THE MEDICAL REQUIREMENTS OF THE CIVIL AERONAUTICS ADMINISTRATION AND THE RECOMMENDED MEDICAL REQUIREMENTS OF THE PERSONNEL LICENSING DIVISION OF THE PROVISIONAL INTERNATIONAL CIVIL AVIATION ORGANIZATION

Prepared

by

National Research Council
Committee on Selection and
Training of Aircraft Pilots

June 1947

CIVIL AERONAUTICS ADMINISTRATION
Division of Research
Washington, D. C.

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Committee on Selection and Training of Aircraft Pilots

Executive Subcommittee

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National Research Council

1947

LETTER OF TRANSMITTAL

NATIONAL RESEARCH COUNCIL

2101 Constitution Avenue, Washington, D. C.
Division of Anthropology and Psychology

Committee on Selection and Training of Aircraft Pilots

June 16, 1947

Dr. Dean R. Brimhall
Assistant to the Administrator
for Research
Civil Aeronautics Administration
Room 5217, Commerce Building
Washington 25, D. C.

Dear Dr. Brimhall:

In accordance with your request the medical requirements of the Civil Aeronautics Administration (as of January, 1947) and those proposed by the Provisional International Civil Aviation Organization (PICAO) have been reviewed by the Committee on Selection and Training of Aircraft Pilots. In the attached report these requirements have been restated in "layman's language" and the two sets of requirements presented in parallel form so as to facilitate their comparison.

This report was prepared largely through the cooperation of Dr. Frank N. Low, Assistant Professor of Anatomy, Johns Hopkins Medical School, Baltimore, Maryland. In addition, it has been reviewed by the medical liaison of the Committee on Selection and Training of Aircraft Pilots and by a representative of the Division of Medical Sciences, National Research Council. It has been difficult at points to overcome the diversity of the materials in the two sets of regulations but, nevertheless, there is reason to believe that the medical requirements are now listed in as convenient a form as possible for direct comparison.

Cordially yours,

MSViteles

Morris S. Viteles, Chairman
Committee on Selection and
Training of Aircraft Pilots
National Research Council

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CONTENTS

SUMMARY

In this report are presented the medical requirements of the CIVIL AERONAUTICS ADMINISTRATION, DEPARTMENT OF COMMERCE, U.S.A., in comparison with those recommended in the FINAL REPORT, PERSONNEL LICENSING DIVISION, PROVISIONAL INTERNATIONAL CIVIL AVIATION ORGANIZATION, Montreal, Canada, February 24, 1946. Both the CAA requirements and the PICAO recommendations have been stated in their original forms, with explanations of technical medical terms inserted. The PICAO materials are presented in full in Part A. The CAA materials are presented in full in Part B, this presentation being on the left hand page throughout. On the right hand page, i.e., on the page opposite the CAA requirements, the sections from the PICAO requirements (which were presented in original context in Part A) are presented opposite the general section of the CAA requirements in terms of which they may be classified.

Inasmuch as the organization of the CAA materials differs from that of the PICAO materials, and since further differences exist in terms of classification of pilots, and inclusiveness of the detailed requirements presented, a direct comparison of the two materials is impossible in many cases. Rather, the PICAO materials have been organized as far as possible as they pertain to (1) vision, (2) ear, nose, throat, and equilibrium; (3) general physical condition, and (4) nervous system, the categories in terms of which the CAA materials are organized. Furthermore, the PICAO Standards No. 1 have been presented in connection with the CAA requirements for transport pilots. Again, however, it should be observed that it is not implied that these references to pilot types in terms of physical standards, are necessarily directly comparable. However, both the PICAO Standards No. 1, and the CAA First Class requirements represent the most strict specifications in the PICAO and CAA materials, respectively.

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THE MEDICAL REQUIREMENTS OF THE CIVIL AERONAUTICS ADMINISTRATION AND THE RECOMMENDED MEDICAL REQUIREMENTS OF THE PERSONNEL LICENSING DIVISION OF THE PROVISIONAL INTERNATIONAL CIVIL AVIATION ORGANIZATION

INTRODUCTION

The medical requirements of the Civil Aeronautics Administration (CAA) of the Department of Commerce, U.S.A., specified for various pilot types are expressed in technical medical terminology. The same circumstance prevails in the Medical Requirements recommended by the Personnel Licensing Division (PEL) of the Provisional International Civil Aviation Organization (PICAO).

This report presents a clarification of the technical medical terminology found in the CAA regulations and in the PICAO recommendations.

The CAA requirements have been printed in RED with insertions which represent clarifications of the technical terms printed in PURPLE. The PICAO recommendations have been prepared in the same manner.

The PICAO recommendations are set up as follows: Pilots are classified according to the type of flying done, by descriptive titles. Certain medical requirements are specified for each pilot type. These medical requirements are divided into four standards: Physical Standard, Visual Standard, Color Perception Standard, and Hearing Standard. Each of these four standards is further subdivided into two, three, or four groups, according to the strictness of the specified requirements. Physical Standard No. 1 is the strictest physical standard and Physical Standard No. 3 the least strict. The subdivisions of the remaining three standards are similarly related. The PICAO recommendations with technical medical terminology translated are found in Part A, which includes a statement of the source material used in its preparation.

