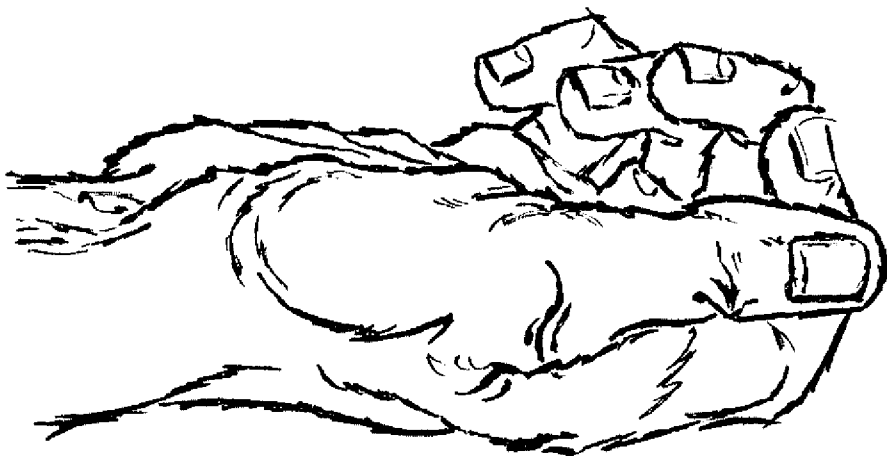
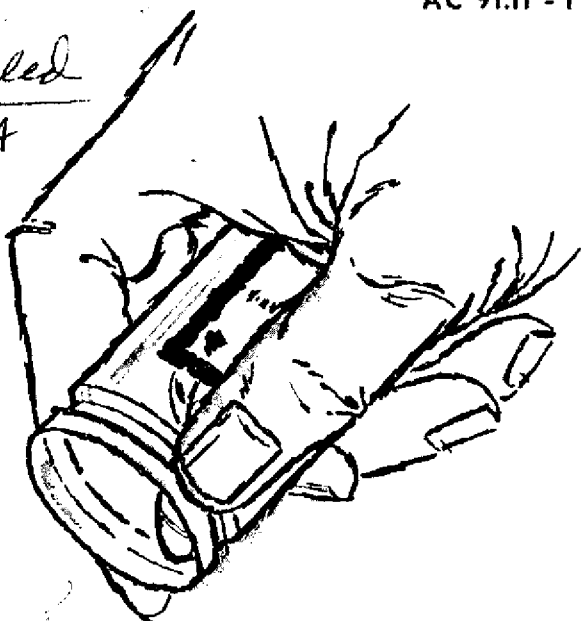


Guide to
**DRUG
HAZARDS
IN
AVIATION
MEDICINE**

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**FEDERAL AVIATION AGENCY
AVIATION MEDICAL SERVICE**

**GUIDE TO
DRUG HAZARDS
IN
AVIATION MEDICINE**

Prepared by
Windsor C. Cutting, M.D.
Stanford University



1962

FEDERAL AVIATION AGENCY
Aviation Medical Service

Foreword

To Each Aviation Medical Examiner:

The need for a manual on pharmacology in aviation prompted the Aviation Medical Service of the Federal Aviation Agency to make this handbook available for your guidance.

The author, Windsor C. Cutting, M.D., an individual with much passenger flying experience, was for many years Professor of Pharmacology and Therapeutics at Stanford University and now is Professor of Experimental Therapeutics there. Also, he was until 1962 Vice Chairman of the Council on Drugs, American Medical Association.

Incorporated are comments submitted by the following consultants who were kind enough to review the manual in preliminary form:

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Throughout the manual, Dr. Cutting has confined himself primarily to pharmacological considerations important in evaluating airmen for aviation duties either at the time of routine certification examinations or during treatment for ailments occurring during periods of participation in airmen duties. He has purposely avoided detailed discussions of individual drugs, clinical consideration of pathological states, and policy aspects of the Federal Aviation Agency's certification procedures, except in special instances.

The manual is, of course, provided only for your guidance, and the individual examiner must consider the details of each case—specific pathology involved, nature of airman's duties, specific drug, exact dosage, individual patient response, and existing regulatory or policy guidelines. After such considerations, the examiner should find himself well prepared to advise patients concerning limitation of airman activities during periods of drug therapy and better able to determine medical qualifications at the time of certification examinations. Necessarily, in any questionable case involving airman certification, the final decision will rest with the Civil Air Surgeon.

In conclusion, I wish to express sincere appreciation to Dr. Cutting and the reviewing consultants for their efforts in preparing this manual for your guidance.

A handwritten signature in cursive script, appearing to read "H. D. Estes", with a long horizontal flourish extending to the right.

H. D. ESTES, M.D.,
Acting Civil Air Surgeon.

Preface

Probably the best general recommendation for flying personnel and others directly associated with flight control is abstinence from all drugs. However, some illnesses and symptoms may not preclude flying or ground traffic control work, but may be benefited by appropriate drugs. The question therefore arises as to whether use of the required drugs in such instances may be safe and in fact advantageous. This has led to the preparation of this book for Aviation Medical Examiners. It lists drugs, the toxic effects relevant to aviation that they may produce, and a conservative estimate of their allowable use.

The drugs named in this book are arranged so that related drugs are grouped under general therapeutic headings. Individual drug names will be found alphabetically in the index. Mixtures of drugs have not ordinarily been included, but, infrequent synergism aside, the hazards of mixtures may be considered the same as those of their individual components.

To simplify the text, salt or ester designations such as hydrochloride or propionate are omitted; their dangers may be assumed to be the same as the free compound. For ease of identification, trade names are given parenthetically after the nonproprietary name.

The symptoms listed under the heading "Undesirable effects in aviation" include only those that might be considered important to flying. It is presumed that the examining physicians will ordinarily have access to the name of the drug under question, and will not be faced with a problem of identifying the drug from the symptoms of the patient. Discussion of the latter is beyond the limited scope of this book.

Under the heading "Use in aviation personnel" the statement usually reads "Airman duty contraindicated for so many hours or days after use," often with qualifications or exceptions. Customary or usual dosage is assumed. The time limits are intended to be conservative; that is, to indicate the time at which undesirable effects would be presumed to be absent even in sensitive or reactive persons. In only a few instances has it been thought possible to distinguish between the dangers of air duty as opposed to ground duty.

It should be stressed that although the likelihood of a drug reaction may disappear after a particular time, this does not mean that the person is fit for duty. In many instances, it is, of course, inconceivable

that a person ill enough to have required a drug would be well enough to work by the time the chance of toxicity from the drug has disappeared. In other instances, the need of a particular drug would of itself indicate a disease state permanently incompatible with flying, ground work, or both. The general medical condition of the patient is always of overriding concern.

It should be stressed that the function of the Medical Examiner is to determine the airman's fitness for duty. The first consideration must be to determine whether the disease process of itself, treated or untreated, contraindicates duty; the consideration of the effects of a drug are then secondary in determining final fitness.

I am most appreciative of the comments and refinements of Drs. James H. Britton, H. D. Estes, Herbert S. Kupperman, H. George Mandel, Walter Modell, Richard W. Payne, and Homer L. Reighard in their consideration of the text.

—WINDSOR C. CUTTING, M.D.

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GUIDE TO DRUG HAZARDS IN AVIATION MEDICINE

1. ANTIBACTERIAL AND RELATED AGENTS

SULFONAMIDES, SYSTEMIC AND URINARY

acetylsulfisoxazole (Gantrisin Acetyl)
methylsulfanilamidoisoxazole (Gantanol)
sulfacetamide (Sulfamyd)
sulfadiazine
sulfadimethoxine (Madribon)
sulfaethidole (Sul-spansion)
sulfamerazine
sulfamethazine
sulfamethizole (Thiosulfil)
sulfamethoxazole (Azo-Gantanol)
sulfamethoxy pyridazine (Kynex)
sulfamidine
sulfamonomethoxine
sulfamoxole (Nuprin, Sulfuno)
sulfaphenazole (Orisul)
sulfapyridine
sulfasomizole
sulfisomidine (Elkosin)
sulfisoxazole (Gantrisin)

Undesirable effects in aviation: Early: nausea, vomiting, dizziness. Late: dermatitis, rash, agranulocytosis, hepatitis.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Medical surveillance advisable for 2 weeks, alert to the appearance of late bone marrow and liver damage, which would preclude work.

SULFONAMIDES, ALIMENTARY AND OTHERS

para-nitrosulfathiazole (Nisulfazole)
phthalylsulfathiazole (Sulfathalidine)

salicylazosulfapyridine (Salazopyrin)
succinylsulfathiazole (Sulfasuxidine)

Undesirable effects in aviation: Toxicity minimal but effects like those from systemic sulfonamides may appear occasionally.

Use in aviation personnel: Airman duties contraindicated for 1 week after use. A patient needing such agents must be presumed to be too sick for duty.

PENICILLINS

ampicillin (Penbritin)
benzathine penicillin G (Bicillin; Neolin; Permapen)
benzathine phenoxymethyl penicillin
benzylpenicillin (penicillin G)
chlorprocaine penicillin O (Depo-Cer-O-Cillin)
diphenicillin (Ancillin)
hydrabamine phenoxymethyl penicillin (Compocillin V Hydrabamine)
levophenethicillin (L-Maxipen)
oxacillin (Prostaphlin)
penicillin O (Cer-O-Cillin)
phenethicillin (Syncillin)
phenoxymethylpenicillin (penicillin V; Pen-Vee Suspension; V-Cillin)
potassium phenoxymethyl penicillin (Compocillin VK)
procaine penicillin G (Aquacillin; Crysticillin; Duracillin; Eskacillin; Hypercillin)
sodium methicillin (Staphcillin)

Undesirable effects in aviation: Early and late allergic reactions, including anaphylaxis, urticaria and angioneurotic edema, asthma and dermatitis.

Use in aviation personnel: Airman duties contraindicated within 12 hours of use. Duty may be permitted after that time if there is no evidence of late toxicity and examination indicates infection is cured.

PENICILLIN INHIBITOR

penicillinase (Neutrapen)

Undesirable effects in aviation: Fever, local pain, tenderness, allergic reactions.

Use in aviation personnel: Airman duties contraindicated for 3 days after use, but in any case patient must be presumed to be too sick for duty.

ERYTHROMYCIN GROUP

carbomycin (Magnamycin) (withdrawn from market)
erythromycin (Ilotycin; Erythrocin); free or various esters
oleandomycin (Matromycin)
spiramycin
staphylomycin
triacetyloleandomycin (Cyclamycin; TAO)
tylosin

Undesirable effects in aviation: Relatively free from serious toxic effects. Doses over 0.5 gm. may cause nausea, vomiting and diarrhea. Late: liver damage reported after erythromycin estolate and triacetyloleandomycin.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use. Frequent medical examinations indicated for the next 2 weeks.

RESERVE PENICILLIN SUBSTITUTES

novobiocin (Albamycin; Cathomycin)
ristocetin (Spontin)
vancomycin (Vancosin)

Undesirable effects in aviation: Severe toxic effects, including variously: skin rashes, urticaria, fever, thrombophlebitis, neutropenia, ototoxicity, nephrotoxicity.

Use in aviation personnel: Airman duties contraindicated for 1 week after use; additionally, it must be presumed that an illness requiring these drugs precludes duty.

TETRACYCLINES

chlortetracycline (Aureomycin)
demethylchlortetracycline (Declomycin)
oxytetracycline (Terramycin)
rolitetracycline (Syntetrin)
tetracycline (Achromycin; Panmycin; Polycycline; Steclin; Sumycin; Tetrabon; Tetracyn; Tetrex)

Undesirable effects in aviation: Early: nausea, vomiting, diarrhea, light-headedness, photosensitivity (especially to demethylchlortetracycline). Late: glossitis, diarrhea, superinfection with monilia.

Use in aviation personnel: Airman duties contraindicated within 12 hours of use, or if any of the listed toxic effects are present, including late or continuing photosensitivity reactions. Frequent medical examinations indicated for the next 2 weeks.

