been administered.

2. In allergic subjects, have adrenaline ready, and give as first trial dose 0·2 ml. of serum diluted 1: 10. If there is no general reaction in half an hour give 0·2 ml. of undiluted serum. If there is no general reaction after another half hour give the full dose. If a reaction occurs give the remaining serum by trial injections after administering a quick-acting antihistamine (100 mg. mepyramine) orally.

In view of these considerations always ensure that allergic subjects are actively immunized against diptheria and tetanus.

Treatment of Serum Reactions

1. Injection of adrenaline, 0·5 to 1 ml., i.m. Repeat with 0·5 ml. every twenty minutes if necessary.

2. An antihistamine i.m. followed by oral doses if necessary.

3. Corticosteroids are of little value as an emergency measure. If reactions cannot be controlled with the usual measures, give 100 mg. hydrocortisone i. v. followed by oral administration of a suitable corticosteroid.

Administration of Antitoxic Serum. After an i.m. injection a maximum blood level is reached only after 36 to 48 hours. After an i.v. injection antitoxin is immediately available for neutralization of circulating toxin so that this route is employed in severe cases or when there has been delay in administering serum. If i.v. injection is not possible, administer by intraperitoneal injection. Certain precautions are essential before injecting serum i.v. :—

1. An i.v. injection is given only if an i.m. injection given at least half an hour, and preferably one hour earlier has not produced any general reaction.

2. An injection of adrenaline must always be ready before injecting serum i.v.

3. Serum should never be given i.v. to an allergic subject or to a person who has shown any reaction to a trial dose.

4. The injection should be given very slowly through a fine needle and it should be stopped if there is any distress, and adrenaline given i.m.

Diphtheria Antitoxin

Prophylactic. For contacts who have not been previously immunized, 1,000 to 2,000 Units. The passive immunity produced lasts for about two weeks. The desirable procedure for persons not previously immunized is a combined active-passive immunization. Injections of serum and the first dose of toxoid are given concurrently into opposite arms followed by a second injection of toxoid one month later as in primary immunization. A better alternative is to start the course of primary immunization two weeks after antitoxin. Do not use TAF for combined immunization. Prophylaxis for contacts who have been previously immunized is mentioned under vaccines.

Curative. If diptheria is suspected, immediate administration of antitoxin is obligatory without waiting for bacteriological confirmation. The dose required is assessed on three criteria :—

1. Site of infection. For nasal type 10,000 to 20,000 Units ; for laryngeal type 20,000 to 80,000 Units ; for faucial type 20,000 to 100,000 Units ; and for diphtheria gravis 100,000 to 200,000 Units.

2. Severity. This is judged by the extent of the membrane, degree of toxaemia, presence of haemorrhage and extensive cervical adenitis. Severe cases are given the higher dose.

3. Delay in treatment. Treatment after the third day of illness requires the higher dose.

When more than 40,000 Units are thought necessary serum is given i.v. if an i.m. dose given earlier has caused no reactions.

Tetanus Antitoxin

Prophylactic. For a non-immune person 1,500 Units. This dose is doubled if there is heavy contamination or much devitalized tissue and also in deep wounds. The passive immunity produced lasts for about one week.

A person is non-immune (*a*) when he has never received toxoid, or received only one injection of toxoid, and (*b*) when six months have elapsed after two injections of toxoid or five years after a full primary course or a booster injection. An immune person requires only a toxoid booster for prophylaxis (*see* table on vaccines).

The desirable procedure for persons not previously immunized is combined active-passive immunization. Injections of serum and the first dose of toxoid are given

into opposite arms and subsequent doses of toxoid are given as in primary immunization. A better alternative is to start the course of primary immunization six weeks after antitoxin.

Curative. 100,000 Units i.v., supplemented by a similar amount after two days in very acute cases. A further 25,000 Units is given weekly until symptoms abate.

Mixed Gas-Gangrene Antitoxin

Prophylactic. Not less than 25,000 Units i.m.

Curative. Not less than 75,000 Units, i.v., repeated daily if necessary.

Snake Antivenom

This is a polyvalent antivenom which is effective against the venoms of cobra, Russell's viper, krait and the saw-scaled viper. The preparation of liquid serum deteriorates rapidly at room temperature. Stored at 2° to 4°C. its potency is retained for two years. The preparation of lyophilized (freeze-dried) serum is more stable and its potency is retained for ten years when stored in a cool dark place so that it can be carried into jungle areas if necessary. It is preferably stored in a refrigerator. The freeze-dried serum is reconstituted with 10 ml. of Water for Injection.

Serum must be injected i.v. without a moments delay and without a preliminary trial dose. The first dose is 20 ml. This repeated after two hours, and if signs of toxicity persist it is given at six-hourly intervals. In a case of viper bite some serum is injected around the fang marks to prevent the intense necrotizing action of viper venom locally.

In order to enable the antivenom to have its maximum effect, absorption of venom into the circulation must be retarded by ligation, incision and suction even after antivenom has been administered. The ligature should be sufficiently tight to stop circulation and loosened for five to ten seconds every ten minutes. It should be removed after half an hour. Each fang wound should be opened by quarter inch cross incisions. Mechanical suction should be applied for several hours over the cuts to drain off as much blood and lymph as is possible. During intervals between suction concentrated magnesium sulphate solution is applied over the wounds, and the incisions are washed with a *weak* solution of potassium permanganate. Avoid applying crystals or strong solutions of this substance or cauterization because the poison then becomes sealed within the tissues.

ANTIVIRAL SERA

Antiviral sera are usually obtained from human convalescents (convalescent serum) or from adults who have had the disease in the past (adult serum). Unfortunately there is a risk of serum hepatitis following the use of convalescent or adult serum. There is no such risk when gamma globulin prepared from this serum is used. These preparations are used only in the prophylaxis of certain diseases like measles, German measles, acute poliomyelitis and infectious hepatitis (but not serum hepatitis). They are of no value in the prevention of mumps, chickenpox and smallpox.

Rabies serum is obtained from hyperimmunized horses and is indicated for those exposed to bites about the head or neck. A course of vaccine injections should be started twenty-four hours after serum has been administered. The manufacturers' instructions regarding dosage should be followed.