The CAA requirements are set up as follows: Pilots are classified according to the type of flying done. There are three classes of pilots: First Class Pilots are airline transport pilots. Second Class Pilots are commercial pilots. Third Class Pilots are student pilots, private pilots, and free balloon pilots. The CAA requirements with technical medical terminology translated are found in Part B, which includes a statement of the source material used in its preparation.

The materials in this report are presented as follows: In Part A are presented the PICAO recommendations with the technical medical terminology translated as indicated above. In Part B are presented the CAA materials, this presentation being on the left hand page. On the right hand page, i.e., on the page opposite the CAA requirements, the sections from the PICAO requirements (which were presented in their original context in Part A) are given.

The PICAO materials have been organized as far as possible as they pertain to (1) vision, (2) ear, nose, throat, and equilibrium; (3) general physical condition, and (4) nervous system. These are the categories in terms of which the CAA materials are organized. It should be emphasized again that the direct comparability of reference between CAA and PICAO materials within these general categories is far from perfect because of the diversity of the two sets of materials.

For ease of reference, opposite the CAA requirements for transport pilots, have been presented the PICAO first class physical standards. Again, however, although the PICAO first class physical requirements apply chiefly to transport pilots, it should be recognized that this is not exclusively so and that certain of the first class physical standards apply also to other classifications of pilots as presented in the PICAO materials.

A comparison of CAA and PICAO materials is presented in the table on page 3. By reference to the page numbers given in this table, the specifications applying to all pilot types can be located in both parts of the report. Again, it should be noted that it has been difficult to collate the CAA and PICAO materials with exactitude because of differing methods of classification. This applies particularly to the four standards used by the PICAO, no comparable subdivision being used by the CAA. However, the page location of the CAA stipulations which most nearly correspond, in the medical sense, to the PICAO standards has been indicated in this table.

The following points should also be noted:

1. In the PICAO recommendations Items 13.05, 13.06, 13.07, and 13.11 pertain to flying personnel not pilots and have been omitted.

2. In the PICAO recommendations Items 13.09 (3rd Class and 2nd Class Airship Pilot) and 13.10 (1st Class Airship Pilot) pertain to pilots of lighter-than-air aircraft. The licensing of lighter-than-air aircraft personnel was recommended for further study (PICAO - Doc. 1390, PEL/75, paragraph 5.06, pp. 4-5). For clarification the reader is referred to Doc. 1385, PEL/70, Standards suggested by the United States for Pilots of Lighter-than-Air Aircraft.

3. Certain of the supporting documents included in the Chairman's Report (PICAO) are related to medical standards for airmen. Doc. 1156, PEL/35, Comments by the United States concerning Physical Standards for Airmen, represents the outlook of the U.S.A. Doc. 1282, PEL/57, Note by the United Kingdom Medical Adviser on the Proposed Medical Standards, represents the outlook of the United Kingdom.

CAA - PART B	pp.	pp.	PICAO - PART A		pp.
1st Class Pilot	58-74		Airline Transport Pilot		
		62-74	Physical Standard	1	9-15
		58-62	Visual Standard	1	19-21
		60	Color Perception Standard	1	22
		62	Hearing Standard	(3) 1	22
2nd Class Pilot	28-58		Commercial (or Aerial Work) Pilot		
		34-58	Physical Standard	2	15-17
		28-34	Visual Standard	1	19-21
		32	Color Perception Standard	2	22
		36	Hearing Standard	(3) 1	22
3rd Class Pilot	28-58		Student Pilot		
		34-58	Physical Standard	3	17-18
		28-34	Visual Standard	2	21
		32	Color Perception Standard	2	22
		36	Hearing Standard	4 (1)	23 (22)
3rd Class Pilot	28-58		Private Pilot		
		34-58	Physical Standard	3	17-18
		28-34	Visual Standard	2	21
		32	Color Perception Standard	2	22
		36	Hearing Standard	4	23
3rd Class Pilot	28-58		Pilot of Free Balloon		
		34-58	Physical Standard	2	15-17
		28-34	Visual Standard	2	21
		32	Color Perception Standard	2	22
		36	Hearing Standard	4	23

4. The above PICAO materials are to be found in the FINAL REPORT of PERSONNEL LICENSING DIVISION, FIRST SESSION of the PROVISIONAL INTERNATIONAL CIVIL AVIATION ORGANIZATION, Montreal, Canada, February 24, 1946.

PART A

PICAO Medical Requirements

Part A contains CHAPTER XIV - MEDICAL REQUIREMENTS, occupying pages 29-43 of the FINAL REPORT of PERSONNEL LICENSING DIVISION of the PROVISIONAL INTERNATIONAL CIVIL AVIATION ORGANIZATION, Montreal, Canada, February 24, 1946.

The original material of CHAPTER XIV above has been rendered in RED and explanatory insertions have been printed in PURPLE.

PICAO INTERNATIONAL RECOMMENDED PRACTICES

Licensing of Operating, Mechanical and Controller Personnel

CHAPTER XIV - MEDICAL REQUIREMENTS

SECTION I - General

9. Every candidate who presents himself to undergo the medical examination required for the issue or renewal of one of the licenses must furnish to the medical examiner a declaration signed by him, stating whether he has previously undergone such a medical examination, and with what results. A false declaration may entail the withdrawal of the license issued and the facts will be brought to the knowledge of the Authorities of the Contracting State whose nationality the person concerned possesses.