CHLORAMPHENICOL

chloramphenicol (Chloromycetin)

Undesirable effects in aviation: Early: nausea and vomiting, blurring of vision, loss of equilibrium.

Late: bone marrow damage, aplastic anemia.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Frequent medical examinations indicated for the next 2 weeks.

STREPTOMYCIN GROUP

dihydrostreptomycin
kanamycin (Kantrex)
neomycin (Mycifradin)
paromomycin (Humatin)
streptomycin

Undesirable effects in aviation: Oral administration: nausea, vomiting, cramping and loose stools; later, moniliasis (neomycin, paromomycin). Parenteral administration: severe auditory or vestibular damage (streptomycin, dihydrostreptomycin, neomycin, kanamycin); nephrotoxicity (neomycin, kanamycin); hepatotoxicity (paromomycin); fever, rash, allergic manifestations.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use or in the presence of any later signs or symptoms. Frequent medical examinations indicated for the next 2 weeks. Medical condition would ordinarily preclude duty.

STREPTOMYCIN ALTERNATIVES

cycloserine (Oxamycin)
viomycin (Vinactane)

Undesirable effects in aviation: Neurotoxicity, convulsions (cycloserine); renal and auditory toxicity (viomycin).

Use in aviation personnel: Same as for streptomycin.

SULFONES

diaminodiphenylsulfone (Alvosulfon)
glucosulfone (Promin)
hydroxyethyl sulfone
sodium acetosulfone (Promacetin)
sulfoxone (Diasone)
thiazolsulfone (Promizole)

Undesirable effects in aviation: Excitement, dermatitis, hemolytic anemia.

Use in aviation personnel: Work contraindicated for 24 hours after use; no present application except in leprosy, which would ordinarily preclude work.

ANTITUBERCULOSIS SYNTHETICS

amithiozone (Tibione)
benzoylpas (Benzepas)
ethionamide (Trecator)
isoniazid (Cotinazin; Dinacrin; Ditubin; INH; Isolyn; Isonicop; Laniazid; Nydrazid; Rimifon; Tyvid)
para-aminosalicylic acid (Pamisyl; Parapas; Parasal; Pasara)
phenyl-p-aminosalicylate (Tebamin)
pyrazinamide (Aldinamide)
pyruvic acid isonicotinyl hydrazone
thiocarbanidin (Thioban)

Undesirable effects in aviation: Unpleasant taste and gastric irritation (aminosalicylates); drug fever, dermatitis, agranulocytosis (amithiozone); mild euphoria, vertigo, headache, dry mouth (isoniazid, ethionamide); hepatic damage, hyperuricemia (pyrazinamide).

Use in aviation personnel: Airman duties contraindicated for 48 hours after use; use limited to tuberculosis, which until arrested precludes work.

NITROFURAN DERIVATIVES

furaltadone (Altafur) (withdrawn from market)
furazolidone (Furoxone)
nitrofurazone (Furacin)
nitrofurantoin (Furadantin)

Undesirable effects in aviation: Allergic sensitization (all derivatives); leucopenia, hemolytic anemia (nitrofurantoin, furaltadone); nausea, dizziness, pruritis, paralysis of lateral rectus of eye, diminished auditory acuity, peripheral neurological disturbances (furaltadone).

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Frequent medical examinations indicated for the next week.

URINARY ANTISEPTICS

methenamine mandelate (Mandelamine)
phenazopyridine (Pyridium)

Undesirable effects in aviation: Relatively nontoxic; rare nausea.

Use in aviation personnel: Airman duties ordinarily not contraindicated after usual dosage.

POLYPEPTIDE ANTIBIOTICS

bacitracin (Baciguent)

colistin; sod. colistimethate (Coly-Mycin)

polymyxin B (Aerosporin)

tyrothricin (Bactratycin; Soluthricin)

Undesirable effects in aviation: Topical use: relatively nonsensitizing. Systematic use: nephrotoxicity (bacitracin); neurotoxicity (polymyxin, colistin).

Use in aviation personnel: Airman duties not contraindicated after topical use; prohibited for 24 hours after systematic use, but medical condition would ordinarily preclude duty. Frequent medical examinations indicated for the next 2 weeks.

Undesirable effects in aviation: Nausea, vomiting, abdominal cramps, methemoglobinemia, hemolysis.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use. Medical condition would ordinarily preclude duty.

EMETINE

emetine

Undesirable effects in aviation: Local irritation, cardiac depression and damage.

Use in aviation personnel: Airman duties contraindicated for 1 week after use. Medical condition would ordinarily preclude duty.

GLAUCARUBIN

glaucaubin (Glarubin)

Undesirable effects in aviation: Doses over 200 mg. daily may produce nausea and vomiting.

Use in aviation personnel: Work contraindicated for 24 hours after use. Frequent medical examinations indicated during the next week.

OXYQUINOLINE GROUP

chiniofon (Yatren)

diiodohydroxyquin (Diodoquin; Lanodoxin; Moebiquin; Quina-done; Yodoxin)

iodochlorhydroxyquin (Enterokin; Enteroquinol; Nioform; Quinambicide; Vioform)

Undesirable effects in aviation: Local irritation; rare iodism.

Use in aviation personnel: Airman duties ordinarily not contraindicated during topical use; contraindicated for 2 days after systematic use. Disease requiring systematic use ordinarily precludes duty.

FUMAGILLIN

fumagillin (Fugillin; Fumadil)

Undesirable effects in aviation: Cramping, diarrhea, headache, vertigo, dermatitis, neutropenia.

Use in aviation personnel: Airman duties contraindicated for 1 week after use. Frequent medical examinations indicated for the next week.

METRONIDAZOLE

metronidazole (Flagyl)

Undesirable effects in aviation: Minor gastrointestinal symptoms and dizziness.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Frequent medical examinations are indicated for the next 2 weeks.

ARSENICALS

arsphenamine (Salvarsan)

carbarsone

glycobiarsol (Milibis)

nearsphenamine

oxophenarsine (Mapharsen)

tryparsamide

Undesirable effects in aviation: Local irritation, nitritoid reaction, Herxheimer reaction, jaundice, neuritis (arsphenamines); optic atrophy (tryparsamide); largely obsolete.

Use in aviation personnel: Airman duties contraindicated during first week of therapy with carbarsone or glycobiarsol, and at all times during use of other drugs listed.

BISMUTH AND MERCURY COMPOUNDS

bismuth subsalicylate and others

mercuric salicylate and others

Undesirable effects in aviation: May produce stomatitis, intestinal and renal epithelial damage.

Use in aviation personnel: Obsolete; use contraindicated.

GOLD COMPOUNDS

aurothioglucose (Solganol)

aurothiglycainide (Lauron)

gold sodium thiomalate (Myochrysine)

gold sodium thiosulfate (Auricidine; Aurolin)

Undesirable effects in aviation: Metallic taste, stomatitis, pruritis, diarrhea, muscle pain, dermatitis, albuminuria, agranulocytosis.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use or in presence of later symptoms; disease ordinarily precludes duty. Frequent medical examinations indicated for the next 2 weeks.

2. ANTIFUNGAL AGENTS

NYSTATIN

nystatin (Mycostatin)

Undesirable effects in aviation: Relatively nontoxic; occasional nausea, diarrhea, after oral administration, which may persist for several weeks.

Use in aviation personnel: Airman duties precluded by presence of any side effects, but otherwise not contraindicated.

AMPHOTERICIN

amphotericin B (Fungisone)

Undesirable effects in aviation: Fever, chills, anorexia, nausea, vomiting, nephrotoxicity, cardiac depression.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use. Frequent medical examinations indicated for the next 2 weeks. Medical condition requiring use would ordinarily be presumed to prevent duty.

GRISEOFULVIN

griseofulvin (Fulvicin; Grifulvin)

Undesirable effects in aviation: Relatively nontoxic; rare headache, insomnia, nausea, rash, fever, joint pains, leucopenia, psychomotor disturbances.

Use in aviation personnel: Airman duties contraindicated during first week of use, but not necessarily thereafter during continuation of therapy if toxicity clearly absent.

3. ANTIPROTOZOAL AGENTS

QUININE

quinine

Undesirable effects in aviation: Deafness, tinnitus, vertigo, nausea, cardiac depression, allergic hypersensitivity.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use; may be permitted after that time if examination reveals no vestibular disturbances. However, medical condition would ordinarily preclude duty during therapeutic use.

CHLOROQUINE GROUP

amodiaquin (Camoquin)

chloroquine (Aralen)

hydroxychloroquine (Plaquenil)

quinacrine (Atabrine)

Undesirable effects in aviation: Early: anorexia, nausea, diarrhea, headache, blurred vision, pruritis. Late: ocular palsies, neuropathies, lenticular opacities.

Use in aviation personnel: Airman duties not contraindicated during usual suppressive antimalarial doses; contraindicated for 48 hours after therapeutic dosage. Medical examination indicated before return to duty to eliminate presence of early or late toxic effects. Medical condition ordinarily precludes duty during therapeutic use.

CHLORGUANIDE GROUP

chlorguanide (Guanatol; Paludrine)

pyrimethamine (Daraprim)

Undesirable effects in aviation: Toxicity relatively slight; nausea, vomiting, diarrhea (chlorguanide); dermatitis, marrow depression, convulsions (high doses of pyrimethamine).

Use in aviation personnel: Same as for chloroquine group.

PRIMAQUINE GROUP

pamaquine (obsolete)

pentaquine (obsolete)

primaquine

6. ANTHELMINTICS

FLATWORM AGENTS

aspidium (male fern)

pelletierine

quinacrine: see ANTIPROTOZOAL AGENTS

Undesirable effects in aviation: Headache, vertigo, blindness, collapse, convulsions.

Use in aviation personnel: Work contraindicated for 48 hours after use.

CHLORINATED HYDROCARBONS

carbon tetrachloride

tetrachlorethylene

Undesirable effects in aviation: Dizziness, staggering, narcosis; later, hepatitis.

Use in aviation personnel: Work contraindicated for 48 hours after use. Frequent medical examinations indicated for the next 2 weeks.

PHENOL DERIVATIVES

hexylresorcinol

thymol

Undesirable effects in aviation: Local irritation; but severe toxicity unlikely.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use.

CYANINE DYES

dithiazanine (Delvex)

pyrvinium (Poquil; Povan; Vanquin)

Undesirable effects in aviation: Frequent nausea, vomiting, and other gastrointestinal symptoms; possible nephrotoxicity.

Use in aviation personnel: Airman duties contraindicated for 2 days after use.

PIPERAZINES

diethylcarbamazine (Hetrazan)

piperazine (Antepar; Anthelcole; Oxucide; Pipazan)

Undesirable effects in aviation: Infrequent nausea, vomiting, headaches, abdominal cramps, urticaria, neurological disturbances (piperazine); nausea, headache, fever, dermatitis, allergic reactions (diethylcarbamazine).

Use in aviation personnel: Airman duties contraindicated for 48 hours (piperazine), and 72 hours (diethylcarbamazine), after use.

BEPHENIUM

bephenium (Alcopar)

Undesirable effects in aviation: Slight nausea, vomiting, soft stools.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use.

OTHER ANTHELMINTICS

methylrosaniline (gentian violet)

oil of chenopodium

santonin

Undesirable effects in aviation: Various mild and severe side effects.

Use in aviation personnel: Airman duties contraindicated for 2 days after use; obsolete.

4. METAL BINDING AGENTS (ANTIDOTES)

DIMERCAPROL

dimercaprol (BAL)

Undesirable effects in aviation: Massive symptoms may follow large therapeutic doses: unrest, weakness, fatigue, paresthesias, lacrimation, perspiration, vomiting, tachycardia.

Use in aviation personnel: Airman duties contraindicated for 1 week after use; metal poisoning for which dimercaprol was given would probably preclude work still further.

ETHYLENEDIAMINE TETRAACETIC ACID SALTS

edathamil calcium-disodium (calcium disodium versenate)

edathamil disodium (Endrate disodium)

penthamil calcium trisodium

Undesirable effects in aviation: Hypocalcemia (edathamil disodium), but all relatively nontoxic.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Disease requiring use of the agents would ordinarily preclude duty.