DOSAGE FOR CHILDREN

Doses for children are often derived by calculation from doses appropriate for adults. But more exact posology is based on calculating from a known amount of drug per pound of body weight and this method is recommended for calculating doses from the table given below. There may be some inconvenience at first in having to weigh every child, but with experience it is possible to assess the weight of most children. When the dose is calculated care must be taken not to exceed the adult dose.

The table is restricted to those drugs in which accuracy of dosage is of importance in children. Ingeneral, children are more resistant than adults to sedatives, purgatives, antihistamines, adrenaline, digitalis, belladonna, sulphonamides, thyroid, iron and iodides. They are especially sensitive to antipyretics, opium derivatives with the exception of codeine and to stimulants.

Rectal doses are approximately twice the amount given orally.

TABLE

Acetazolamide : oral, 2·5 mg/lb./day.

Adrenaline : s.c. or i.m., 0·01 ml/lb.

Aminopbylline : oral or i.v., 2 mg./lb.
rectal, 3 mg./lb.

Amodiaquine : *see* page 92.

Amylobarbitone : oral, 1·5 to 3 mg./lb.

Antihistamines in general : oral, 1 to 2 mg./lb/day.

Atropine : s.c., 0·01 mg./lb.

Carbarsone : oral, 3 mg./lb./day in two doses.

Chloral hydrate : oral, as sedative 5 mg./lb. ; as hypnotic 10 to 15 mg./lb.

Chloramphenicol : oral, 25 to 50 mg./lb./day in three doses. oral, in meningitis 100 mg./lb/.day in three doses.

Chloroquine ; *see* page 92.

Chlorothiazide : oral, 5 to 10 mg./lb./day.

Cblorpromazine : oral, 1 mg./lb./day in three doses. i.m., 0·25 mg./lb.

Codeine : oral, 0·25 to 0·5 mg./lb.

Corticotrophin : i.m., 0·5 to 1 unit/lb.

Cortisone : oral or i.m., 4 to 5 mg./lb./day up to a maximum of 300 mg./day.

Dichlorophen : oral, for one day treatment 30 mg./lb.

Diethylcarbamazine : oral, for tropical eosinophilia 9 mg./lb./day in three doses for five days ; for filariasis 1 mg./lb./day for ten days, repeated twice at fortnightly intervals.

Digitalis folia : oral, digitalizing dose 15 mg./lb. daily maintenance 1·5 mg./lb.

Digoxin : oral, digitalizing dose 0·01 mg./lb. daily maintenance 0·001 mg./lb.

Emetine : s.c. or i.m., 0·5 mg./lb./day.

Ephedrine : oral, 0·5 mg./lb.

Erythromycin : oral, 20 mg./lb./day in four doses.

Hexylresorcinol : oral, 0·1 G./year of apparent age. Maximum dose 1 G.

Iron ferrous : oral, 3 mg./lb./day of elemental iron up to a maximum of 200 mg.

Iron : i.v. or i.m., total iron required (including body stores) = 1·3W (19–Hb) mg.

W = weight in lb. and Hb is expressed as G./100ml.

The maximum dose at any one injection should not exceed 25 mg. for children under 8 lb., 50 mg. between 8 and 20 lb. and 100 mg. for children over 20 lb.

Isoniazid : oral, 5 mg./lb./day ; in meningitis 10 mg./lb./day.

Mepacrine : oral, for tapeworm 10 mg./lb.

Metsalyl : i.m. infants 0·25 ml. and older children 0·5 to 1 ml.

Methoin : 1·5 to 5 mg./lb./day.

Morphine : s.c., 0·1 mg./lb.

Nalorphine : i.v., 0·1 mg./lb.

Neomycin sulphate : oral, 25 mg./lb./day in four doses.

Neostigmine : oral, 0·15 mg./lb. and by injection 0·015 mg./lb.

Nitrofurantoin : oral, 3 to 5 mg./lb./day in three doses.

Nystatin : oral, 500,000 units/day below 2 years ; over 2 years 1 to 2 million units/day.

Paraldehyde : oral or i.m., 0·05 ml./lb. and rectal, 0.1 to 0·3 ml./lb.

PAS : oral, 0·2 G./lb./day in four doses.

Penicillin, crystalline : i.m., 20,000 units/lb./day in two doses.

Penicillin, fortified procaine : i.m., half adult dose up to 6 years.

Penicillin, fortified benethamine : i.m., half adult dose up to 6 years.

Penicillin, benzathine : i.m., half adult dose up to 6 years.

Penicillin V : oral, up to 6 years 60 mg. four-hourly ; over 6 years 125 mg. four-hourly.

Pentobarbitone : oral, 1 to 2 mg./lb.

Pethidine : i.m., 0·5 to 1 mg./lb.

Phenobarbitone : oral, for sedation 0·5 mg./lb ; as anticonvulsant 1 to 2 mg./lb./day.

Phenobarbitone sodium : i.m., 2 mg./lb.

Phenytoin : oral, 1 to 4 mg./lb./day in divided doses.

Piperazine : oral, for threadworms 20 mg./lb./day in two doses for one week ; for roundworms 2 G below 44 lb and 3 G over 44 lb. Repeat next day if necessary.

Polymyxin : oral, 5 to 10 mg./lb./day in four doses ; i.m., 1 mg./lb./day in three doses.

Prednisone and prednisolone : oral, 1 mg./lb./day in three doses up to maximum of 60 mg.

Primaquine : *see* page 93.

Primidone : oral, under 6 years 125 mg. in two doses ; over 6 years 250 mg. in two doses.

Procainamide : oral, 7·5 mg./lb.

Quinalbarbitone : oral, 1 to 2 mg./lb.

Quinidine : oral, 3 mg./lb.

Reserpine : oral 0·005 to 0·015 mg./lb./day.

Sodium salicylate : oral, single analgesic-antipyretic dose 1 gr./year ; for rheumatic fever 1 gr./lb./day in divided doses.

Streptomycin : i.m. or oral, 10 to 20 mg./lb./day.

Sulphadiazine : oral, 75 mg./lb./day in six doses.

Sulphadimidine : oral, 60 mg./lb./day in four doses.

Sulphaguanidine : oral, 120 mg./lb./day in four doses.

Tetrachloroethylene : oral, 0·05 ml./lb. as a single dose without purgation.

Tetracyclines : oral, 5 to 15 mg./lb./day in four doses ; im., or i.v., 6 mg./lb./day.

Troxidone : oral, 7·5 to 15 mg./lb./day in divided doses.