10. The medical examinations must be passed, with the exception of the examination referred to in para. 8 of Annex Doc. 1025 PEL/2, before medical men especially designated for that purpose by the Contracting State issuing the license. Medical examiners responsible for applying the critical standards for members of the operating crew must be aware of the practical conditions in which the personnel will have to fulfill their functions. Each Contracting State shall designate for the purpose of the medical examinations, medical examiners from among medical practitioners licensed in the practice of medicine by that State.

11. Each Contracting State shall provisionally fix its own methods of examination, until the details and the minimal conditions of the tests shall have been settled by a decision of the International Civil Aviation Organization.

12. The medical re-examinations to ensure the maintenance of efficiency of the holder of a license shall be the same as for the original acceptance.

13. The medical standards for the various types of licenses are divided into:

Physical Standards Nos. 1, 2, and 3;
Visual Standards Nos. 1, 2, and 3;
Colour Perception Standards Nos. 1 and 2; and
Hearing Standards Nos. 1, 2, 3, and 4;

and full details are set out below in Sections II, III, IV, and V of this Chapter.[1]

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[1] In these standards; the lower the number, the stricter the requirements.

The medical requirements for the various types of licenses shall be:

13.01	Student Pilot	
	Physical Standard	No. 3
	Visual Standard	No. 2
	Colour Perception Standard	No. 2
	Hearing Standard	No. 4 (1)
13.02	Private Pilot	
	Physical Standard	No. 3
	Visual Standard	No. 2
	Colour Perception Standard	No. 2
	Hearing Standard	No. 4
13.03	Commercial (or Aerial Work) Pilot	
	Physical Standard	No. 2
	Visual Standard	No. 1
	Colour Perception Standard	No. 2
	Hearing Standard	No. 3 (1)
13.04	Airline Transport Pilot	
	Physical Standard	No. 1
	Visual Standard	No. 1
	Colour Perception Standard	No. 1
	Hearing Standard	No. 1 (2)
13.05[2]	Flight Engineer and Cadet Engineer	
	Physical Standard	No. 2
	Visual Standard	No. 3
	Colour Perception Standard	No. 2
	Hearing Standard	No. 3
13.06[2]	Navigator and Cadet Navigator	
	Physical Standard	No. 2
	Visual Standard	No. 3
	Colour Perception Standard	No. 2
	Hearing Standard	No. 3
13.07[2]	Flight Radio Operator	
	Physical Standard	No. 2
	Visual Standard	No. 3
	Colour Perception Standard	No. 2
	Hearing Standard	No. 1 (2)

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[2]The non-pilot classifications are not relevant to the present report. The 3 classes of airship pilot refer to lighter-than-air aircraft. For the latter, no recommendations have been made, the subject having been deferred for further study. See page 1, INTRODUCTION, for clarification.

13.08 Pilot of Free Balloon

Physical Standard	No. 2
Visual Standard	No. 2
Colour Perception Standard	No. 2
Hearing Standard	No. 4 (1)

13.09[2] 3rd Class and 2nd Class Airship Pilot

Physical Standard	No. 2
Visual Standard	No. 1
Colour Perception Standard	No. 2
Hearing Standard	No. 4 (1)

13.10[2] 1st Class Airship Pilot

Physical Standard	No. 2
Visual Standard	No. 2
Colour Perception Standard	No. 2
Hearing Standard	No. 4 (1)

13.11[2] Airship Flight Engineer and Airship Helmsman

Physical Standard	No. 2
Visual Standard	No. 3
Colour Perception Standard	No. 2
Hearing Standard	No. 3

SECTION II

PHYSICAL REQUIREMENTS FOR LICENSES

Physical Standard No. 1

14. The candidate must have the complete use of his four limbs, must be free from any active or latent (concealed), acute or chronic (of long duration), medical or surgical disability or infection, which would entail any degree of functional incapacity which might interfere with the safe handling of an aircraft at any altitude even in the case of prolonged or difficult flight.

15. The medical examination shall also be based on the following requirements of mental and physical fitness:

15.1 The candidate will be questioned concerning his family and personal history.

15.2 Examination of the nervous system. The examination of the nervous system of the candidate shall include a full inquiry into family and personal history. The information obtained shall be given in a statement made and signed by the candidate. He must be free from any history of morbid mental or nervous trouble. The candidate must not present any mental, or trophic (nutritional) impairment, pathological tremor (trembling due to disease), or presumptive evidence of latent epilepsy. Motility (movement), sensibility (physical

sensation), tendinous (pertaining to tendons or sinews), cutaneous (pertaining to the skin) and pupillary (pertaining to the pupil of the eye) reflexes (involuntary movements in response to stimulation), coordination of movements and cerebellar functions[3] must be normal. An exception may be made for local peripheral trouble due to accidental section of a nerve branch.[4]

Injuries of the head will be dealt with as follows:

(1) Cases of simple concussion (brain injury due to a blow or violent shaking), or simple fracture of the skull without associated intracranial damage (injury to the contents of the skull) will entail temporary unfitness for a period of at least two months from the date of the concussion or fracture. After the candidate has resumed his duties, his license will be rendered valid only for successive periods of two months, until the after-effects no longer appear liable to produce a sudden incapacity in flight.