PENICILLAMINES

acetylpenicillamine

penicillamine

Undesirable effects in aviation: Relatively nontoxic.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Medical condition would be presumed to preclude duty.

5. AGENTS IN TROPICAL DISEASES

ANTIMONIALS

antimony potassium tartrate (tartar emetic)
stilbamine glucoside (Neostam)
stibophen (Fuadin)

Undesirable effects in aviation: Trivalent forms (tartar emetic, stibophen) may produce coughing, vomiting, pneumonitis, arthralgic, bradycardia, thrombocytopenia. Pentavalent forms may produce vomiting, anaphylactoid reactions, hepatitis.

Use in aviation personnel: Airman duties contraindicated for 72 hours after use. Frequent medical examinations indicated for the next 2 weeks. Medical condition would ordinarily preclude duty.

SYNTHETICS

aminostilbamidine
antricyde
hydroxystilbamidine
lucanthone (Miracil D)
metamidium
stilbamidine
suramin (Bayer 205; Germanin; Naphuride)

Undesirable effects in aviation: Various mild and severe adverse effects.

Use in aviation personnel: Airman duties contraindicated for 1 week after use, but patients requiring these agents must be considered unfit for duty.

7. ANTICANCER AGENTS

ALKYLATING AGENTS

busulfan (Myleran)
chlorambucil (Leukeran)
cyclophosphamide (Cytosan)
epipropidine (Eponate)
mechlorethamine (Mustargen; nitrogen mustard)
sarcolysin
thiotepa
triethylenemelamine (TEM)
uracil mustard

Undesirable effects in aviation: Certain members (nitrogen mustards) are local vesicants and necrotizing agents; all may produce abdominal pain, diarrhea, nausea, muscular paralysis, convulsions, damage to the bone marrow (early and delayed).

Use in aviation personnel: Airman duties contraindicated for 1 week after use, or in the presence of any of the adverse effects. Medical conditions requiring such medications would ordinarily preclude flying.

FOLIC ACID ANTAGONISTS

aminopterin
methotrexate (amethopterin)

Undesirable effects in aviation: Ulceration of buccal mucosa, bleeding gums, diarrhea, purpura, ecchymoses.

Use in aviation personnel: Airman duties contraindicated for 1 week after use, or in the presence of any adverse effects. Medical condition would ordinarily preclude duty.

PURINE AND PYRIMIDINE ANTAGONISTS

5-fluorouracil
mercaptopurine (Purinethol)

Undesirable effects in aviation: Nausea, vomiting, bone marrow depression with bleeding, thrombopenia, leucopenia.

Use in aviation personnel: Airman duties contraindicated for 1 week after use, or in the presence of adverse effects. Medical condition would ordinarily preclude duty.

OTHERS

azaserine
demecolcine (Colcemid)
meractinomycin (Actinomycin D)
puromycin
urethane
vinblastine (Velban)

Undesirable effects in aviation: Nausea, vomiting, diarrhea and various other symptoms.

Use in aviation personnel: Airman duties contraindicated for 1 week after use; also, on medical grounds, patient must be presumed unfit for duty.

cetyl pyridinium (Ceepryn)
soap
sodium lauryl sulfate
sodium tetradecyl sulfate (Sotradecol; Tergitol)
triclobonium (Triburon)

Undesirable effects in aviation: Relatively nontoxic.

Use in aviation personnel: Airman duties not restricted after topical use in conventional dosage.

SCLEROSING AGENTS

sodium morrhuate
sodium psylliate
sodium ricinoleate
sodium tetracycl sulfate (Sotradecol)

Undesirable effects in aviation: Local irritation and inflammation.

Use in aviation personnel: Airman duties contraindicated for 1 week after use; thereafter permitted when examination shows vascular process healed.

PROTECTIVES, EMOLLIENTS, COSMETICS

Undesirable effects in aviation: None.

Use in aviation personnel: Airman duties not contraindicated.

SUN TAN AND DEPIGMENTING PREPARATIONS

dioxyacetone (Man-Tan)
méthoxsalen (Meloxine; Methoxa-Dome; OxSORALEN)
monobenzene (Benoquin)

Undesirable effects in aviation: May produce severe erythema and blistering; liver damage from systemic administration of methoxsalen.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use or in presence of signs of toxicity. Frequent medical examinations indicated for the next 2 weeks.

9. CARDIOVASCULAR AGENTS

CARDIAC GLYCOSIDES

acetyldigitoxin (Acylanid)
deslanoside (Cedilanid D)
digilanid
digitalis
digitoxin
digoxin (Lanoxin)
gitalin (Gitalgin)
ouabain

Undesirable effects in aviation: May produce anorexia, nausea, vomiting, diarrhea, visual abnormalities, arrhythmias.

Use in aviation personnel: Airman duties contraindicated for 2 weeks after initiation of use. Thereafter, well stabilized digitalization is not of itself a contraindication to duty. However, the medical condition requiring digitalization would almost certainly preclude work.

ANTIARRHYTHMICS

quinidine
procaine amide (Pronestyl)

Undesirable effects in aviation: Nausea, vomiting, diarrhea, tinnitus, arrhythmias, sensitivity phenomena, thrombocytopenia from quinidine; hypotension, granulocytopenia from procaine amide.

Use in aviation personnel: Airman duties contraindicated for 2 days after cessation of treatment; patient ordinarily considered permanently unfit for work because of underlying disease.

AGENTS IN HEART BLOCK

ephedrine
isoproterenol (Aleudrin; Asdrin; Isopro; Isuprel)

Undesirable effects in aviation: Palpitation, tachycardia, nervousness.

Use in aviation personnel: Airman duties contraindicated for 6 hours after use; however, medical condition (heart block) must be presumed to prohibit duty permanently.

DIURETICS, OSMOTIC AND ACIDIFYING

ammonium chloride
potassium salts
sorbitol
urea

Undesirable effects in aviation: Dehydration, electrolyte disturbances.

Use in aviation personnel: Airman duties contraindicated for 24 hours or longer after use, and in any case are permissible only after examination shows effects of agents on electrolytes to have ceased. Medical condition ordinarily precludes duty.

DIURETICS, XANTHINES

aminophylline (Aminocardol; Cardophyllin; Diophyllin; Metaphyllin)
theophylline

Undesirable effects in aviation: Immediate nausea and vomiting after oral, rectal or intravenous administration; later dehydration, electrolyte disturbances.

Use in aviation personnel: Airman duties contraindicated for 24 hours or longer after use, and in any case are permissible only after examination shows effects of agents on electrolytes to have ceased. Medical condition ordinarily precludes duty.

DIURETICS, MERCURIALS

chlormerodrin (Neohydrin)
meralluride (Mercurhydrin)
mercaptomerin (Thiomerin)
mercumatilin (Cumertilin)
mercurophylline (Mercuzanthin)
mersalyl sodium and theophylline (Diursal; Merphylline; Salyrgan theophylline)

Undesirable effects in aviation: Stomatitis, renal damage, fever, rash; ventricular fibrillation after intravenous use; electrolyte abnormality.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use; or 1 week after appearance of any adverse effects, and in any case are permissible only after examination shows effects of agents on electrolytes to have ceased. Medical condition ordinarily precludes duty.

DIURETICS, CARBONIC ANHYDRASE INHIBITORS

acetazolamide (Diamox)
dichlorphenamide (Daranide)
ethoxzolamide (Cardrase)
methazolamide (Neptazane)

Undesirable effects in aviation: Anorexia, fatigue, drowsiness, tingling, leg pains.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use of agents for any reason, or for 1 week after appearance of any adverse effects. However, usual indications ordinarily (edema), or absolutely (epilepsy, glaucoma) contraindicate duty.

DIURETICS, THIAZIDE AND RELATED

benfroflumethiazide (Naturetin)
benzthiazide (Di-ademil)
chlorthalidone (Hygroton)
chlorthiazide (Diuril)
flumethiazide (Ademol)
hydrochlorothiazide (Esidrix; Hydrodiuril; Oretic)
methylclothiazide (Enduron)
polythiazide (Renese)
trichlormethiazide (Naqua)

Undesirable effects in aviation: Minor nausea and vomiting; weakness from potassium deficiency; rare agranulocytosis, thrombocytopenia.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use, or for 1 week after appearance of any adverse effects. Medical condition requiring use would ordinarily preclude duty permanently.

DIURETICS, AMINOURACIL DERIVATIVES

aminometradine (Mictine)
amisometradine (Rolicton)

Undesirable effects in aviation: Toxicity minimal but nausea, vomiting, diarrhea, dizziness and rash may appear.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use (nearly obsolete).

DIURETICS, ALDOSTERONE ANTAGONISTS

spironolactone (Aldactone)

Undesirable effects in aviation: Rare headache, drowsiness, abdominal pain.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Medical conditions requiring use would ordinarily preclude duty permanently.

DIURETICS, CATIONIC EXCHANGE RESINS

carbacylamine resins (Carbo-Resin)

Undesirable effects in aviation: May produce nausea from local irritation; constipation from bulk.

Use in aviation personnel: Airman duties contraindicated in the presence of any side effects. However, conditions requiring use would ordinarily preclude duty permanently. (Little used).

AGENTS INHIBITING RENAL TUBULES (REABSORPTION OF URIC ACID; EXCRETION OF PENICILLIN)

probenecid (Benemid)

sulfinpyrazone (Anturane)

zoxazolamine (Flexin) (withdrawn from market)

Undesirable effects in aviation: Nausea, vomiting, anorexia, rashes; activation of peptic ulcer and bone marrow depression (sulfinpyrazone); liver damage (zoxazolamine).

Use in aviation personnel: Airman duties contraindicated for 48 hours after use. Frequent medical examinations for the next week.

AGENTS IN ATHEROSCLEROSIS

heparin

nicotinic acid; niacin

safflower oil (Saff; Saffola; Saffolin)

sitosterols (Cytellin)

sodium dextrothyroxin (Choloxin)

thyrotropic acid (Triopron)

triparanol (MER-29) (withdrawn from market)

unsaturated fatty acids

Undesirable effects in aviation: Minimal adverse effects except for unpleasant immediate flushing from nicotinic acid and undetermined hazards (alopecia, cataracts, accumulation of cholesterol precursor) from triparanol.

Use in aviation personnel: Airman duties contraindicated during use of triparanol, for 4 hours after nicotinic acid, 6 hours after heparin; otherwise not contraindicated if adverse effects absent.

However, the presence of atherosclerosis requiring treatment ordinarily precludes duty.

HYPOTENSIVES, CENTRAL

alkavervir (Veriloid)
hydralazine (Apresoline)
propranolol (Inderal)
reserpine (Crystoserpine; Eskaserp; Rau-Sed; Reserpoid; Roxinoid; Serfin; Serpasil; Serpiloid)
syrosingopine (Singoserp)

Undesirable effects in aviation: Postural hypotension, headache, vomiting, diarrhea. From hydralazine: edema, urticaria, polyneuritis, systemic lupus erythematosus. From rauwolfia, reserpine, syrosingopine: sedation, nightmares, parkinsonism, nasal stuffiness, bleeding from peptic ulcer.

Use in aviation personnel: Airman duties contraindicated for 1 week after use, or in presence of any later drug symptoms. Hypertension requiring treatment ordinarily contraindicates duty. However, patients with formerly mild hypertension, who have been completely controlled by the lower conventional doses of drugs for periods of 6 months or longer, and who show no postural hypotension or other adverse effects of drug therapy, may be considered for restricted duty.

HYPOTENSIVES, GANGLION BLOCKERS

chlorisondamine (Ecolid)
hexamethonium (Bistrium; Esomid; Hexameton; Hiohex; Methium)
mecamylamine (Inversine)
pempidine (Perolysen)
pentolinium (Ansolysen)
tetraethylammonium (Etamon)
trimethaphan (Arfonad)

Undesirable effects in aviation: Postural hypotension, impaired cerebral and renal circulation, dilated pupils, dry mouth, urinary retention, constipation; central stimulation (mecamylamine).