Vitamin K_1 : for infants 1 to 2 mg./day.

PREPARATIONS FOR INFANTS

(Up to one year of age)

Carminative Mixture for Infants

Sodium Bicarbonate		1 gr.		60 mg.
Tincture of Ginger..	..	1 m.		0·06 ml.
Compound Tincture of Cardamom		3 m.		0·2 ml.
Syrup	.. ..	30 m.		2 ml.
Water	to	60 m.	to	4 ml.

Dose: 60 to 120 minims (4 to 8 millilitres).

Kaolin Mixture for Infants

Light Kaolin	.. ..	15 gr.		1 G.
Tragacanth in powder	..	1/8 gr.		8 mg.
Syrup	.. ..	10 m.		0·6 ml.
Cinnamon Water ..	..	15 m.		1 ml.
Chloroform Water	to	60 m.	to	4 ml.

Dose : 60 minims (4 millilitres).

Chlorpromazine Syrup

Contains Chlorpromazine Hydrochloride 25 mg. per 4 ml. (60 m.).

Glycerin Suppositories for Infants, B. P.

Contains glycerin 70 per cent. w/w, as small size, prepared in a 15 gr. (1 G.) mould.

Magnesium Sulphate Enema for Infants

Contains magnesium sulphate 25 per cent. in water.

Magnesium Hydroxide Mixture, B. P.

Synonym : Cream of Magnesia.

Contains in 30 m. (2 ml.), the equivalent of about 1½ gr. (100 mg.) of magnesium oxide.

Dose : 30 minims (2 millilitres).

Rhubarb Mixture for Infants, B. P. C.

Compound Tincture of Rhubarb	5 m.	0·3 ml.
Light Magnesium Carbonate	1½ gr.	75 mg.
Sodium Bicarbonate	1½ gr.	75 mg.
Syrup	10 m.	0·6 ml.
Chloroform Water	to 60 m.	to 4 ml.

Dose : 60 to 120 minims (4 to 8 millilitres).

Compound Syrup of Figs, B. P. C.

Contains Compound Tincture of Rhubarb and Cascara Sagrada Elixir, of each, 3 m. (0·2 ml.) and Liquid Extract of Senna 6 m. (0·4 ml.) in syrup of fig to 60 m. (4 ml.)

Dose : 30 to 120 minims (2 to 8 millilitres).

Chloral Elixir for Infants

Chloral Hydrate	¼ gr.	60mg.
Syrup	30 m.	2 ml.
Water	to 60m.	to 4 ml.

Dose : 60 minims (4 millilitres).

Sodium Salicylate Mixture for Infants

Sodium Salicylate	2 gr.	130 mg.
Sodium Bicarbonate	1 gr.	60 mg.
Sodium Metabisulphite	1/8 gr.	8 mg.
Syrup	10 m.	0·6 ml.
Chloroform Water	to 60 m.	to 4 ml.

Dose : 60 minims (4 millilitres).

Potassium Citrate Mixture for Infants

Potassium Citrate	5 gr.	325 mg.
Citric Acid	2 gr.	130 mg.
Syrup	20 m.	1·3 ml.
Water	to 60 m.	to 4 ml.

Dose : 60 to 120 minims (4 to 8 millilitres).

Sulphadimidine Mixture for Infants

Sulphadimidine	4 gr.	250 mg.
Compound Powder of Tragacanth	3 gr.	200 mg.
Syrup	20 m.	1·3 ml.
Chloroform Water	to 60 m.	to 4 ml.

Dose : According to the needs of the patient.

Tetracycline, Oral Suspension

Tetracycline Hydrochloride, suitably flavoured, to make a suspension with water to contain 25 to 50 milligrams per ml.

Chloramphenicol, Oral Suspension

Chloramphenicol palmitate or cinnamate, suitably flavoured to make a suspension with water to contain 125 mg. chloramphenicol per 4 ml.

Hexylresorcinol

Enteric-coated pills containing 0·1 G. of hexylresorcinol.

Dose : 0·1 G. for each year of age. The pills must never be crushed or chewed.

Ferrous Sulphate Mixture for Infants, B. N. F.

Ferrous Sulphate ..	1 gr.	60 mg.
Dextrose Monohydrate	10 gr.	650 mg.
Dilute Hypophosphorous Acid	1½ m.	0·1 ml.
Syrup of Orange ..	10 m.	0·6 ml.
Water	to 60 m.	to 4 ml.

Dose : 60 to 120 minims (4 to 8 millilitres).

Sedative Cough Mixture for Infants

Syrup of Codeine Phosphate	.. 10 m.	0·6 ml.
Syrup of Tolu	.. 15 m.	1 ml.
Solution of Benzoic Acid	.. 1½ m.	0·08 ml.
Chloroform Water..	to 60 m.	to 4 ml.

Dose : 60 to 120 minims (4 to 8 millilitres).

Stimulant Cough Mixture for Infants

Ammonium Bicarbonate	½ gr.	30 mg.
Tincture of Ipecacuanha	1¼ m.	0·08 ml.
Aromatic Spirit of Ammonia	2 m.	0·12 ml.
Syrup of Tolu	10 m.	0·6 ml.
Chloroform Water	to 60 m.	to 4 ml.

Dose : 60 minims (4 millilitres).

Opiate Liuctus of Squill for Infants, B. P. C.

Camphorated Tincture of Opium	5 m.	0·3 ml.
Oxymel of Squill ..	5 m.	0·3 ml.
Syrup of Tolu ..	5 m.	0·3 ml.
Glycerin ..	20 m.	1·3 ml.
Syrup	to 60 m.	to 4 ml.

Dose : 60 minims (4 millilitres).

Belladonna and Ephedrine Mixture for Infants

Tincture of Belladonna ..	2½ m.	0·15 ml.
Ephedrine Hydrochloride ..	1/8 gr.	8 mg.
Potassium Iodide	1 gr.	60 mg.
Solution of Benzoic Acid ..	1¼ m.	0·08 ml.
Syrup	10 m.	0·6 ml.
Water .. to	60 m.	to 4 ml.

Dose : 60 to 120 minims (4 to 8 millilitres).

Ephedrine Tablets for Infants, B. N. F.

Ephedrine Hydrochloride Tablets

1/8 grain (8 milligrams).

Dose : For a child, 1/8 grain (8 milligrams).