(2) In the case of severe intracranial injuries, the presence of local lesion (wound or injury) of the brain will entail permanent rejection. Any trepanning[5] with loss of the bony substance involving the two tables[6] of the cranial vault (the rounded portion of the skull) will entail rejection. The same will apply in case of lesion of the dura mater (the tough outer membrane covering the brain), even after a bone graft.[7]

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[3]The main function of the cerebellum is to produce graceful coordination of voluntary movement. Disturbance of physical equilibrium may be due to cerebellar disease or injury.

[4]When a nerve is cut the muscles supplied by it are paralysed and the skin area supplied by it becomes insensitive. When the injury occurs outside of the brain or spinal cord (and is called peripheral) nerve regeneration eventually restores normal function if the cut ends of the nerve are brought into proximity. The same principles apply when a peripheral nerve has been crushed or bruised severely enough to interfere with normal function.

[5]The removal of a disc of bone from the skull by means of a circular saw is called trepanning or trephination.

[6]The skull bones are composed of two hard layers (tables) of bone (outer and inner) separated by a soft (cancellous) layer.

[7]A bone graft is a piece of bone transplanted to cover a bony defect; in this case substituting for loss of bone in the cranial vault.

Any syphilis, past or present, affecting the central nervous system **(brain and spinal cord)** or its blood vessels or its membranes[8] will entail the permanent rejection of the candidate. Any presumed nervous syphilis will entail rejection, unless the non-existence of such an impairment is proved by an examination of the blood and an examination of the cerebro-spinal fluid,[9] made with the consent of the candidate.

15.3 General surgical examination. The candidate must neither suffer from any wound, or injury, nor have undergone any operation, nor possess any abnormality, congenital **(existing at birth)** or acquired, which might interfere with the safe handling of an airplane at any altitude even in the case of prolonged or difficult flight. He must be completely free from hernia **(rupture)**.

When palpation **(the act of feeling with the hand)** of the abdomen reveals any swelling or distinct pain, the abdominal examination must be completed by a radioscopic and radiographic examination.[10]

Any anatomical lesion in the walls of any part whatever of the digestive tract, and stricture **(narrowing)** of its calibre, any calculus **(concretion, such as gall stones)** or foreign body, and peritoneal **(pertaining to the peritoneum)**[11] lesion, established by clinical or laboratory examinations will entail rejection. Exception may be made for spasmodic strictures **(temporary narrowing of the digestive tract due to muscular action)** not accompanied by other troubles and for ptoses **(a falling or sinking down of any organ below its normal position)** compensated by a good abdominal musculature.

Any candidate who has undergone a surgical operation on the biliary passages **(the system of tubes running from the liver and gall bladder to the digestive tube just beyond the stomach)** or the digestive tract, except for appendicitis, involving a total or partial exci-

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[8] The brain and spinal cord are encased in three membranes, the meninges, called the pia (soft) mater, the arachnoid and the dura (hard, tough) mater.

[9] The cerebro-spinal fluid is the clear fluid in which the brain and spinal cord are suspended. Tests of this fluid are used to detect the presence of syphilis of the central nervous system.

[10] A radioscopic examination, also known as fluoroscopy, implies the use of x-rays which are so modified by a fluoroscopic screen as to be visible to the examiner when the patient is being examined. A radiographic examination also entails the use of x-rays but the process is photographic, requiring subsequent development and examination of the plates.

[11] The peritoneum is the membrane which covers the organs of the abdominal cavity and the inner surfaces of the abdominal walls.

sion (cutting out) or a diversion of any of these organs shall be declared unfit unless a period of two years has elapsed since the surgical operation and the effects of the operation are not deemed liable to cause sudden incapacity in the air, or an attestation made by a surgeon having knowledge of the nature of the disease which necessitated the operation, certifies that no immediate or future after-effects are to be feared.

Diseases of the liver (including those of the biliary passages) and of the pancreas will, in cases where it is deemed necessary, be verified by laboratory and other examinations, particularly by radiography as well as by an examination of the blood and of the urine, and will entail rejection only if they afford indication of the existence of a calculus, tumour or lesion involving a persistent impairment of function of these organs.

15.4 General medical examination. The candidate must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the management of aircraft. His muscular power must be adequate for the handling of the types of airplanes he will have to pilot or the apparatus he is to use. The heart must be normal, with normal function, and only respiratory arrhythmia (irregular heart beat due to breathing) increase of pulse rate from excitement or exercise and a general slow pulse not associated with auriculo-ventricular dissociation[12] will be allowed. He must not have any signs of aneurism (aneurism; a sac formed by the dilatation or swelling of the walls of an artery and filled with blood) of the large arterial trunks.

The candidate must not suffer from any acute disability of the lungs, nor possess any cicatricial lesion (a wound or injury containing scar tissue) of the lungs, and must be free from tuberculosis capable of being diagnosed by the use of clinical methods and, in the cases of examinations for original acceptances, by radioscopy, from tracheo-bronchial (pertaining to the windpipe or its larger branches) disease of the glands and from pulmonary emphysema[13], even if slight. However, with regard to the maintenance of efficiency of the pilot, pulmonary emphysema will entail rejection only when marked. In addition, each examination shall include a radiographic record in doubtful clin-

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[12] Normally the contraction of the heart muscle begins at the upper chambers (atria with auricles) and proceeds to the lower chambers (ventricles). The progress of the contraction from upper to lower chambers in the normal heart is precisely timed. When these two contractions do not bear the proper relationship to each other the condition is known as auriculo-ventricular dissociation.