Use in aviation personnel: Airman duties contraindicated for 1 week after use, or in presence of any later drug symptoms. Hypertension requiring treatment ordinarily contraindicates duty. However, patients with formerly mild hypertension, who have been completely controlled by the lower conventional

doses of drugs for periods of 6 months or longer, and who show no postural hypotension or other adverse effects of drug therapy, may be considered for restricted duty.

HYPOTENSIVES, SYMPATHOLYTICS

bretylum (Darenthin)
guanethidine (Ismelin)
methyldopa (Aldomet)

Undesirable effects in aviation: Postural hypotension, nasal stuffiness, drooping eyelids, bradycardia, diarrhea, muscular weakness, mental confusion or sedation, facial pain (bretylum).

Use in aviation personnel: Airman duties contraindicated for 1 week after use, or in presence of any later drug symptoms. Hypertension requiring treatment ordinarily contraindicates duty. However, patients with formerly mild hypertension, who have been completely controlled by the lower conventional doses of drugs for periods of 6 months or longer, and who show no postural hypotension or other adverse effects of drug therapy, may be considered for restricted duty.

10. SMOOTH MUSCLE AGENTS

NITRITES AND NITRATES

amyl nitrite
erythrityl tetranitrate (Erythrol tetranitrate)
glyceryl trinitrate
isorbide dinitrate (Isordil)
mannitol hexanitrate (Maxitrate)
octyl nitrite (Octrite)
pentaerythritol tetranitrate (Angitet; Circulin; Duotrate; Pen-
card; Pentritol; Peritrate; Rythritol; Vasodilatol)
trolnitrate (Metamine)

Undesirable effects in aviation: Flushing, throbbing headache, palpitation, fainting.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use. It is to be noted that certain indications (angina pectoris) are absolutely incompatible with duty, while others (mild hypertension, completely controlled for 6 months and without adverse drug effects) might not be disqualifying for certain ground duties.

XANTHINES

aminophylline
diphylline
oxytriphylline (Choledyl)
theophylline methyl glucamine (Glucophylline)
theophylline sodium glycinate (Theoglycinate)

Undesirable effects in aviation: Gastric irritation after oral use; vomiting after intravenous (see also DIURETICS and PSYCHIC STIMULANTS for other uses).

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

PAPAVERINE AND SIMILAR AGENTS

amotriphene (Myodil)
cyclandelate (Cyclospasmol)
dioxyline (Paveril)

ethyl papaverine (Ethaverine)
papaverine

Undesirable effects in aviation: Cardiac depression possible from papaverine.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. However, underlying medical conditions (angina pectoris or phlebothrombosis) would contraindicate duty.

ERGOT ALKALOIDS

dihydroergotamine (DHE-45)
ergotamine (Gynergan)
methyl ergonovine (Methergine)

Undesirable effects in aviation: Nausea, vomiting, vascular spasm.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use, or if any side effects are present. It should be noted that repeated attacks of migraine are disqualifying for duty.

POSTERIOR PITUITARY PREPARATIONS

oxytocin (Pitocin; Syntocinon)
posterior pituitary
vasopressin (Pitressin)

Undesirable effects in aviation: Nausea, abdominal cramps cerebral or coronary artery spasm, water intoxication.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. However, most conditions requiring use (labor, intestinal paresis) ordinarily contraindicate duty for a much longer period; completely controlled diabetes insipidus might be judged compatible with certain duties.

11. AGENTS IN BLOOD DISEASES

IRON PREPARATIONS

dextriferon (Astrifer)
ferric ammonium citrate
ferrocholate (Chel-Iron; Ferrolip)
ferrous fumarate (Ferrospan; Fumasorb; Hemorate; Iron; Toleron)
ferrous gluconate (Fergon; Irox; Nionate)
ferrous sulfate (Feosol; Ferralyn; Ferro-Theron; Irosul; Sulferrous)
iron dextran complex (Imferon)
iron oxide, saccharated (Proferrin)
polyferose (Tefron)

Undesirable effects in aviation: Indigestion from oral administration; nitritoid reactions, hemochromatosis from intravenous.

Use in aviation personnel: Airman duties not contraindicated after oral use; contraindicated for 12 hours after intravenous use.

VITAMIN B₁₂, LIVER, FOLIC ACID PREPARATIONS

calcium leucovorin
cyanocobalamin (Vitamin B₁₂)
folic acid
hydroxocobalamin (alpha-Redisol)
liver injection

Undesirable effects in aviation: None.

Use in aviation personnel: Airman duties not contraindicated by use.

HEPARIN PREPARATIONS

heparin potassium, sublingual (Clarin)
heparin repository (Depo-Heparin)
heparin sodium (Hed-Heparin; Lipo-Hepin; Liguaemin)

Undesirable effects in aviation: Nontoxic except for danger of bleeding from excessive doses.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. However, medical status ordinarily precludes duty.

HEPARIN ANTAGONISTS

hexadimethrine (Polybrene)

protamine

tolonium (Blutene)

Undesirable effects in aviation: Protamine may give shock from overdosage.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; however, the medical indication would ordinarily prohibit duty.

COUMARIN AND INDANDIONE DERIVATIVES

acenocoumarin (Sintrom)

anisindone (Miradon)

bishydroxycoumarin (Dicumarol)

cyclocoumarol (Cumpyran)

diphenadione (Dipaxin)

ethylbiscoumacetate (Tromexan)

phenindione (Danilone; Hedulin; Indon)

phenprocoumon (Liquamar)

warfarin (Coumadin; Panwarfin; Prothromadin)

Undesirable effects in aviation: Danger of bleeding; vomiting, diarrhea, urticaria; hepatitis and agranulocytosis (indandiones).

Use in aviation personnel: Airman duties contraindicated during first month of therapy; thereafter therapy per se may not be contraindicated if administration well controlled and signs of overdosage absent. However, the most common use, underlying coronary artery disease, contraindicates duty on medical grounds.

PROTEOLYTIC AND OTHER ENZYMES

chymotrypsin (Chymar; Chymotest; Enzeon)

fibrinolysin (human) (Actase; Thrombolysin)

pancreatic dornase (Dornavac)

streptokinase-streptodornase (Varidase)

trypsin (Orenzyme; Parenzyme; Tryptar; Tryptest)

Undesirable effects in aviation: Febrile reactions, allergic symptoms after parenteral use.

Use in aviation personnel: Airman duties contraindicated for 2 days after parenteral use; for 24 hours after local use. Medical condition would often preclude duty.

VITAMIN K PREPARATIONS

menadione (Kanone; Kappaxin; Kayklot; Kayquinone; Thyloquinone)

menadione sodium bisulfite (Hykinone)

phytonadione (Konakion; Mephyton)

vitamin K₁ oxide

Undesirable effects in aviation: Relatively nontoxic in adults.

Use in aviation personnel: Airman duties not contraindicated by the toxic effects from the agents.

12. ALIMENTARY AGENTS

ANTACIDS

aluminum hydroxide gel (Alcid; Alokreen; Amphogel; Creamalin; Fluangel; Gelumina; Hydroxal)
aluminum phosphate (Phosphaljel)
basic aluminum carbonate (Basaljel)
calcium carbonate
dihydroxyaluminum amino acetate (Alglyn; Alkam; Alminate; Aspogen; Dimothyn; Robalate)
gastric mucin
magnesium oxide
magnesium trisilicate (Chooz; Magmasil; Salicyl; Trimax; Trinesium; Trisomin)
polyamine-methylene resin (Exorbin)
sodium bicarbonate

Undesirable effects in aviation: *Minor constipation or diarrhea.*

At high altitudes, the CO₂ liberated by sodium bicarbonate may give dangerously increased intragastric pressure.

Use in aviation personnel: Airman duties not contraindicated by most of the agents. However, use of sodium bicarbonate should be limited to ground personnel.

ANTICHOLINERGICS

(see under PARASYMPATHETIC DEPRESSANTS)

EMETICS

apomorphine
syrup of ipecac
zinc sulfate

Undesirable effects in aviation: Nausea and vomiting.

Use in aviation personnel: Airman duties contraindicated within 24 hours of use by the effects of the drug itself. The underlying medical condition would presumably contraindicate duty for a longer period.

CHOLERETICS

bile acids
bile salts (Chobile; Glycotauro; Plebilin)

dehydrocholic acid (Decholin; Dehychol; Dilabil; Hykolex;
Oxycholin; Procholon)
florantyrone (Zanchol)
ox bile extract
sodium dehydrocholate

Undesirable effects in aviation: Adverse effects unlikely.

Use in aviation personnel: Airman duties not contraindicated by use.

CATHARTICS; LUBRICANTS, SOFTENERS AND BULKY SUBSTANCES

calcium-bis-dioctyl sulfosuccinate (Surfak)
dioctyl sodium sulfosuccinate (Colace)
emulsion of liquid petrolatum (Agarol; Cremagol; Nivea Cream;
Petrogalar)
liquid petrolatum (Albolene; Nujol; Saxol; Petronol)
methylcellulose (Cellothyl)
plantago ovata coating (Konsyl)
poloxalkol (Polykol)
psyllium hydrophilic mucilloid (Metamucil)
sodium carboxymethyl cellulose (Almeloze; Apergel; Carbethox;
Carmethose; Cethylose; Natulose)

Undesirable effects in aviation: Leakage of oil from anus;
inspissation of fecal mass.

Use in aviation personnel: Airman duties not contraindicated by use.

CATHARTICS: SALINE, VEGETABLE AND OTHER

aloe
aromatic fluid extract of cascara
bisacodyl (Ducolax)
cascara
castor oil
diacetyldihydroxyphenylisatin (Isacen)
magnesia magma (Milk of Magnesia)
magnesium citrate
magnesium sulfate
mild mercurous chloride (Calomel)
phenolphthalein
rhubarb
senna
sodium phosphate
sodium sulfate

14. AGENTS FOR IMMUNOLOGY AND ALLERGY

TOXINS AND TOKOIDS

diphtheria toxoid (various forms)
tetanus toxoid (various forms)

Undesirable effects in aviation: Local pain and soreness.

Use in aviation personnel: Work not contraindicated after use.

VACCINES

adenovirus vaccine
cholera vaccine
epidemic typhus vaccine
influenza virus vaccine
mumps virus vaccine
pertussis vaccine (various forms)
plague vaccine
poliomyelitis virus vaccine (killed and attenuated)
rabies vaccine
smallpox vaccine
tuberculosis vaccine (BCG)
typhoid and paratyphoid vaccine (various forms)
yellow fever vaccine

Undesirable effects in aviation: Local pain, nausea, vomiting, lassitude, aching to varying degrees.

Use in aviation personnel: Airman duties contraindicated for 24 hours or longer if reaction persists, except after oral poliovirus vaccine and smallpox vaccine which do not contraindicate duty.

IMMUNE SERA

antivenin (various types)
diphtheria antitoxin
gas gangrene antitoxin (various types)
hyperimmunized gamma-globulin
immune serum globulin
pertussis immune serum
poliomyelitis immune globulin
scarlet fever immune serum
tetanus antitoxin

cular twitching, rare hyperpyrexia. The drowsiness can be a particular hazard because it may not be recognized by the patient, and because it may recur after seeming alertness.

Use in aviation personnel: Airman duties contraindicated for 24 hours after administration of usual dose; for 12 hours after one-half of the smallest adult dose listed in USP or NND.

ANTIMOTION SICKNESS AGENTS

cinnarazine (Mitronal)

cyclizine (Marezine)

meclizine (Bonamine; Bonine)

phenglutaramide (Aturban)

Undesirable effects in aviation: Similar to those for antihistamines.

Use in aviation personnel: Contraindications same as those for antihistamines.

Undesirable effects in aviation: Mild and severe hypersensitivity reactions.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use, and in presence of any later effects.

ALLERGENIC AND DIAGNOSTIC PREPARATIONS

allergenic preparations (danders, dusts, plants and many others)
skin test antigens (diphtheria, streptococcus, mumps, tuberculin)

Undesirable effects in aviation: Local whealing and urticaria.