TREATMENT OF ACUTE POISONING

GENERAL MEASURES should be adopted even if the poison cannot be immediately identified.

Removal of poison. If immediate gastric lavage is impracticable and the patient is conscious, induce vomiting by touching the back of the throat with fingers or by administering a tablespoon of common salt or a teaspoon of mustard in a tumbler of warm water. Gastric lavage is more reliable for removing poison. The patient should be lying face downwards with the head low. Wash out the stomach by means of a funnel and tube until the washings are clear. Use at least a gallon of tap water in quantities not exceeding half to one pint at each filling to prevent fluid passing into the duodenum. After lavage leave a solution of sodium sulphate (1 oz. in half a pint) in the stomach for purgation to remove unabsorbed poison.

Gastric lavage and emesis are usually contraindicated in corrosive poisoning and in poisoning with convulsants for fear of provoking convulsions.

If removal of poison is not immediately possible, its absorption can be delayed by giving water, starch suspension egg white or "universal antidote" (2 parts powdered charcoal or burnt toast, 1 part of magnesium oxide or Cream of Magnesia and 1 part of tannic acid or strong tea). Dilution reduces the local effect of corrosives and delays absorption. The quantity of liquid should not exceed one pint.

Pain occurs chiefly after poisoning with corrosives. Morphine or pethidine should be administered provided there is no respiratory depression.

Vomiting and Diarrhoea. If the poison is strongly irritant to the gastro-intestinal tract the mucous membrane can be protected by giving demulcents like olive oil, egg white or milk and adsorbents like activated charcoal or kaolin at hourly intervals.

Dehydration and shock are treated with appropriate fluids intravenously and the blood pressure may have to be maintained with noradrenaline or methoxamine.

Respiratory depression requires the maintenance of a clear airway (insertion of oro-pharyngeal airway, sucking secretions from throat and trachea, &c.); the administration of oxygen and stimulants like nikethamide or 30 mg. methylamphetamine intravenously. Artificial respiration is necessary in respiratory failure and an anaesthetist should be consulted for methods of supporting respiration.

Pulmonary oedema from poisoning is due to inhalation of irritant gases or ingestion of strong parasympathetic stimulants. Postural drainage should be instituted and morphine, oxygen and aminophylline intravenously should be given.

Convulsions are controlled by intravenous injection of a barbiturate. Pentobarbitone sodium 0·2 to 0·4 G. is probably the best, but others like amylobarbitone or thiopentone can be used. The injection may be repeated as required taking great care not to depress respiration. If there is risk of respiratory depression it is safer to give paraldehyde. Morphine should not be used because it stimulates the spinal cord and respiratory stimulants should be avoided.

Specific Measures can be adopted if the nature of the poison is known. Antidotes can often be added to the water used for gastric lavage. For example, potassium

permanganate 1 in 5,000 to oxidize organic poisons, diluted egg white or milk for corrosives and tannic acid a tablespoon per pint for alkaloids.

Acids (acetic, hydrochloric, nitric, sulphuric). Emetics and lavage are inadvisable. The acid should be diluted and neutralized with magnesium oxide (Cream of Magnesia), aluminium hydroxide gel or lime water. Milk and egg white are useful as demulcents. It is usually necessary to give morphine and adopt measures to combat shock.

Alkalis. Emetics and lavage should be avoided and the alkali neutralized with dilute acetic acid or vinegar. Demulcents are useful. Oedema of the glottis may require tracheotomy.

Antihistamines cause central stimulation often with convulsions which may be preceded by a phase of central depression. Analeptic drugs may provoke convulsions and should not be used for respiratory depression. Mechanical support of respiration is preferable. Convulsions are controlled with paraldehyde. Treat hyperpyrexia with aspirin and sponging.

Agricultural pesticides are of two types, the chlorinated hydrocarbons and the alkyl phosphates. The *chlorinated hydrocarbons* are dicophane (DDT), benzene hexachloride (BHC) and the indane derivatives dieldrin, aldrin, endrin and diendrin. The indane derivatives are several times more toxic than DDT or BHC. Acute poisoning from indane derivatives can arise from ingestion, inhalation or skin contamination. Acute DDT or BHC poisoning occurs only from ingestion ; only small quantities are absorbed through the skin even in organic solvents. Chronic poisoning due to DDT and BHC is extremely rare and mild, but careless handling of indane derivatives for two or

three months leads to toxic effects. The chlorinated hydrocarbons increase the reflex excitability of the central nervous system leading to tremors, excitement and convulsions which are countered by injecting a barbiturate. Later there is vomiting, diarrhoea and respiratory depression which are treated symptomatically. Parenteral calcium decreases the toxicity of these compounds. Ingested poison is washed out with potassium permanganate solution.

The *alkyl phosphates* are parathion, malathion, TEPP, HETP and OMPA, which are highly toxic substances having powerful and sustained anticholinesterase effects. Neuromuscular junctions, ganglia and the central nervous system are initially stimulated and then paralysed and there is intense parasympathetic stimulation. Clinically there is vomiting, abdominal pain, diarrhoea, profuse secretions, muscular twitchings, convulsions, bradycardia and eventually respiratory failure. Atropine should be given intravenously in doses of 1 to 2 mg. and repeated hourly if necessary. Artificial respiration should be given for as long as necessary. Decontamination like removal of clothes and washing the skin with soap and water should be quick and thorough. Ingested poison should be washed out with sodium bicarbonate solution. Treat convulsions with a barbiturate.

Pyridine-2-aldoxine (2-PAM) is a specific antagonist for poisoning with anticholinesterases. The dose is 1,000 mg. given intravenously over a period of 30 minutes.

Arsenic causes dilatation and increased permeability of capillaries, which in the alimentary canal leads to severe vomiting, abdominal pain and diarrhoea with dehydration and shock. Inject BAL for specific treatment and treat symptomatically for pain, shock and respiratory depression.

Aspirin and salicylates produce gastric irritation, renal damage and intense hyperpnoea which causes respiratory alkalosis at first and metabolic alkalosis later. Wash stomach with water and if urine is acid leave sodium bicarbonate in stomach. Urine should be alkalinized to hasten removal of salicylate. Force fluids by mouth and give sodium lactate intravenously if urine is acid, or glucose if urine is alkaline. Give vitamin K_1 by injection and blood transfusions if haemorrhage occurs.