[13] Pulmonary emphysema is a condition in which the alveoli of the lungs become distended or ruptured.

ical cases. When the examination of the spleen and of the ganglionic tract[14] reveals hypertrophy (enlargement) of these organs, the candidate shall be declared unfit unless a hematological (pertaining to the blood) examination has shown that it is not a case of an original impairment of the hematopoietic (blood forming) organs. Hemoglobinury (presence, in the urine, of hemoglobin, a substance normally found in red blood corpuscles), hemophily (hemophilia, characterized by profuse uncontrollable bleeding) and purpuras (affections caused by bleeding into the skin, membranes or internal organs) shall also entail rejection, unless a hematological examination shows that it is a case of only transitory impairment. The candidate must not present any signs of organic disease[15] of the kidneys; these latter must be insensitive to palpation and be of normal size. The urine must not contain any pathological element. Affections of the urinary passages[16] and of the genital organs, even blennorrhoea (mucous discharge from the organs of generation), may entail temporary unfitness, an exception being allowed as regards the maintenance of efficiency in the case of tuberculosis orchi-epididymitis[17] in its mild and localized form.

Candidates of the female sex must present a normal uterus (womb; the hollow muscular organ in which the impregnated oveum is developed into the child) and appendages (the internal organs of generation associated with the uterus). Cases in which surgical operation has taken place will be considered individually. Any presumed pregnancy will entail rejection until, at least, after the pregnancy has been terminated. Following confinement or miscarriage,[18] the holder of a license will be allowed to resume her air duties only after having undergone a new medical examination. The candidate must not present any clinical signs of syphilis.

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[14]The ganglionic tracts are the pathways along which lymph, a body fluid, is drained. Lymph nodes are grouped along these pathways, notably in the neck, armpit, and groin.

[15]An organic disease is one in which there is evident structural change in some of the tissues or organs of the body.

[16]The urinary passages are those structures which convey the urine from the kidneys to the outside. They include the ureters, bladder, and urethra.

[17]Tuberculous orchi-epididymitis is an inflammation of the testis and of the epididymis, the convoluted tube leading from it. It is caused by tuberculosis of these parts.

[18]Confinement usually refers to the birth of the child at the normal time. Miscarriage refers to birth before the period of pregnancy is finished. Both medical and legal definitions of miscarriage vary considerably.

Dysentery (a disease characterized by the passing of frequent bloody stools) shall be considered as an acute disease; provided that a presumption of dysenteric (pertaining to dysentery) infections shall entail rejection, unless the medical examiner considers that the clinical phenomena have disappeared.

15.5 Eye examination. The candidate must present no active nor chronic pathological condition of either eye or adnexae[19] which might interfere with its proper function. The details of the visual standards for candidates for licenses shall be as set out in Section III, and those of the colour perception standards as set out at Section IV.

15.6 Ear examination. The candidate must have:

(1) No active pathological process, acute or chronic, of the internal ear[20] or middle ear cleft.[21]

(2) No unhealed (unclosed) perforation or perforations of the tympanic membrane (ear drum).

(3) No obstruction of the Eustachian tubes.[22]

(4) No disturbances of the vestibular apparatus.[23]

The details of the hearing standards shall be as set out at Section V.

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[19]Adnexae are parts accessory to a main organ or structure. In this case reference is made to the eyelids, lacrimal apparatus (tears), etc.

[20]The internal ear is located deep in the head. It contains the organ of sound perception and the vestibular (equilibratory) apparatus.

[21]The middle ear cleft is the tympanic cavity, an air-filled space located medial to the ear drum and containing the ossicles, or conducting bones. It connects posteriorly with the mastoid air cells and anteriorly with the throat (naso-pharynx) by the Eustachian tube which normally remains open and is air filled.

[22]The Eustachian tubes are passageways leading from the tympanic cavities on both sides to the upper throat (naso-pharynx), opening above and behind the soft palate on both sides. They are normally air-filled (see footnote 21).

[23]The vestibular apparatus is the balance mechanism of the body (see footnote 20).

15.7 Nose, throat, and mouth examination. The candidate must possess free nasal and tubal air entry on both sides and must have neither serious malformation **(structural defect)** or serious, acute or chronic, affection of the buccal **(mouth)** cavity or upper respiratory tract.[24]

Physical Standard No. 2

16. The medical examination shall be based on the following requirements of mental and physical fitness:

16.1 The candidate must have a good family and personal history with particular reference to nervous stability. Information as to this history must be given in a statement made and signed by the candidate.

16.2 Examination of the nervous system. The candidate must be free from any disability, congenital or acquired, of the nervous system causing such degree of functional incapacity as might interfere, in the case of piloting, with the safe handling of the aircraft at any altitude even in the case of prolonged or difficult flight or, in the case of air-work other than piloting, with the efficient performance of the duties for which the license is being sought. **(See text of paragraph 15.2 and footnotes 3-9 for technical terminology.)**

Injuries of the head will be dealt with as follows:

(1) Cases of simple concussion or simple fracture of the skull, without associated intracranial damage, will entail temporary unfitness for a period of, at least, two months from the date of concussion or fracture. After the candidate has resumed his duties, his license may be rendered valid only for a reduced period, or periods, until the after-effects no longer appear liable to produce a sudden incapacity during flight.