Use in aviation personnel: Airman duties contraindicated for 6 hours after use or in presence of any later adverse effects.

ANTIHISTAMINES

antazoline (Antistine)
antergan
carbinoxamine (Clistin)
chlorcyclizine (Perizil)
chlorothen (Tagathen)
chlorpheniramine (Chlor-Trimeton)
chlorphenoxamine (Systiral)
clemizole (Allercur)
cyproheptadine (Periactin)
dimethpyridene (Forhistal)
diphenhydramine (Benadryl)
diphenylpraline (Diafen)
doxylamine (Decapryn)
methapheniline (Diatrine)
methapyrilene (Histadyl)
methdilazine (Tacaryl)
phenindiamine (Thephorin)
pheniramine (Trimeton)
promethazine (Phenergan)
proxamine
pyrathiazine (Pyrrolazote)
pyrilamine maleate (Antamine; Antihist; Diamidide; Neo-
antergan; Renstamin; Thylogen)
pyrrobutamine (Pyrnonil)
thenalidine (Sandostene)
thenyldiamine (Thenfadil)
thonzylamine (Anahist; Neo-hetramine)
tripellenamine (Pyrribenzamine)
triprolidine (Actidil)

Undesirable effects in aviation: Drowsiness (excitement with phenindiamine), dizziness, dry mouth, headaches, nausea, mus-

Undesirable effects in aviation: Allergic reactions and dermatitis; agranulocytosis.

Use in aviation personnel: Airman duties contraindicated until the drug effect is stabilized, and without the presence of adverse symptoms; thereafter it may be permissible for certain types of duty. Periodic medical examinations are indicated during the course of therapy.

IODIDES

sodium iodide

strong iodide solution (Lugol's)

Undesirable effects in aviation: Iodism, characterized by dermatitis, bronchitis, stomatitis and mental depression.

Use in aviation personnel: Airman duties not contraindicated by iodides in usual dosage if no adverse effects are present.

ESTROGENS

benzestrol (Octofollin)

chlorotrianisene (Tace)

dienestrol (Restrol)

diethylstilbestrol (Stilbestrol)

estradiol (Aquagen; Dimenformon; Diogyn; Estraldine; Ovocyclin; Progynon)

estriol (Theedol)

estrogenic substances, conjugated (Ammestrogen; Cogenat; Conestron; Estrifol; Konogen; Premarin)

estrone (Crystogen; Menagen; Menformin; Theelin; Thelestrin)

ethinyl estradiol (Diogyn E; Esteed; Estinyl; Eticyclol; Inestra; Novestrol; Orestralyn)

hexestrol

methallenestril (Vallestril)

piperazine estrone sulfate (Sulestrex)

Undesirable effects in aviation: Anorexia, nausea, vomiting, headache.

Use in aviation personnel: Airman duties contraindicated only if adverse effects are present.

PROGESTINS

allylestrenol (Gestanon)

ethisterone (Lucorteam; Lutocyclol; Lutoral; Ora-Lutin; Pralone; Progestoral; Tyrosinone)

haloprogesterone (Prohalone)

hydroxyprogesterone (Delantin)

medroxyprogesterone (Provera)
norethindrone (Norlutin)
norethynodrel (component of Enovid)
normetandrone (Orgasteron)
progesterone (Colprosterone; Lipo-Lutin; Luocorteam; Luto-
cyclin; Syngesterone)

Undesirable effects in aviation: Minor nausea.

Use in aviation personnel: Airman duties contraindicated only if adverse effects are present.

NONSTEROID LUTEAL FACTORS

relaxin (Cervilaxin)
lututrin (Lutrexin)

Undesirable effects in aviation: Rare allergic sensitivity.

Use in aviation personnel: Work contraindicated only if adverse effects are present.

ANDROGENS

dromostanolone (Drolban)
fluoxymesterone (Halotestin; Ora-Testryl; Ultrandren)
methalone
methandrostenediol (Dianabol)
methylandrostenediol (Androdiol; Methostan; Nabadial; Neo-
stene; Stenediol)
methyltestosterone (Dumogran; Masenone; Metandren; Oreton-
M; Testra)
nandrolone (Durabolin)
norethandrolone (Nilevar)
oxymetholone (Aldroyd)
stanolone (Androlone; Neodrol)
stanozolol (Winstrol)
testosterone (Androlin; Mertestate; Neo-Hombreol; Oreton-F;
Synandrol; Testobase; Testryl)

Undesirable effects in aviation: Acne, baldness, testicular inhibition, priapism, hepatic damage (methyltestosterone, norethandrolone), sodium and water retention, hypercalcemia.

Use in aviation personnel: Airman duties contraindicated only if adverse effects are present.

GONADOTROPINS

chorionic gonadotropin (Antuitrin; APL; Chorioginin; Follu-
tein; Pregnyl)

15. HORMONES

ADRENAL MINERAL CORTICOIDS

desoxycorticosterone (Cortate; Cortenil; Cortiron; DCA; Syn-cort)

Undesirable effects in aviation: Excessive retention of sodium with edema and hypertension; excessive depletion of potassium with muscular weakness.

Use in aviation personnel: Airman duties not contraindicated by the drug in the absence of side effects and when clinical condition is stable. However, underlying medical disease is ordinarily a contraindication to duty.

ADRENAL GLUCOSTEROIDS

betamethasone (Celestone)

chlorprednisone

cortisone (Cortogen; Cortone)

dexamethasone (Decadron)

fludrocortisone (Alflorone)

fluocinolone (Synalar)

fluoxolone (Oxylone)

hydrocortisone (Cortef; Cortifan; Cortril; Heb-Cort; Hycortole; Hydrocortone)

methylprednisolone (Medrol; Wyacort)

prednisolone (Cotolone; Delta-Cortef; Hydextra; Meticortelone; Ulacort)

prednisone (Deltasone; Deltra; Listacort; Metasone; Meticorten; Paracort)

triamcinolone (Aristocort)

Undesirable effects in aviation: Cushing's syndrome with edema, muscle wasting, osteoporosis, potassium loss and hypertension being particularly relevant to aviation. Also, aggravation of peptic ulcer and diabetes, masking of myocardial infarction, non-restraint of infections, mental changes, euphoria and psychotic reactions. Sudden withdrawal may produce prolonged mental depressions.

Use in aviation personnel: Airman duties contraindicated for 3 days after systemic use in customary dosage, or in the presence of any side effects. Topical use not a contraindication to duty.

Small, (physiologic) replacement, doses do not contraindicate duty, but the underlying medical state (adrenal insufficiency) ordinarily would.

ADRENAL CORTICAL HORMONE ANTAGONISTS

mepyrapone (Metopirone)

Undesirable effects in aviation: Vertigo; precipitation of adrenal insufficiency.

Use in aviation personnel: Airman duties contraindicated within 3 days of use.

CORTICOTROPIN

corticotropin (ACTH; Acthar; Acthotrop; Cortrophin; Solac-thyl)

Undesirable effects in aviation: Allergic symptoms possible; otherwise effects similar to, but milder than, adrenal glycos-teroids.

Use in aviation personnel: Airman duties contraindicated for 2 days after use.

THYROID PREPARATIONS

levothyroxine, sodium (Synthroid)

liothyronine, sodium (Cytomel)

thyroid

thyroxin

(see also Agents in Atherosclerosis under **CARDIOVASCULAR AGENTS**)

Undesirable effects in aviation: Signs and symptoms of hyperthyroidism: nervousness, tremor, sleeplessness, weakness, ex-ophthalmos.

Use in aviation personnel: Airman duties not contraindicated when used in dosage adequate to control hypothyroidism with-out producing any significant hyperthyroidism; administration not permitted for the purpose of inducing hyperthyroidism (e.g. in the treatment of obesity).

ANTITHYROID SUBSTANCES

carbimazole (Neomercazole)

iothiouracil (Itrumil)

methimazole (Tapazole)

methylthiouracil (Methiocil; Muracil)

propylthiouracil

thiouracil

thiourea

Undesirable effects in aviation: Adverse effects unlikely.

Use in aviation personnel: Airman duties not contraindicated.

INSULINS

insulin (all forms)

Undesirable effects in aviation: Hypoglycemia with sweating, dizziness, impaired judgment, unconsciousness, convulsions; rare allergic hypersensitivity.

Use in aviation personnel: Airman duties contraindicated by Federal Aviation Regulation for any patient taking any amount of insulin. However, if exceptions are made in the future for personnel with ground duty of noncritical nature, the following will provide a guide: Work may be permitted when the patient requires only small doses (less than 15 units) and has been under satisfactory medical control, without laboratory or clinical hypoglycemia, for 3 months.

INSULIN SUBSTITUTES

chlorpropamide (Diabinese)

phenformin (DBI)

tolbutamide (Orinase)

Undesirable effects in aviation: Chlorpropamide and tolbutamide may produce, variously: indigestion, urticaria, nausea, vomiting, flushing after alcohol, cholestatic jaundice, hypoglycemia (chlorpropamide), neurological disturbances (chlorpropamide), thrombocytopenia, agranulocytosis. Phenformin may produce severe gastrointestinal effects, acidosis and ketosis.

Use in aviation personnel: Airman duties contraindicated by Federal Aviation Regulation for a patient taking any amount of such drugs. However, if exceptions are made in the future for personnel with ground duty of noncritical nature, the following will provide a guide: Work may be permitted when the patient has been under satisfactory medical control, without laboratory or clinical hypoglycemia, for 3 months.

PARATHYROID

parathyroid injection (Parathormone)

Undesirable effects in aviation: Excessive dosage may produce hypercalcemia; little therapeutic application.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use. Underlying medical condition would ordinarily preclude duty.

16. BLOOD, FLUIDS AND ELECTROLYTES

BLOOD AND BLOOD PRODUCTS

albumin, normal human serum
human albumin
normal human plasma
plasma protein fraction, human (Plasmanate)
whole blood

Undesirable effects in aviation: Incompatibility and other immune reactions; serum hepatitis.

Use in aviation personnel: Airman duties contraindicated for 8 days after use. Medical reason for use would ordinarily provide further contraindication.

PLASMA SUBSTITUTES

dextran (Expandex; Gentran)
gelatin solution, special intravenous (Plazmoid)
polyvinyl pyrrolidone (Periston; PVP)

Undesirable effects in aviation: Toxicity negligible, but immunological type reactions may occur.

Use in aviation personnel: Airman duties contraindicated for 8 days after use. Medical reason for use would ordinarily provide further contraindication.

INORGANIC SALTS

calcium gluconate
calcium lactate
calcium salts
potassium chloride
sodium bicarbonate
sodium chloride
sodium lactate

Undesirable effects in aviation: Oral use in customary dosage unlikely to produce troublesome effects. Parenteral use may produce electrolyte disturbances.

Use in aviation personnel: Airman duties not contraindicated after usual oral dosages (except, potassium chloride contraindicates for 24 hours). Work contraindicated after parenteral use for 24 hours. Medical indication would ordinarily preclude duty.

18. AGENTS IN NUTRITION

NUTRITIONAL SUPPLEMENTS, CARBOHYDRATE

dextrose (glucose)
fructose
glucourolactone (Glucurone)

Undesirable effects in aviation: Unlikely.

Use in aviation personnel: Airman duties not contraindicated by use.

NUTRITIONAL SUPPLEMENTS, PROTEIN AND AMINO ACID

arginine (Argivene)
arginine glutamate (Modumate)
glutamic acid
methionine (Altara; Amurex; Meonine; Metione)
potassium and magnesium salts of aspartic acid (Spartase)
protein hydrolysates (Am-B; Amigen; Aminonat; Aminosol; Aminovitox; Amiprote; Calorigen; Caminoids; Casein hydrolysate; Lactamin; Travamin)
sodium glutamate (Glutavene; Glutavite)

Undesirable effects in aviation: Relatively nontoxic by mouth; allergic symptoms possible after intravenous use.

Use in aviation personnel: Airman duties contraindicated for 24 hours after intravenous use.