Atropine poisoning is usually due to repeated conjunctival instillations or from eating fruits of *Datura fastuosa* (S-Katuattana, T-Vennumattai). The danger is not from the peripheral effects of atropine but from stimulation and subsequent depression of the central nervous system, especially the respiratory centre. Hyoscine is solely depressant. Wash stomach with potassium permanganate or tannic acid solution and give fluids to hasten renal elimination. Treat respiratory failure ; cold sponge for hyperpyrexia ; barbiturate or paraldehyde cautiously for stage of excitement ; pilocarpine 20 mg. or methacholine 25 mg. subcutaneously to counteract the peripheral effects of atropine.

Barbiturates. Wash stomach with potassium permanganate and leave sodium sulphate in stomach. Immediate danger is from respiratory depression ; maintain clear airway, give oxygen and respiratory stimulants. If coma is deep and reflexes are absent inject 50 mg. bemegride followed by 15 mg. amiphenazole into tube of intravenous drip infusion and repeat at three to five minute intervals until muscle tone just returns. Overdosage leads to convulsions. Penicillin and streptomycin may be given to prevent hypostatic pneumonia.

Cerbera manghas (S-Gonkaduru, T-Kadalma). The seeds and kernel of the fruit contain the poison cerberin which causes vomiting, diarrhoea and bradycardia. Give atropine for bradycardia and treat dehydration and shock. *Tabernamontana dichotoma* (S-Divikaduru) when eaten leads to the same toxic effects.

Chlorpromazine. In acute poisoning there is severe hypotension, loss of muscle tone, central depression and damage to the liver. Hypotension requires the administration of noradrenaline. Treat respiratory depression and other symptoms.

Copper sulphate causes gastrointestinal corrosion, nephritis, collapse and coma. Give milk or egg white, then empty the stomach and give 60 grains potassium ferrocyanide in a tumbler of water. Administer BAL, morphine and parenteral fluids as necessary.

Croton tiglium (S-Jayapala, T-Nervalam). Seeds contain croton oil which causes drastic purgation. Treat symptomatically.

Cyanides *see* manioc poisoning.

Ethyl alcohol causes depression of the central nervous system. Gastric lavage or emesis ; maintain clear airway ; give stimulant drugs. Glucose and insulin intravenously reduces toxicity of alcohol.

Formalin causes vomiting, abdominal pain, diarrhoea and collapse. Wash stomach with 1 per cent. ammonium carbonate solution and leave saline purgative in stomach. Treat shock and renal failure.

Gloriosa superba (S-Niyangala, T-Kallapai). The fleshy tubers which are mistaken for edible yams contain colchicine. In poisoning there is severe abdominal pain, vomiting and

watery or bloody diarrhoea leading to dehydration and shock. Later there may be renal failure and ascending paralysis of the nervous system. Wash stomach, treat shock, administer morphine for pain and treat respiratory depression.

Hypnotics. Wash stomach with potassium permanganate solution ; keep airway clear and give oxygen and respiratory stimulants.

Hypochlorites cause corrosion of the gastrointestinal tract. Wash stomach with sodium thiosulphate solution (one tablespoon per pint) and leave a portion in stomach.

Iodine causes gastrointestinal corrosion. It is not absorbed as such but converted to iodide in tissues. Wash stomach with solution of starch or flour (two tablespoons per pint) until return is no longer blue and leave sodium thiosulphate (one tablespoon in a pint) in the stomach. Treat symptomatically.

Iron, usually as ferrous sulphate causes poisoning in children. Large doses cause corrosion. Wash stomach with sodium bicarbonate (two tablespoons per pint) to convert material to the less toxic ferrous carbonate.

Kerosene and Petroleum distillates cause poisoning both from inhalation of vapour as well as from gastrointestinal absorption. Whether inhaled or swallowed there is acute pulmonary oedema because they are powerful irritants to the lung. The central nervous system is first stimulated and then depressed. Manifestations are cough, dyspnoea, haemoptysis and later bronchopneumonia, excitement, delerium, convulsions and coma. Gastric lavage is risky because the substance can easily pass into the trachea during lavage. Keep airway clear ; treat respiratory depression with oxygen and stimulants, and excitement with small doses of barbiturate. Administer antibiotics.

Manioc (S-Maniokka, T-Maravalli). Poisoning is due to hydrocyanic acid which is released from a cyanogenetic glucoside by the action of enzymes. The reaction occurs in the outer coat of the manioc root when it has been bruised during uprooting and then kept for some hours and cooked in a closed vessel. Cyanides inhibit oxidative enzymes in tissues so that blood remains bright pink due to failure of tissues to withdraw oxygen. There is sudden onset with vomiting, headache, excitement, muscular twitching followed by coma and respiratory failure. Wash stomach and introduce a mixture of ferrous and ferric salts with sodium carbonate. Produce methæmoglobinaemia by inhalation of amyl nitrite at frequent intervals until 10 ml. of 3 per cent. sodium nitrite solution is given intravenously. The cyanide is thereby converted to cyanmethæmoglobin which is less toxic. This is followed by 50 ml. of 25 per cent. sodium thiosulphate intravenously to convert remaining cyanide to harmless thiocyanate. These injections may be repeated after two hours. Treat respiratory and circulatory failure.

Mercury. Mercuric salts cause gastrointestinal corrosion and renal tubular necrosis. Give immediate injection of BAL ; wash stomach and treat symptomatically for pain, shock, convulsions and respiratory depression.

Methyl alcohol. Toxic effects are chiefly due to formaldehyde and formic acid produced by oxidation of methyl alcohol. Inebriation is slight and there is marked acidosis, central nervous system depression, retinal oedema and optic atrophy. All these appear 24 to 72 hours after ingestion. Wash stomach with sodium bicarbonate solution and leave some of it in the stomach together with 3 fl. oz. of 40 per cent. ethyl alcohol (arrack, brandy or whisky). Ethyl alcohol inhibits the oxidation of methyl alcohol. Give

a litre of 5 per cent. sodium bicarbonate intravenously for severe acidosis. Sodium bicarbonate orally or parenterally and alcohol should be repeated until urine is alkaline, and once daily thereafter. Treat convulsions, respiratory depression and shock.

Morphine, pethidine and methadone. The dominant feature is respiratory depression. Give 10 mg. nalorphine intravenously and repeat every half hour as necessary up to a maximum of 40 mg. If the poison has been ingested wash stomach with potassium permanganate solution.