(2) Severe intracranial injuries, the presence of local lesion of the brain, trepanning with loss of bony substance involving the two tables of the cranial vault or a lesion of the dura mater will involve permanent rejection.

Any presumed nervous syphilis will require to be investigated by an examination of the blood and an examination of the cerebro-spinal fluid, made with the consent of the candidate.

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[24]The upper respiratory tract can be generally defined as the pathway taken by inspired air from the outside to the larynx (voice box). This includes the nasal cavities and the throat (pharynx) from its communication with the nasal cavities above to its opening into the larynx below the root of the tongue.

16.3 General surgical examination. The candidate must neither suffer from any wound, or injury, nor have undergone any operation, nor possess any abnormality, congenital or acquired, which might interfere, in the case of piloting, with the safe handling of the aircraft at any altitude even in the case of prolonged or difficult flight, or in the case of air work other than piloting, with the efficient performance of the duties for which a license is being sought. (See text of paragraph 15.3 and footnotes 10-11 for technical terminology.)

When palpation of the abdomen reveals any swelling or distinct pain, the abdominal examination must be completed by a radioscopic and radiographic examination. Any anatomical lesion in the walls of any part of the digestive tract, any stricture of its calibre, any calculus or foreign body, any peritoneal lesion, established by clinical or laboratory examinations, will entail rejection. Exception may be made for spasmodic strictures not accompanied by other troubles and for ptoses compensated by a good abdominal musculature. Any candidate who has undergone a surgical operation on the biliary passages or the digestive tract, except for appendicitis, involving a total or partial excision or a diversion of any of these organs, shall be declared unfit unless a period of two years has elapsed since the surgical operation and the effects of the operation are not deemed liable to cause sudden incapacity in the air, or an attestation made by a surgeon, having knowledge of the nature of the disease which necessitated the operation, certifies that no immediate or future after-effects are to be feared.

Diseases of the liver (including those of the biliary passages) and of the pancreas will in cases where it is deemed necessary, be verified by laboratory and other examination, particularly by radiography as well as by an examination of the blood and of the urine, and will entail rejection only if they afford indication of the existence of a calculus, tumour or lesion involving a persistent impairment of function of these organs.

16.4 General medical examination. The candidate must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the performance of his duties. He must have no organic cardiac lesion. He must be in a state to withstand the effects of altitude. He must be free from kidney disease and must not present any clinical sign of syphilis. (See text of paragraph 15.4 and footnotes 12-18 for technical terminology.)

Candidates of the female sex must present a normal uterus and appendages. Cases in which surgical operation has taken place will be considered individually. Any presumed pregnancy will entail rejection until, at least, after the pregnancy has been terminated. Following confinement or miscarriage a candidate of the female sex will be allowed to resume her duties only after having undergone a new medical examination.

16.5 Eye examination. The candidate must present no active nor chronic pathological condition of either eye or adnexae which might interfere with its proper function. The details of the visual standards for candidates for licenses shall be as set out in Section III and those of the colour perception standards as set out at Section IV. **(See text of paragraph 15.5 and footnote 19 for technical terminology.)**

16.6 Ear examination. The candidate must have: **(See text of paragraph 15.6 and footnotes 20-23 for technical terminology.)**

(1) No active pathological process, acute or chronic, of the internal ear or middle ear cleft.

(2) No unhealed (unclosed) perforation or perforations of the tympanic membrane.

(3) No obstruction of the Eustachian tubes.

(4) No disturbances of the vestibular apparatus.

The details of the hearing standards shall be as set out at Section V.

16.7 Nose, throat, and mouth examination. The candidate must possess free nasal and tubal air entry on both sides and must have neither serious malformation nor serious, acute or chronic, affection of the buccal cavity or upper respiratory tract. **(See text of paragraph 15.7 and footnote 24 for technical terminology.)**

Physical Standard No. 3

17. The medical examination shall be based on the following requirements of mental and physical fitness:

17.1 The candidate must have a good family and personal history with particular reference to nervous stability. Information as to this history must be given in a statement made and signed by the candidate.

17.2 Examination of the nervous system. The candidate must be free from any wound, or injury, nor have undergone any operation, nor possess any abnormality, congenital or acquired, which might interfere with the safe handling of the aircraft under ordinary conditions. **(See text of paragraph 15.2 and footnotes 3-9 for technical terminology.)**

17.3 General surgical examination. When palpation of the abdomen reveals any swelling or distinct pain, the abdominal examination must be completed by the radioscopic and radiographic examination. **(See text of paragraph 15.3 and footnotes 10-11 for technical terminology.)**

Any candidate who has undergone a surgical operation on the biliary passages, or the digestive tract, except for appendicitis, involving a total or partial excision or a diversion of any of these organs, shall be declared unfit unless a period of two years has elapsed since the surgical operation and the effects of the operation are not deemed

liable to cause sudden incapacity in the air, or an attestation made by a surgeon, having knowledge of the nature of the disease which necessitated the operation, certifies that no immediate or future after-effects are to be feared.

The existence of a calculus, tumour, or lesion involving a persistent impairment of function of the liver or the pancreas will entail rejection.