NUTRITIONAL SUPPLEMENTS, FAT

cottonseed oil emulsion (Lipomul)
homogenized fat preparations

Undesirable effects in aviation: Severe immediate "colloid" reactions may occur after parenteral use, with dyspnea, flushing, urticaria, fever and other symptoms.

Use in aviation personnel: Airman duties contraindicated for 8 days after parenteral use. Medical indication for use would presumably contraindicate duty.

AGENTS IN OBESITY

amphetamine (Amitrene; Amphetrine; Benzedrine)
dextroamphetamine (Adrizine; Am-Dex; Dadex; Dexedrine)
diethylpropion (Tepanil)
methamphetamine (Amphedroxyn; Desoxedrine; Desoxyephedrine; Desoxyn; Desyphed; Drinalfa; Methedrine; Methoxyn; Norodin)
phenmetrazine (Preludin)
phentermine (Ionamin)
phenylpropanolamine (Propadrine)
(see also SYMPATHETIC STIMULANTS)

Undesirable effects in aviation: Nervousness, wakefulness, errors in judgment, psychotic reactions.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

21. PARASYMPATHETIC STIMULANTS

PARASYMPATHETIC STIMULANTS, DIRECT

bethanechol (Urecholine)
carbachol (Carbamiotin; Carcholin; Doryl)
furtrethonium (Furmethide)
methacholine (Mecholyl)
pilocarpine

Undesirable effects in aviation: Intestinal cramping, sweating, diarrhea, bronchial constriction, pulmonary edema, asthma, bradycardia, cardiac arrest.

Use in aviation personnel: Airman duties contraindicated for 24 hours after local or systemic use.

PARASYMPATHETIC STIMULANTS, ANTICHOLINESTERASE

ambenonium (Mytelase)
benzpyrinium (Stigmonene)
demecarium (Humorsol)
echothiophate (Phospholine)
isofluorophate (Fluoropryl)
neostigmine (Prostigmine)
physostigmine (eserine)

Undesirable effects in aviation: Same as parasympathetic stimulants direct, plus some element of muscular weakness.

Use in aviation personnel: Airman duties contraindicated for 48 hours after local or systemic use. Medical indication would ordinarily contraindicate duty.

20. SYMPATHETIC DEPRESSANTS

VASODILATORS AND HYPOTENSIVES

azapetine (Ilidar)

dihydroergot alkaloids (Hydergine)

phenoxybenzamine (Dibenzyline)

phentolamine (Regitine)

piperoxan (Benodaine)

tolazoline (Benzazoline; Priscoline; Vasimid)

(see also Hypotensives, Sympatholytics, under **CARDIOVASCULAR AGENTS**)

Undesirable effects in aviation: Mild to severe side effects common, including variously tachycardia, hyperpnea, postural hypotension and mixed autonomic effects.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

drine; Desoxyn; Desyphed; Drinalfa; Methedrine; Methoxyn; Norodin)

phenmetrazine (Preludin)

(see also Agents in Obesity under NUTRITION)

Undesirable effects in aviation: Wakefulness, nervousness, impaired judgment.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

SMOOTH MUSCLE RELAXANTS

isoetharine (Dilabron)

isoproterenol (Aleudrin; Aludrin; Asdrin; Isopro; Isuprel)

isoxuprine (Vasodilan)

nylidrin (Arlidin)

protochylol (Caytine)

Undesirable effects in aviation: Palpitation, tachycardia, tremulousness, insomnia.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

19. SYMPATHETIC STIMULANTS

VASOCONSTRICTORS

cyclopentamine (Clopane)
ephedrine
epinephrine (Adrenalin; Supranephrin; Vasodrine)
hydroxyamphetamine (Paredrine)
isometheptene (Octin)
levarterenol (Levophed)
mephentermine (Wyamine)
metaraminol (Aramine)
methoxamine (Vasoxyl)
methoxyphenamine (Orthoxine)
methylaminoheptane (Oenethyl)
methylhexaneamine (Forthane)
naphazoline (Privine)
nordefrin (Cobefrin)
phenylephrine (Isophrin; Neosynephrine; Synasal)
phenylpropanolamine (Panamine; Propadrine)
phenylpropylmethylamine (Vonedrine)
propylhexedrine (Benzedrex)
racephedrine (Vaponephrin)
tetrahydrozoline (Tyzine)
tuaminoheptane (Tuamine)
xylometazoline (Otrivin)

Undesirable effects in aviation: Local use as nasal decongestants seldom produces side effects, but naphazoline may induce wakefulness. Systemic use may produce, variously: local tissue necrosis (levarterenol); trembling, pallor, nervousness (epinephrine).

Use in aviation personnel: Airman duties not contraindicated by topical use in the nose, but should not be allowed for 6 hours after systemic use (12 hours for preparations of epinephrine in oil).

CENTRAL STIMULANTS

amphetamine (Amitrene; Amphetamine; Benzedrine)
dextroamphetamine (Adrizine; Am-Dex; Dadex; Dexedrine)
methamphetamine (Amphedroxyn; Desoxedrine; Desoxyephe-

Use in aviation personnel: Airman duties contraindicated during first week of use, but then allowable 24 hours after use if medical condition permits, providing that no adverse effects are present. It is to be noted that the presence of peptic ulcer precludes flying.

CYCLOPLEGICS AND MYDRIATICS

cyclopentolate (Cyclogyl)
eucatropine (Euphthalmine)
homatropine
tropicamide (Mydriacyl)

Undesirable effects in aviation: Dilated pupils and paralyzed accommodation after local use in eyes.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

CENTRAL DEPRESSANTS AND ANTIPARKINSON AGENTS

belladonna
biperidin (Akineton)
benztropin (Cogentin)
caramiphen (Panparnit; Toryn)
cycrimine (Pagitane)
diethazine (Diparcol)
ethopropazide (Parsidol)
orphenadrine (Disipal)
procyclidine (Kemadrin)
scopolamine
stramonium
tincture of belladonna
trihexlphenidyl (Artane; Pipanol)

Undesirable effects in aviation: Sedation, dry mouth, dilated pupils.

Use in aviation personnel: Same as for antispasmodic group. Parkinsonism would ordinarily be expected to preclude duty.

22. PARASYMPATHETIC DEPRESSANTS

ANTISPASMODICS

adiphenine (Trasentine)
ambutonium
aminopentamide (Centrine)
amolane (Amethone)
amprotropine (Syntropan)
atropine
belladonna
benzomethamine (Cotranul)
dibutoline (Dibuline)
dicyclomine (Bentyl)
diethylaminoethyldiphenylacetate (adiphenine; Trasentine)
diphemanil (Prantal)
hexocyclium (Tral)
homatropine (Homapin; Homatromide; Malcotran; Mesopin;
Novatrin; Sethyl)
isopropamide (Darbid)
mepenzolate (Cantil)
methantheline (Banthine)
methscopolamine (Pamine)
octatropine (Valpin)
oxyphenacylimine (Daricon)
oxyphenonium (Antrenyl)
pavatrine
pentapiperide (Quilene)
penthienate (Monodral)
pipenzolate (Piptal)
piperidolate (Dactil)
poldine (Nacton)
propantheline (Pro-Banthine)
tincture of belladonna
tricyclamol (Elorine)
tridihexethyl (Pathilon)
valethamate (Murel)

Undesirable effects in aviation: Dry mouth, dilated pupils and paralyzed accommodation, difficulty in urination, precipitation of glaucoma.

23. MYONEURAL AGENTS

MUSCLE RELAXANTS, CURARE TYPE

benzoquinonium (Mytolon)
chondodendron (Intocostrin)
curare
decamethonium (Syncurine)
dimethyltubocurarine (Metubine)
gallamine (Flaxedil)
succinylcholine (Anectine; Quelicin; Sucostrin; Suxinyl)
tubocurarine (Delacurarine; Mecostrin; Tubadil; Tubarine)

• **Undesirable effects in aviation:** Paralysis of muscle; rare extreme respiratory depression.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use. Medical condition would usually preclude work.

MUSCLE STIMULANTS

ambenonium (Mytelase)
benzpyrinium (Stigmonene)
edrophonium (Tensilon)
neostigmine (Prostigmine)
pyridostigmine (Mestinon)
(see also PARASYMPATHETIC STIMULANTS)

Undesirable effects in aviation: Overdosage may produce muscular fasciculations, weakness and paralysis.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; work improbable on medical grounds.

MUSCLE RELAXANTS, MEPHENESIN TYPE

carisoprodol (Soma)
mephenesin (Avosyl; Glytol; Mephedan; Myanesin; Oranixon; Prolax; Sinan; Tolansin; Toloxyn; Tolserol)
mephenesin carbamate (Tolseram)
methocarbamol (Robaxin)
promoxolane (Dimethylane)
styramate (Sinaxar)

Undesirable effects in aviation: Sleepiness, weakness, vertigo, lassitude; rare hemolysis and hemoglobinuria (mephenesin).

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

MUSCLE RELAXANTS, OTHERS

chlormezanone (Trancopal)

chlorzoxazone (Paraflex)

zoxazolamine (Flexin) (no longer marketed)

Undesirable effects in aviation: Headache, weakness, drowsiness, rashes, hepatitis, (chlorzoxazone, zoxazolamine); sedation (chlormezanone).

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

quinine and urea hydrochloride
saligenin

Undesirable effects in aviation: Allergic sensitization; local irritation.

Use in aviation personnel: Airman duties not contraindicated if no side effects are present. However, underlying condition may contraindicate duty.

25. NON-NARCOTIC ANALGESICS

SALICYLATES

acetylsalicylic acid
aspirin
calcium acetylsalicylate carbamide (Calurin)
choline salicylate (Arthropan)
methyl salicylate (oil of wintergreen)
salicylamide (Amid-Sal; Liquiprin, Salamide; Salicin; Salrin)
salicylic acid
sodium salicylate

Undesirable effects in aviation: Nausea, tinnitus, deafness, then diarrhea and hallucinations with excessive dosage; local irritation; infrequent allergic manifestations.

Use in aviation personnel: Airman duties not contraindicated by usual dosage (less than 1 gm. of aspirin) unless adverse effects are present.

ANILINE DERIVATIVES

acetaminophen (Amdil; Anelix; Apamide; Tempra; Tylenol)
acetanilid
acetophenetidin (Phenacetin)

Undesirable effects in aviation: Rare sensitivity; prolonged administration may cause cyanosis and anoxemia from sulf- or methemo-globinemia.

Use in aviation personnel: Airman duties not contraindicated by usual dosage (less than 0.5 gm. acetanilid) but chronic use should be avoided.

PYRAZOLON DERIVATIVES

aminopyrine (Pyramidon)
antipyrine
oxyphenbutazone (Tandearil)
phenylbutazone (Butazolidin)
sulfipyrazone (Anturane)

Undesirable effects in aviation: Nausea, anorexia, vertigo, rashes, water retention; may induce bleeding in peptic ulcer; serious danger of agranulocytosis.

29. ANTICONVULSANTS

BARBITURATE GROUP

- mephobarbital (Mebaral)
- metharbital (Gemonil)
- phenobarbital (Luminal)
- N-phenylbarbital (Pyrietal)
- primidone (Mysoline)

Undesirable effects in aviation: Excessive sedation and impairment of mental and physical activity.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; however, Federal Aviation Regulation prohibits duty in persons with convulsive disorders.

HYDANTOINS

- diphenylhydantoin (Dilantin; Diphentoin; Diphenylan)
- ethotoin (Peganone)
- N-methylphenylethyhydantoin (Mesantoin)

Undesirable effects in aviation: Minor sedation, hyperplasia of gums, nystagmus, tremor.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; however, Federal Aviation Regulation prohibits duty in persons with convulsive disorders.

OXAZOLIDONES

- paramethadione (Paradione)
- trimethadione (Tridione)

Undesirable effects in aviation: Glare phenomenon, rashes, fever.

Use in aviation personnel: Airman duties contraindicated for 3 days after use; however, Federal Aviation Regulation prohibits duty in persons with convulsive disorders.