Mushrooms. The toxic substances are muscarine, phalloidine and amanitine which cause toxicity of two types. With muscarine there is intense parasympathetic stimulation resulting in miosis, profuse secretions, abdominal pain, vomiting, diarrhoea and collapse. Convulsions may occur. The specific antidote is atropine, 1 to 2 mg. given intravenously and repeated as necessary. In poisoning due to phalloidine and amanitine there is severe abdominal pain, vomiting haematemesis, diarrhoea, damage to the kidney, heart and central nervous system resulting in renal and cardiac failure, convulsions and respiratory depression. Wash stomach with permanganate solution; treat symptomatically for pain, shock, convulsions and respiratory depression.

Naphthalene is the chief constituent of moth balls. It causes acute haemolytic anaemia and damage to the liver, kidneys, heart and central nervous system. Wash stomach with permanganate solution and leave sodium sulphate in stomach. Give blood transfusions and treat symptomatically for shock, renal failure and respiratory depression.

Oxalic acid and oxalates cause corrosion, hypocalcaemia and renal tubular damage. Wash stomach with calcium containing fluids like milk, lime water or calcium chloride to precipitate calcium oxalate. Inject calcium gluconate repeatedly and treat symptomatically.

Phenols (lysol, chlorocresol, &c.) are strongly corrosive and depressants of the central nervous system. Wash stomach with permanganate solution or milk and treat symptomatically.

Strychnine causes tonic convulsions which are controlled with barbiturate intravenously. Wash stomach with permanganate solution and treat respiratory depression. A source of strychnine poisoning is *Strychnos Nux vomica* (S-Godakaduru, T-Yetti).

Turpentine causes severe irritation of the gastrointestinal and respiratory tracts. Wash stomach with water and avoid milk, egg and oils because they hasten absorption of turpentine. Treat symptomatically for pain, shock, convulsions, renal failure and respiratory depression as they occur.

Dimercaprol Injection, B.P.

Synonym : BAL.

Ampoules containing Dimercaprol 100 mg. per ml. with benzyl benzoate in arachis oil.

Dose : 1·5 mg. per lb. for each injection. On the first day, four injections at 4-hourly intervals and then two injections daily for another seven to ten days.

For poisoning with arsenic, mercury, bismuth, antimony and gold. Not to be given in poisoning with iron, lead and cadmium.

Sodium Thiosulphate Injection

Ampoules containing 50 ml. of 25 per cent. sodium thiosulphate.

Nalorphine Injection, *see* page 147.

METRIC AND IMPERIAL EQUIVALENTS

Minims	*Fl. oz.*	*Pints*	*Metric*
1	—	—	0·059 ml.
16·89	—	—	1 ml.
60	0·125	—	3·55 ml.
480	1	0·05	28·43 ml.
9600	20	1	568·25 ml.
16894	35·196	1·76	1 litre

Grains	*Ounces*	*Metric*
0·015	—	1 mg.
1	0·002	64·799 mg.
15·432	0·035	1 G.
60	0·125	3·89 G.
480	1	31·104 G.
15432	35·274	1 Kg.

1% Solution = 4.375 gr. in one oz of Water

The following table gives approximate equivalents of doses used in this Formulary in the Metric and Imperial Systems :

mg.	*gr.*	*mg.*	*gr.*
0·25	1/240	60	1
1	1/60	100	1½
5	1/12	130	2
8	1/8	150	2½
10	1/6	200	3
15	1/4	250	4
20	1/3	325	5
25	2/5	400	6
30	1/2	500	8
50	3/4	650	10

G. or ml.	*gr. or m.*
0·12	2
0·2	3
0·25	4
0·3	5
0·5	8
0·6	10
1	15
1·3	20
2	30
5	75

The appearance of a drug in this list does not indicate that it has been approved for inclusion in the Formulary. The list is merely meant to provide information on official and proprietary name equivalents.

Official or Approved Names	*Proprietary Names*
Acetazolamide	Diamox
Acetomenaphthone	Kapilon ; Prokayvit ; Vitavel-K
Acinitrazole	Trichorad ; Tritheon
Allobarbitone	Dial
Aloxidone	Malidone
Aluminium hydroxide	Alocol ; Aludrox ; Amphogel ; Collumina ; Gelusil
Amethocaine	Decicain ; Anethaine
Aminometradine	Mictine
Aminophylline	Cardophylin ; Diaphyllin ; Perphyllon
Amiphenazole	Daptazole
Amisometradine	Rolicton
Amodiaquine	Camoquin
Amphetamine	Amphamed ; Benzedrine
Amylobarbitone	Amytal ; Dorminal
Amylocaine	Stovaine
Aneurine	Benerva ; Berin ; Betavel ; Betaxan
Antazoline	Antistin ; Histostab
Ascorbic Acid	Ascorvel ; Celin ; Cevalin ; Davitamon-C ; Redoxon ; Cebion
Aspirin soluble	Disprin ; Regaspirin ; Solprin ; Uniprin
Atropine methonitrate	Eumydrin
Belladonna and phenobarbitone	Belladenal
Bemegride	Megimide
Benactyzine	Cevanol ; Lucidil ; Nutinal ; Suavitil
Benethamine penicillin	Benapen
Benzalkonium	Drapolene ; Roccal ; Zephiran
Benzathine penicillin	Diamine; Dibencil ; Neolin; Penidure; Permapen
Benzhexol	Artane ; Pipanol
Benzyl benzoate application	Ascabiol ; Proscabin
Bismuth glycolylarsanilate	Milibis ; Vinsept
Bromodiphenhydramine	Ambodryl