17.4 General medical examination. The candidate must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the performance of his duties. He must have no organic cardiac lesion. His lungs must be in a state to withstand the effects of altitude. He must be free from kidney disease and must not present any clinical signs of syphilis. **(See text of paragraph 15.4 and footnotes 12-18 for technical terminology.)**

Candidates of the female sex must present a normal uterus and appendages. Cases in which surgical operation has taken place will be considered individually. Any presumed pregnancy will entail rejection until, at least, after the pregnancy has been terminated.

17.5 Eye examination. The candidate must present no active nor chronic pathological condition of either eye or adnexae which might interfere with its proper function. The details of the visual standards for candidates for licenses shall be as set out at Section III and those of the colour perception standards as set out at Section IV. **(See text of paragraph 15.5 and footnote 19 for technical terminology.)**

17.6 Ear examination. The candidate must have: **(See text of paragraph 15.6 and footnotes 20-23 for technical terminology.)**

(1) No active pathological process, acute or chronic, of the internal ear or middle ear cleft.

(2) No unhealed (unclosed) perforation or perforations of the tympanic membrane larger than pin point in size.

(3) No obstruction of the Eustachian tubes.

(4) No disturbances of the vestibular apparatus.

The details of the hearing standards shall be as set out at Section V.

17.7 Nose, throat, and mouth examination. The candidate must possess free nasal and tubal air entry on both sides and must have neither serious malformation nor serious, acute or chronic, affection of the buccal cavity or upper respiratory tract. **(See text of paragraph 15.7 and footnote 24 for technical terminology.)**

SECTION III

VISUAL REQUIREMENTS FOR LICENSES

18. The measurement of the visual acuity **(keenness of vision)** will be made by means of a series of optotypes **(test letters)** of Landholt, or similar optotypes, illuminated at not less than 12 lux **(meter-candle)** and not more than 20 lux, and placed at a distance of 6 metres (20 feet) from the candidate.[25]

Visual Standard No. 1

19. The candidate must have:

19.1 A visual acuity of at least 6/9 (20/30)[26] in each eye separately, without correction **(no glasses)**; provided that if the vision in either or both eyes is poorer than 6/9 (20/30) but not poorer than 6/18 (20/60), and can be brought up to 6/6 (20/20) or better in each eye by glasses, the candidate may be admitted upon condition that correcting glasses be worn while exercising the privileges of his license.

19.2 In the case of application for an original license, not more than -2.25 dioptres of hyermetropia.[27]

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[25] The lux, or meter-candle is a measure of the brightness of the illumination. The prescribed brightness is sufficient for effortless reading and does not produce glare in a range known to produce maximal visual acuity.

[26] Outside the parentheses the measure is in meters; inside the parentheses it is in feet. One meter is about 39.4 in., a little over 3 ft. Thus, 6 meters equal about 19 ft. 8 in., or 20 ft. In this generally accepted fractional method of noting visual acuity the numerator (1st number) of the fraction represents the distance the subject stands from the test chart, and does not change. The denominator (2nd number) represents the distance from which a "normal" eye could read the smallest line of type successfully read by the subject whose score is recorded. For example, a 6/9 (20/30) eye, as above, can read test type which could be read from a distance of 30 ft. by a normal eye. The 20/30 eye thus possesses weaker acuity than a normal eye. A 6/6 (20/20) eye is "normal." In young people an eye is frequently better than normal, as 6/5 (20/16). The poorer the visual acuity, the larger the denominator of the fraction.

[27] The lens dioptre (or diopter) is a unit used to denote the strength (refractive power) of a lens. A lens which brings parallel rays of light to a focus 1 meter from the lens has a strength of one diopter. The strength of a lens in diopters is the reciprocal of the focal distance of the lens measured in meters (39.4 in.). Hypermetropia, or far sightedness, is a condition in which the transparent light bending media in the eye (cornea, lens, etc.) do not bend the light rays enough to produce a focus on the proper membrane (retina) of the eye. The focal point in this condition lies behind the eye

19.3 Not more than 1 diopter of hyperphoria in either eye.[28]

19.4 Not more than 10 diopters of esophoria.[28]

19.5 Not more than 5 diopters of exophoria.[28]

19.6 An accommodation of at least V = 1.00 at 30 cm. with each eye separately without the use of correcting lenses. Where the candidate is over 40 years of age, correcting glasses may be used to provide the same character of near vision, if he already holds a license.[29]

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[27](continued) and a convex lens, which causes light rays to converge, is necessary to produce a focus on the retina. The degree of hypermetropia present is expressed in terms of the strength of the lens necessary to correct the eye to normal. The plus sign indicates a convex lens (minus would mean a concave lens). Hypermetropia rarely exceeds 6 to 7 diopters.

[28]When the eyes look at an object they are so placed that their visual axes intersect at the object under regard. If the line of vision of one eye is occluded a slight change in the position of the occluded eye occurs, and is readjusted when the occlusion is removed. Rarely the occluded eye will remain in the same position, this being known as orthophoria, said by some authorities to be rare. When the occluded eye is seen to readjust itself after removal of the occlusion the condition is called heterophoria, of which there are several varieties: in hyperphoria (as above) the visual axis of one eye rises above that of the other; in esophoria (as above), the visual axes converge, a convergent squint; and in exophoria, the visual axes diverge, divergent squint. The various phorias are measured by the strength of the prism (which bends light rays) required to realign the two visual axes when the eyes are out of line. The "prism diopter" is used to designate the strength of a prism. A 1 diopter prism bends a ray of light 1 cm. out of line 1 meter away. A 2 diopter prism bends the light 2 cm., etc. It will be seen from the specification that only a small degree of vertical misalignment (1 diopter) is permitted. Greater degrees of convergence (10 diopters) and divergence (5 diopters) are permitted. In the various phorias no misalignment is implied when both eyes can see an object. Phorias are a <u>tendency</u> to misalignment which is revealed by obscuring the vision of one eye.