OTHER ANTICONVULSANTS

- aminoglutethimide (Elipten)
- ethosuximide (Zarontin)
- methsuximide (Celontin)
- phenacemide (Phenurone)
- phensuximide (Milontin)

Undesirable effects in aviation: Sedation, headache, nausea, vertigo, rash; prolonged use has caused fever and psychosis.

Use in aviation personnel: Airman duties contraindicated for 24 hours after a single dose; for 1 week after more continued use.

ANTIHISTAMINE SEDATIVES

promethazine (Phenergan)

propiomazine (Largon)

Undesirable effects in aviation: Same as short acting barbiturates.

Use in aviation personnel: Airman duties contraindicated for 24 hours after a single dose, or 48 hours after chronic use.

28. SEDATIVES AND HYPNOTICS

HALOGENATED HYDROCARBONS

chloral hydrate
petrichloral (Perichlor)
toloxychlorinol

Undesirable effects in aviation: Rapid sedation, but rather short lived. Overdosage may give cardiac depression.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use.

BROMIDES

bromides
potassium bromide
sodium bromide

Undesirable effects in aviation: Continued use may cause psychosis and dermatitis.

Use in aviation personnel: Airman duties not contraindicated after a single dose, but prohibited for 3 weeks after steady use for a week or more; obsolete drugs.

PARALDEHYDE

paraldehyde

Undesirable effects in aviation: Relatively safe in usual doses, but breath highly offensive for 24 hours or more.

Use in aviation personnel: Airman duties contraindicated for 2 days after use.

UREIDES, CARBAMATES, HIGHER ALCOHOLS

allylisopropylacetylcarbamide (Sedormid)
bromisovalum (Bromural; Isoval; Kartryl)
carbromal (Adalin)
ectylurea (Nostyn)
emylcamate (Nuncital)
ethchlorvynol (Placidyl)
ethinamate (Valmid)
methylparafynol (Dormison)

Undesirable effects in aviation: Relatively feeble depressants and little chance of serious side effects (except for thrombocytopenia from allylisopropylacetylcarbamide).

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

BARBITURATES, SHORT AND INTERMEDIATE ACTING

allylbarbituric acid (Sandoptal)
amobarbital (Amytal)
aprobarbital (Alurate)
butabarbital (Butisol)
butallylonal (Pernoston)
cyclobarbital (Phanodorn)
diallylbarbituric acid (Dial)
heptabarbital (Medomin)
pentabarbital (Isobarb; Napental; Nembutal; Pembule; Pental)
probarbital (Ipral)
secobarbital (Barbosec; Evronal; Seconal; Synate)
talbutal (Lotusate)
vinbarbital (Delvinal)

Undesirable effects in aviation: Often initial excitement, then sleepiness, sedation, impairment of mental and physical activity; minor sedation during recovery often not appreciated adequately by patient.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use in usual dosage.

BARBITURATES, LONG ACTING

barbital (Veronal)
phenobarbital (Luminal)

Undesirable effects in aviation: Sedation, prolonged, and impairment of mental and physical activity.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; however, after a month or more of therapy with usual dosage, certain types of ground work might be permitted for patients in whom the only observable effect was calmness. However, more often the underlying medical condition would preclude duty.

GLUTETHIMIDE GROUP

glutethimide (Doriden)
methypylon (Nodular)

Undesirable effects in aviation: Various: drowsiness, ataxia, rashes, diarrhea, leucopenia, hepatic damage.

Use in aviation personnel: Airman duties contraindicated for 3 days after use, or in presence of side effects; however, Federal Aviation Regulation prohibits duty in persons with convulsive disorders.

30. TRANQUILIZERS

PHENOTHIAZINE GROUP

acetophenazine (Tindal)
chlorpromazine (Thorazine)
chlorprothixine (Taractan)
fluphenazine (Prolixin)
mepazine (Pacatal)
methoxypromazine (Tentone)
perphenazine (Trilafon)
piperacetazine (Quide)
prochlorperazine (Compazine)
promazine (Sparine)
thiopropazate (Dartal)
thioridazine (Mellaril)
trifluoperazine (Stelazine)
triflupromazine (Vesprin)

Undesirable effects in aviation: Autonomic and metabolic: weakness, chilliness, constipation, stuffy nose, blurred vision, dry mouth, hypotension. CNS: drowsiness, parkinsonism, akathisia, dystonia. Organ damage: obstructive hepatitis, marrow depression and agranulocytosis.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use of the drug per se; however, patients requiring tranquilizers are ordinarily excluded from duty.

ANTIEMETICS

pipamazine (Mornidine)
thiethylperazine (Torecan)
thioperazine (Vontil)
trimethobenzamide (Tigan)

Undesirable effects in aviation: Similar to phenothiazine group.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

ANTIPRURITICS

methdilazine (Tacaryl)
trimeprazine (Tamaril)

Undesirable effects in aviation: Similar to phenothiazine group.

Use in aviation personnel: Work contraindicated for 24 hours after use.

RESERPINE GROUP

alseroxylon (Rauwiloid)

deserpidine (Harmony)

rauwolfia (Abten; Koglucoid; Raudixin; Raulon; Rau-Tab; Rautensin; Vio-Serpine)

rescinamine (Moderil)

reserpine (Crystoserpine; Eskaserp; Rau-sed; Reserpoid; Roxinoid; Sandril; Serfin; Serpasil Serpiloid; Serpine)

tetrabenazine (Nitoman)

Undesirable effects in aviation: Autonomic: nasal congestion, salivation, flushing, vomiting, diarrhea, bradycardia. CNS: sedation, nightmares, parkinsonism. Other: induction of bleeding in peptic ulcer.

Use in aviation personnel: Airman duties contraindicated for 1 week after use; however, patients requiring tranquilizers are ordinarily excluded from duty.

DIPHENYLMETHANE GROUP

azacyclonal (Frenquel)

benactyzine (Suavital)

captodiamine (Suvren)

haloperidol

hydroxyzine (Atarax; Vistaril)

piperilate (Sycotrol)

Undesirable effects in Aviation: Sedation, autonomic side effects.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use; however, patients requiring tranquilizers are ordinarily excluded from duty.

PROPANEDIOL-CARBAMATE GROUP

meprobamate (Equanil; Meprospan; Miltown)

oxanamide (Quinactin)

phenaglycodol (Ultran)

valnoctamide (Axiquel)

Undesirable effects in aviation: Tremulousness, muscular relaxation, sleepiness, nausea, depression, allergic reactions, leucopenia, thrombocytopenia, intolerance to alcohol, withdrawal symptoms.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; however, patients requiring tranquilizers are ordinarily excluded from duty.

CHLORDIAZEPOXIDE

chlordiazepoxide (Librium)

Undesirable effects in aviation: Drowsiness, vertigo, ataxia (in doses over 50 mg. per day), syncope, itching, dermatitis, impaired thinking, confusion.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; however, patients requiring tranquilizers are ordinarily excluded from duty.

OTHERS

amphenidone (Dornwall)

clemizole (Allercur)

mephenoalone (Trepidone)

Undesirable effects in aviation: Various: sedation, muscular relaxation.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use; however, patients requiring tranquilizers are ordinarily excluded from duty.

Undesirable effects in aviation: Excitement, nervousness, dry mouth, constipation, impotence, visual disturbances, hypotension, rash, jaundice.

Use in aviation personnel: Airman duties contraindicated for 1 week after use. Medicinal need would probably indicate unfitness for duty.

DIBENZAZEPINE GROUP

amitriptyline (Elavil)

imipramine (Tofranil)

Undesirable effects in aviation: Excitement or drowsiness, dry mouth, blurred vision, tachycardia, constipation, allergic reactions, hypotension, cholestatic jaundice, agranulocytosis, parkinsonism, tremor.

Use in aviation personnel: Work contraindicated for 1 week after use. Medicinal need would probably indicate unfitness for duty.

33. AGENTS IN ALCOHOLISM

METABOLIC INHIBITORS

calcium carbide
disulfiram (Antabuse)

Undesirable effects in aviation: Distressing effects after the ingestion of alcohol: nausea, vomiting, drowsiness, collapse, psychosis.

Use in aviation personnel: Airman duties contraindicated for 2 weeks after use; however, alcoholism precludes duty.

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8. TROPICAL AGENTS

INSECTICIDES

benzyl benzoate
chlorophenothane (DDT)
crotamiton (Eurax)
lindane (benzene hexachloride; hexachlorocyclohexane)

Undesirable effects in aviation: Local irritation; DDT and lindane may produce irritability, numbness and tingling, tremors, and later, convulsions and death in excessive dosage.

Use in aviation personnel: Airman duties not contraindicated after customary topical application and dosage. Medical examination indicated before return to duty.

INSECT REPELLANTS

butapyronoxyl (Indalone)
dimethylphthalate
dimethyltolumide (m-Delphene)
ethohexadiol (Rutgers 612)

Undesirable effects in aviation: Local irritation; little chance of systemic effects.

Use in aviation personnel: Airman duties not contraindicated after customary application. Medical examination indicated before return to duty.

ANTISEPTICS: PHENOLS, METALS, HALOGENS, OXIDIZING AGENTS, ALCOHOLS, DYES

acriflavine
ammoniated mercury
bismuth tribromphenate (Xeroform)
boric acid
cresol
ethyl alcohol
hexachlorophene (Gamophen; pHisohex)
hydrogen peroxide
iodine, tincture
iodochlorhydroxyquin (Enterokin; Enteroquinol; Quinambicide)
iodoform

isopropyl alcohol
menthol
merbromin (Mercurochrome)
mercuric chloride
methylrosaniline (gentian violet)
nitromersol (Metaphen)
oil of cloves
oil of eucalyptus
phenol
potassium permanganate
proflavine
resorcinol
scarlet red
silver nitrate
silver picrate (Picragol)
sodium hypochlorite
sodium perborate
strong and mild silver protein (Argyn; Argyrol; Lunargen;
Protargin; Protargol; Silvol)
thiomersol (Merthiolate)
thymol
yellow mercuric oxide
zinc oxide

Undesirable effects in aviation: Relatively nontoxic. Some may be irritating (tincture of iodine); some sensitizing (ammoniated mercury); some capable of producing systemic toxicity if applied excessively or on abraded skin (phenol).

Use in aviation personnel: Airman duties not contraindicated after topical use in conventional dosage.

FUNGICIDES

benzoic acid
caprylic compound (Naprylate)
caprylic salts
salicylanilide
salicylic acid
triacetin (Enzactin)

Undesirable effects in aviation: Relatively nontoxic.

Use in aviation personnel: Airman duties not restricted after topical use in conventional dosage.

SURFACE ACTIVE COMPOUNDS

benzalkonium (Zephiran)
benzethonium (Phemerol)

13. DIAGNOSTIC AGENTS

PLASMA AND BLOOD VOLUME AGENTS

Evans blue
radioactive chromic chloride
radio-iodinated serum albumin
sodium radiochromate

Undesirable effects in aviation: Unlikely to produce adverse effects.

Use in aviation personnel: Airman duties not contraindicated from the use of these drugs themselves, but medical or diagnostic reasons would ordinarily preclude it for at least 24 hours.

GASTRIC ACIDITY AGENTS

azuresin (Diagnex blue)
betazole (Histalog)
histamine
quinine carbacrylic resin (Diagnex)

Undesirable effects in aviation: Transitory flushing and palpitation from histamine.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use.

KIDNEY AND LIVER FUNCTION AGENTS

benzoic acid
galactose
inulin
mannitol
phenolsulfonphthalein (phenol red)
sodium p-amminohippurate
sodium indigotindisulfonate
sodium thiosulfate
sulfbromphthalein (Bromthalein)

Undesirable effects in aviation: Adverse effects unlikely.

Use in aviation personnel: Airman duties not contraindicated by the agents themselves.

17. VITAMINS

VITAMIN A

- carotene in oil
- cod liver oil
- halibut liver oil
- oleovitamin A
- percomorph liver oil
- vitamin A

Undesirable effects in aviation: Unlikely in adults.

Use in aviation personnel: Airman duties not contraindicated by treatment with usual dosage.