Scabyl. Metzyl

Official or Approved Names	*Proprietary Names*
Buclizine	Vibazine
Busulphan	Myleran
Buthalitone Sodium	Transithal ; Ulbreval
Butobarbitone	Monodorm ; Soneryl
Calciferol	Fortodyl ; Ostelin ; Radiostol ; Sterogyl
Calcium gluconate	Calcium-Sandoz
Calcium with vitamin D	Calcivitan ; Ostocalcium
Caramiphen	Parpanit
Carbachol	Doryl ; Moryl
Carbarsone	Leucarsone
Carbimazole	Neo-Mercazole
Carbromal	Adalin ; Dormupax
Cetrimide	Biocetab ; Cetavlon
Chiniofon	Quinoxyl ; Yatren
Chlorambucil	Leukeran
Chloral hydrate	Noctec ; Somnos
Chloramphenicol	Alficetyn ; Chloromycetin ; Kemicetine ; Synthomycetine
Chlorbutol	Chloretone
Chlorcyclizine	Di-paralene ; Histantin
Chlorhexidine	Hibitane
Chlorisondamine	Ecolid
Chlormerodrin	Mercloran ; Neohydrin
Chloroquine phosphate	Aralen ; Avlochlor ; Resochin
Chloroquine sulphate	Nivaquine
Chlorothiazide	Chlortride ; Diuril; Saluric; Warduzide
Chlorotrianisene	TACE
Chloroxylenol solution	Dettol
Chlorpheniramine	Piriex ; Piriton
Chlorpromazine	Largactil ; Thorazine
Chlortetracycline	Aureomycin
Cholinetheophyllinate	Choledyl
Chorionic Gonadotrophin	Antuitrin S ; Gonan ; Pregnyl ; Prolan
Cinchocaine	Nupercaine
Codeine compound tablets	Codalgin ; Codis ; Codopyrin ; Veganin
Corticotrophin	Acthar ; Cortrophin
Cortisone	Adreson ; Cortelan ; Cortistab ; Cortisyl
Crotamiton	Eurax
Cyanocobalamin	Anacobin ; Bitevan ; Cobastab ; Cytacon ; Cytamen ; Distivit ; Megalovel ; Rubramin

Official or Approved Names	*Proprietary Names*
Cyclizine	Marzine
Cyclobarbitone	Phanodorm ; Rapidal
Cyclocoumarol	Cumopyrin
Dapsone	Avlosulfon
Deoxycortone acetate	Decortacete ; DOCA ; Percorten ; Syncortyl
Deoxycortone trimethylacetate	Percorten M
Dexamethasone	Decadron ; Dexa-cortisyl
Dexamphetamine	Dexamed ; Dexedrine
Dextran	Dextraven ; Intradex
Dextran sulphate	Dexulate
Dextromethorphan	Romilar
Dichlorophen	Anthiphen
Dicophane	Chlorophenothane ; DDT
Diethazine	Diparcol
Diethylcarbamazine	Banocide ; Ethodryl ; Hetrazan
Digitoxin	Crystodigin
Digoxin	Lanoxin
Dihydrotachysterol	A. T. 10
Diiodohydroxyquinoline	Diodoquin ; Embequin ; Floraquin-Savorquin
Diloxanide	Entamide
Dimenhydrinate	Dramamine
Dimethyltubocurarine	Diametbine
Diphenhydramine	Benadryl
Disulfiram	Antabuse ; Cronetal
Dithranol	Cienolin ; Cignolin
Domiphen	Bradosol
Dyflos	DFP
Edrophonium	Tensilon
Ergometrine	Ergotrate
Ergotamine tartrate	Femergin
Erythromycin	Erythrocin ; Ilotycin
Ethinyl oestradiol	Dyloform ; Estigyn ; Ethidol ; Eticyclin ; Lynoral
Ethisterone	Oraluton ; Progestoral
Ethopropazine	Lysivane
Ethyl biscoumacetate	Pelentan ; Tromexan
Ferrous fumarate	Fersamal
Ferrous gluconate	Cerevon ; Fergon ; Ferlucon ; Fertonicum
Ferrous succinate	Ferromyn
Ferrous Sulphate	Ferosan ; Fersolate

Official or Approved Names	*Proprietary Names*
Fludrocortisone	Alflorone ; Florinef ; Fludrocortone
Folic acid	Folvite
Fortified benethamine penicillin	Triplopen
Fortified procaine penicillin	Abbocillin ; Avloprocil NA ; Bistabillin ; Distaquiane fortified ; Duracillin Fort ; Grunicin ; Seclopen ; Wycillin Fort.
Gallamine triethiodide	Flaxedil
Gamma benzene hexachloride	Gammexane ; Lorexane
Glyceryl trinitrate	Angised ; Nitrocine
Halothane	Fluothane
Heparin	Pularin
Hexylresorcinol	Crystoids
Hyaluronidase	Hyalase ; Rondase ; Wydase
Hydrallazine	Apresoline
Hydrocortisone	Cortef ; Cortril ; Ef-Cortelan ; Hydro-Adreson ; Hydrocortistab ; Hydro-Cortisyl ; Hydrocortone
Hydromorphone	Dilaudid
Iodochlorhydroxyquinoline	Entero-Vioform
Iron dextran complex	Imferon
Isoniazid	Cotioazin ; Mybasan; Neumandin; Nicetal ; Nydrazid ; Pycazide ; Rimifon ; Vazadrine
Isoprenaline	Aleudrin ; Isupren ; Neodrenal ; Neo-Epinine ; Norisodrene
Kaolin poultice	Antiphlogistine
Laudexium	Laudolissin
Leptazol	Cardiazol ;Centrazol ; Phrenazol
Levorphanol	Dromoran ; Levodromoran
Lignocaine	Xylocaine ; Xylotox
Liothyronine	Cynomel ; Tertroxin
Magnesium hydroxide mixture	Milk of Magnesia
Magnesium trisilicate	Novasorb
Mecamylamine	Inversine ; Mevasine
Meclozine	Ancolan
Mepacrine	Quinacrine
Mephenesin	Myanesin ; Tolseram
Meprobamate	Equanil ; Mepavlon ; Miltown
Mepyramine	Anthisan
Mercaptomerin	Thiomerin