VITAMIN B MEMBERS AND RELATED SUBSTANCES

- choline
- dried yeast
- methylol riboflavin (Hyflavin)
- niacin (nicotinic acid)
- niacinamide (nicotinic acid amide)
- pantothenic acid
- pyridoxine
- riboflavin
- thiamine

Undesirable effects in aviation: Nil except for immediate flushing from niacin.

Use in aviation personnel: Airman duties not contraindicated except for 4 hours after the use of doses of niacin which produce any side effects.

VITAMIN C

- ascorbic acid

Undesirable effects in aviation: Unknown.

Use in aviation personnel: Airman duties not contraindicated during use.

VITAMIN D AND RELATED STEROIDS

- calciferol
- dihydrotachysterol (Hytakerol; formerly hydrocalciferol)
- fish liver oils
- synthetic oleovitamin D

Undesirable effects in aviation: Excessive dosage may produce hypercalcemia with anorexia and loss of weight.

Use in aviation personnel: Airman duties not contraindicated by antirachitic dosage. Doses over 50,000 i.u. (vitamin D), or 1 ml. dihydrotachysterol daily contraindicate work during the first 2 months of therapy; work thereafter may be permitted in some positions when the blood calcium is adequately stabilized and no symptoms are present.

VITAMIN E

alpha tocopherol

Undesirable effects in aviation: Unknown.

Use in aviation personnel: Airman duties not contraindicated by use.

POLYVITAMIN PREPARATIONS

dried yeast
hexavitamin
triasyn B
wheat germ

Undesirable effects in aviation: Unlikely.

Use in aviation personnel: Airman duties not contraindicated by use.

24. ANESTHETICS AND THERAPEUTIC GASES

INHALATION ANESTHETICS

chloroform
cyclopropane
ether
ethyl chloride
ethylene
halothane (Fluothane)
methoxyflurane (Penthrane)
nitrous oxide
trichloroethylene (Trilene)
trifluoroethylvinyl ether (Fluormar)
vinyl ether (Vinethane)

Undesirable effects in aviation: Nausea and vomiting during recovery; arrhythmias, liver damage (chloroform).

Use in aviation personnel: Airman duties contraindicated for 72 hours after use (24 hours after nitrous oxide if examination shows no sequelae).

NONVOLATILE ANESTHETICS

hexobarbital (Evipal; Evipan; Sombulex)
hydroxydione (Viadril)
magnesium salts
methitural (Neraval)
methohexital (Brevital)
phencyclidine (Sernyl)
thiamylal (Surital)
thiopental (Pentothal)
tribromethanol (Avertin)

Undesirable effects in aviation: Recurrent sleepiness after partial recovery.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use.

THERAPEUTIC GASES

carbon dioxide
helium
oxygen

Undesirable effects in aviation: Local irritation and fatigue remaining after use.

Use in aviation personnel: Airman duties contraindicated for 48 hours after therapeutic use. However, it is to be noted that oxygen, properly used, is of advantage to normal airmen in high-altitude flying.

LOCAL ANESTHETICS, INJECTION OR TOPICAL

benoxinate (Dorsacaine)
butacaine (Butyn)
butethamine (Monocaine)
chlorprocaine (Nesacaine)
cocaine
cyclomethycaine (Surfacaine)
dibucaine (Nupercaine)
hexylcaine (Cyclaine)
lidocaine (Xylocaine)
mepivacaine (Carbocaine)
naepaine (Amylsine)
piperocaine (Metycaine)
procaine (Lactocaine; Neocaine; Novocaine; Scurocaine)
proparacaine (Ophthaine)
propoxycaine (Ravocaine)
tetracaine (Pontocaine)

Undesirable effects in aviation: Local discomfort during recovery. Excitement and possible convulsions from overdosage.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use.

LOCAL ANESTHETICS, TOPICAL ONLY

amydracaine (Alypin)
benzyl alcohol
butylaminobenzoate (Butesin)
dimethisoquin (Quotane)
diperodon (Diothane)
dicyclonine (Dyclone)
ethylaminobenzoate (Benzocaine)
ethyl chloride
eugenol
larocaine
orthoform (Orthocaine)
phenacaine (Holocaine)
pramoxine (Tronothane)

Undesirable effects in aviation: Moderate depression from large therapeutic doses.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use.

METHADONE GROUP

dextromoramide (Dimorlin; Palfium)

dextropropoxyphene (Darvon)

methadone (Amidone; Dolophine)

Undesirable effects in aviation: Nausea, depression, slowed respiration.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. In most instances the medical condition would preclude duty for an additional period.

MEPERIDINE GROUP

alphaprodine (Nisentil)

anileridine (Leritine)

diphenoxylate (Lomotil)

ethoheptazine (Zactane)

meperidine (Demerol; Pethidine)

prodilidine

Undesirable effects in aviation: Nausea, depression, slowed respiration.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

PHENAMPROMIDE DERIVATIVES

diampromide

phenampromide

Undesirable effects in aviation: Sedation.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use.

27. ANTITUSSIVES

EXPECTORANTS

ammonium chloride
glyceryl guaiacolate (Guaianesin)
ipecac
sodium iodide

Undesirable effects in aviation: Serious side effects unlikely.

Use in aviation personnel: Airman duties not contraindicated by use.

NONNARCOTIC SUPPRESSIVES

benzonatate (Tessalon)
carbetapentane (Toclase)
chlorphendianol (Detigon)
dimethoxanate (Clothera)
homarylamine
noscapine (Nectadon)

Undesirable effects in aviation: Occasional mild nausea, dizziness, drowsiness.

Use in aviation personnel: Airman duties not contraindicated by usual dose.

31. STIMULANTS

NIKETHAMIDE GROUP

ethamivan (Emivan)
nikethamide (Coramine; Nikorin)

Undesirable effects in aviation: Toxicity minor; extra-therapeutic doses convulsive.

Use in aviation personnel: Airman duties contraindicated by the use of the drug per se for 48 hours. Medical indication would usually preclude duty for a longer period.

OTHER MEDULLARY STIMULANTS

amiphenazole (Daptazole)
bemegrade (Megimide)
pentylentetrazol (Cardiazol; Metrazol; Pentrazol; Pentrolone)
picrotoxin

Undesirable effects in aviation: Strong respiratory stimulation, convulsions.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. However, medical status would presumably preclude duty.

REFLEX STIMULANTS

ammonium carbonate
aromatic spirit of ammonia

Undesirable effects in aviation: Effects minor.

Use in aviation personnel: Airman duties not contraindicated by use per se, but medical need would probably indicate unfitness for duty.

32. PSYCHIC STIMULANTS

XANTHINE GROUP

caffeine

coffee; tea, and other beverages containing xanthines

Undesirable effects in aviation: Wakefulness, tremor, indigestion, nervousness.

Use in aviation personnel: Airman duties not contraindicated by beverage use, but medicinal use would probably indicate unfitness for duty.

SYMPATHOMIMETIC GROUP

amphetamine (Amitrene; Amphetamine; Benzedrine)

dextroamphetamine (Adrizine; Am-Dex; Dadex; Dexedrine)

methamphetamine (Desoxyn)

Undesirable effects in aviation: Wakefulness, nervousness, impaired judgment.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use.

DIPHENYLMETHANE GROUP

deanol (Deaner)

methylphenidate (Ritalin)

pipradol (Meratran)

Undesirable effects in aviation: Irritability, hyperexcitability, insomnia.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. Medicinal need would probably indicate unfitness for duty.

AMINE OXIDASE INHIBITORS

etryptamine (Monase)

iproniazid (Marsilid)

isocarboxazid (Marplan)

nialamide (Niamid)

phenelzine (Nardil)

pheniprazine (Catron) (withdrawn)

tranlycypromine (Parnate)

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Naprylate (caprylic compound)...	18	emulsion).....	32
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Nearsphenamine.....	10	Norodin (methamphetamine)...	48, 50
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Neohydrin (chlormerodrin).....	21	Novocaine (procaine).....	58
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Neostam (stilbamine glucoside)...	12	Nupercaine (dibucaine).....	58
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ol).....	42	Nydrazid (isoniazid).....	5
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		Nystatin.....	7

26. NARCOTIC ANALGESICS

OPIUM DERIVATIVES

camphorated tincture of opium (paregoric)
pantopon
powdered opium
powder of ipecac and opium (Dover's powder)
tincture of opium (laudanum)

Undesirable effects in aviation: Sleepiness from excessive dosage.

Use in aviation personnel: Airman duties contraindicated for 12 hours after use.

MORPHINE DERIVATIVES (AND ANTAGONISTS)

apomorphine
dihydromorphinone (Dilaudid)
heroin
levallorphan (Lorfan)
levorphanol (Levo-Dromoran)
metapon
morphine
nalorphine (Nalline)
oxymorphone (Numorphan)
phenazocine (Primadol)

Undesirable effects in aviation: Nausea, vomiting, colic, general depression, slowed respiration, vasomotor depression.

Use in aviation personnel: Airman duties contraindicated for 24 hours after use. In most instances the medical condition would preclude work for an additional period.

CODEINE DERIVATIVES

codeinè
dextromethorphan (Romilar)
dihydrocodeinone (Codone; Dicodid; Mercodinone)
dihydrohydroxycodone (contained in Percodan)
drocode (Didrate)
elixir terpin hydrate and codeine and similar mixtures
ethyl morphine (Dionin)
pholcodine (Ethnine)

Use in aviation personnel: Airman duties not contraindicated in the absence of adverse effects; however, patient should be under close observation for blood changes.

COLCHICINE GROUP

colchicine
demecolcine (Colcemid)

Undesirable effects in aviation: Purging at upper therapeutic levels.

Use in aviation personnel: Airman duties contraindicated for 48 hours after use.

OTHERS

cinchophen (Atophan)
neocinchophen (Tolysin)
phenyramidol (Analexin)

Undesirable effects in aviation: The cinchophens may produce hepatitis; phenyramidol causes infrequent gastrointestinal distress and pruritis.

Use in aviation personnel: Airman duties not contraindicated in the absence of adverse effects. Medical examinations indicated at 2-week intervals if therapy continuous.

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4. AVAILABILITY. Although the contents of the guide should be interpreted and applied by physicians, who know the nature of airman activities, it is available to any purchaser. Order it from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20401. The purchase price is 55 cents.

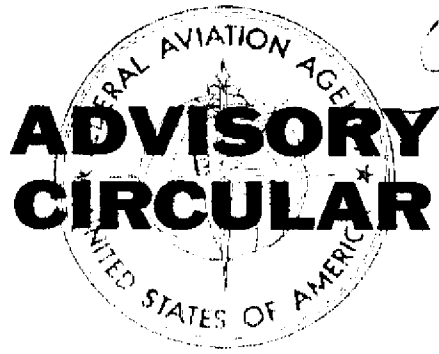


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AIR TRAFFIC CONTROL AND GENERAL OPERATIONS
EFFECTIVE : 7/19/63

SUBJECT : GUIDE TO DRUG HAZARDS IN AVIATION

-
1. PURPOSE. This circular announces the publication and availability of the Guide to Drug Hazards in Aviation Medicine.
 2. BACKGROUND. Section 91.11 of the Federal Aviation Regulations states:
 "91.11 Liquor and drugs.
 - (a) No person may act as crewmember of a civil aircraft while -
 - (1) Under the influence of intoxicating liquor; or
 - (2) Using any drug that affects his faculties in any way contrary to safety." (Underscoring supplied).

A means of determining the type of drug which "affects his faculties" has not, heretofore, been provided to airmen.

The Guide to Drug Hazards in Aviation Medicine consists of a comprehensive list of all commonly-used prescription and nonprescription drugs, suitably indexed. The text of the guide groups those drugs with similar pharmacological effect. For each group a concise statement is made concerning: (1) the side effects, if any, which make them undesirable for use while serving as an airman, and (2) recommendations concerning the length of time an airman should wait after taking a drug before resuming airman activities.

3. APPLICATION. A copy of the guide is in the possession of all FAA Aviation Medical Examiners.

Examiners are prepared to provide advice and professional interpretation of guide recommendations as they might apply to specific circumstances involving the use of drugs by airmen.