Official or Approved Names	*Proprietary Names*
Mercaptopurine	Puri-nethol
Mersalyl	Neptal ; Salyrgan ; Esidrone
Methacholine	Amechol ; Mecholin
Methadone	Amidone ; Physeptone
Methimazole	Tapazole
Methoin	Mesontoin
Metboxamine	Vasoxine ; Vasylox
Methscopolamine	Pamine ; Skopyl
Methylampbetamine	Methedrine
Methylandrostanolone	Androstalone
Methylandrostenediol	Protandren ; Stenediol
Methylergometrine	Methergin
Methylpentynol	Atempol ; Insomnol ; Oblivon ; Somnesin
Methylphenobarbitone	Phemitone ; Prominal
Methyltestosterone	Glossosterandryl ; Oraviron ; Perandren
Methyprylone	Noludar
Nalorphine	Lethidrone
Nandrolone	Durabolin
Naphazoline	Privine
Neomycin	Mycifradin ; Myciguent ; Neomin
Neomycin & Bacitracin ointment	Dermamed ; Neobacrin
Neomycin & Hydrocortisone	Hydromycin ; Neocortef
Neostigmine	Prostigmin
Nicotonic acid	Nicovel
Nicotinyl alcohol	Ronicol
Nikethamide	Anacardone ; Coramine ; Corediol ; Corvotone
Nitrofurantoin	Furadantin
Noradrenaline	Adrenor ; Levophed
Norethandrolone	Nilevar
Novobiocin	Albamycin ; Biotexin ; Cathomycin
Nystatin	Mycostatin
Oestrogens, conjugated equine	Premarin
Oleandomycin	Matromycin ; Romicil
Oxyphenonium	Antrenyl
Oxytetracycline	Terramycin
Oxytocin	Pitocin ; Syntocin
Panthenol	Bepanthen
Papaveretum	Omnopon ; Opoidine

Official or Approved Names	*Proprietary Names*
Papaveretum & hyoscine injection	Omnopon-Scopolamine
Paracetamol	Panadol ; Tabalgin
Paramethadione	Paradione
Penicillin & streptomycin injection	Distavone ; Seclomycin ; Supragrunicin
Pentaerythritol	Mycardol ; Peritrate
Pentobarbitone	Nembutal
Pentolinium	Ansolysen
Phenindamine	Thephorin
Phenindione	Dindevan ; Indema
Phenobarbitone	Gardenal ; Luminal
Phenoxybenzamine	Dibenyline
Phenoxymethylpenicillin	Calcipen-V ; Compocillin V ; Distaquaine V ; Eskacillin V; Icipen ; Oracyn ; Penavlon V
Phensuximide	Milontin
Phentolamine	Rogitine
Phenylbutazone	Butazolidin
Phenylmercuric dinaphthylmethane disulphonate	Penotrane
Phenytoin sodium	Dilantin sodium ; Epanutin ; Eptoin
Pholcodine	Ethoino ; Codylin ; Memine
Phthalylsulphathiazole	Cremothalidine ; Sulfathalidine Thalazole
Piperazine adipate	Entacyl ; Nometan
Piperazine citrate	Antepar ; Bryrel ; Helmacid ; Helmezine ; Piperex
Piperazine tartrate	Veroxil
Pituitary injection	Glanduitrin ; Infundibulin; Infundin Pituitrin
Polymyxin B	Aerosporin
Polymyxin and Bacitracin ointment	Polyfax
Polyvidone	Periston ; Plasmosan
Prednisolone	Codelcortone ; Deltacortef ; Deltacortril ; Delta-Stab ; Di-Adreson-F ; Hydrodeltalone ; Precortisyl ; Predsol
Prednisolone acetate	Delta-Ef-Cortelan
Prednisone	DeCortisyl ; Deltacortone ; Di-Adreson ; Nisone
Prednisone acetate	Delta-Cortelan
Primidone	Mysoline

Official or Approved Names	*Proprietary Names*
Probenecid	Benemid
Procainamide	Pronestyl
Procaine & Adrenaline injection	Planocaine
Procaine benzylpenicillin	Avloprocil A. S. ; Distaquaine; Duracillin A. S. ; Mylipen
Procaine	Novocaine
Procyclidine	Kemadrin
Progesterone	Gestone ; Luteostab ; Lutocyclin Lutoform ; Proluton
Proguanil	Paludrine
Promethazine	Phenergan
Promethazine chlorotheophyllinate	Avomine
Propantheline	Pro-Banthine
Protein hydrolysate injection	Amigen ; Casydrol
Pyridostigmine	Mestinon
Pyridoxine	Benadon ; Pyrivel
Pyrimethamine	Daraprim
Quinalbarbitone sodium	Seconal
Rauwolfia tablets	Hypertane ; Rauwiloid
Reserpine	Bioserpine ; Quiescin ; Reserpamed; Reserpex ; Riserpa ; Sandril ; Serpasil ; Serpiloid
Riboflavin	Beflavit ; Ribovel
Saccharated oxide of iron injection	Ferrivenin ; Iviron ; Neo-ferrum
Sodium aminosalicylate	Aminacyl ; Entepas ; Paramisan sodium
Sodium aurothiomalate	Myocrisin
Sodium calcium edetate	Calcium Disodium versenate
Sodium thiosulphate injection	Ametox
Solapsone	Sulphetrone
Spiramycin	Rovamycin
Succinylsulphathiazole	Cremosuxidine ; Sulfasuxidine
Sulphadiazine	Cremodiazine
Sulphacetamide	Albucid ; Steramide ; Steravite
Sulphadimidine	Sulphamezathine
Sulphafurazole	Gantrisin
Sulphamethizole	Urolucosil
Sulphamethoxypyridazine	Lederkyn ; Midicel
Sulphasomidine	Aristamide ; Elkosin
Suxamethonium bromide	Brevidil-M
Suxamethonium chloride	Anectine ; Scoline

Official or Approved Names	*Proprietary Name*
Testosterone oenanthate	Primoteston depot
Testosterone phenyl propionate	Tes.P. P.
Testosterone propionate	Pantestin ; Perandren ; Sterandryl ; Testoform; Testoviron
Tetracycline	Achromycin ; Tetracyn
Thenalidine	Sandosten
Thialbarbitone	Kemithal
Thiopentone sodium	Intraval ; Pentothal
l-Thyroxine sodium	Eltroxin
Tolazoline	Priscol
Tolbutamide	Orinase ; Rastinon
Tretamine	Triethanomelamine ; TEM
Triamcinolone	Adcortyl ; Kenacort ; Ledercort
Trichloroethylene	Trilene
Trimetaphan	Arfonad
Tripelennamine	Pyribenzamine
Trisulphonamide mixture	Cremomesamide ; Sulphatriad
Troxidone	Tridione
Tubocurarine	Tubarine
Vasopressin	Di-Sipidin ; Piton ; Pitressin
Viomycin	Viocin
Vitamin A injection	Arovit ; Prepalin
Vitamin K_1	Klottogen ; Konakion ; Mephyton

Dental Paint

Glycerine Acidi Tannici ā 100 mg
Glycerini Amylum 80 mg
Liquoris Ammoniatis 5 mg
Liquorem Sodii Mitis ad 10 g