[29]Accommodation is the technical term denoting the focusing power of the eye. The normal eye at rest is focused for objects 20 ft. or more distant. For an object any nearer than 20 ft. the normal eye must "accommodate" to bring the light rays from the object to a focus at the proper point in the eye. The range of accommodation is greatest in young people and decreases with age. The nearest point at which clear focus can be made by a normal eye is about 3 inches distant, the farthest point being infinitely distant. The focusing power of any eye is measured by the strength of the lens required to produce the same effect, and is expressed in (lens) diopters (footnote 27). At the age of 12 about 13 diopters of accommodation are possible, the range decreasing to 6 diopters at 40 and 1 diopter at

19.7 Normal visual fields.[30]

Visual Standard No. 2

20. The candidate must have:

20.1 A visual acuity of at least 6/12 (20/40) in each eye separately, without correction, provided that if the vision in either or both eyes is proper that 6/12 (20/40) but not poorer than 6/60 (20/200) and can be brought up to 6/6 (20/20) or better in each eye by glasses, the candidate may be admitted upon condition that correcting glasses be worn while exercising the privileges of his license. **(See text of paragraph 19.1 and footnote 26 for technical terminology.)**

20.2 Satisfactory ocular muscle balance. **(See text of paragraph 19.3 to 19.5 and footnote 28 for technical terminology.)**

20.3 Normal fields of vision, due allowance being made, where errors of refraction exist, concerning those areas not covered by the correcting lenses.[30]

Visual Standard No. 3

21. The candidate must have:

21.1 A visual acuity of at least 6/12 (20/40) in each eye separately, without correction, provided that if the vision in either or both eyes is poorer than 6/12 (20/40) but not poorer than 6/24 (20/80) and can be brought up to 6/6 (20/20) or better in each eye by glasses, the candidate may be admitted upon condition that correcting glasses be worn while exercising the privileges of his license. **(See text of paragraph 19.1 and footnote 26 for technical terminology.)**

21.2 Normal fields of vision, due allowance being made, where errors of refraction exist, concerning those areas not covered by the correcting lenses.[30]

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[29](continued) 60. The above specification requires the examinee to read a line of type 30 centimeters (12 inches) distant. The size of the type is so reduced that it corresponds to the type size that a normal eye could read at 20 feet. Correcting glasses are fitted so as to bring the focus of the resting eye to a convenient point. Thus, when correcting glasses are worn the eye is able to exert whatever range of accommodation it possesses with an artificial "head start." In this way correcting glasses may bring the "same character of near vision" to persons with a limited range of accommodation.

[30]This implies normal extent of vision above, below, and to both sides of the line of vision. It also implies that no abnormal blind spots or areas of dim vision can be detected anywhere in the fields.

SECTION IV

COLOUR PERCEPTION REQUIREMENTS FOR LICENSES

Colour Perception Standard No. 1

22. The candidate must have normal colour perception as tested by means of Ishihara plates or isochromatic plates.[31]

Colour Perception Standard No. 2

23. The candidate must be able to distinguish easily signal red, signal green, and white.

SECTION V

HEARING REQUIREMENTS FOR LICENSES

24. The measurement of the auditory acuity (keenness) in the first three standards detailed below will be made by means of a standard pure tone audiometer (an electrical instrument for recording the "minimum audible" for pure sounds of various pitches) in a quiet room, that is, a room in which the intensity of the background noise is less than 50 decibels as measured by a sound level meter.[32]

Hearing Standard No. 1

25. The candidate must not have a loss in either ear of more than 20 decibels at any one of the five frequencies 256, 512, 1024, 2048, and 4096 cycles per second.[33]

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[31] Ishihara plates or isochromatic plates are sets of cards on which spots of different colors are arranged in certain patterns (figures, letters, winding lines) against a background of differently colored spots. Persons with defective color vision experience difficulty in reading the designs. In certain of the Ishihara plates people with normal color vision read one number and color blind individuals another.

[32] The decibel is used to measure the intensity values of audible sound. Sounds in a quiet street approximate 30 decibels; a conversational voice at 12 feet, 50 decibels; and a loud peal of thunder, 70 decibels.

[33] Hearing loss in decibels may be roughly estimated by reading the figure as a percentage: a loss of 20 decibels may be considered a 20 per cent loss. The pitch of a sound depends on the number of vibrations per second in the air, its frequency. Audible frequencies vary from 32 per second, the very lowest, to about 20,000 per second, the very highest. Ordinary conversation occupies frequencies of from 300 per second to 3000 per second. The above frequencies comprise a somewhat greater range than that of spoken conversation in paragraph 25. Note the differences in paragraphs 26 and 27.

Hearing Standard No. 2

26. The candidate must not have a loss in either ear of more than 20 decibels at any one of the four frequencies 256, 512, 1024, and 2048 cycles per second.[33]

Hearing Standard No. 3

27. The candidate must not have a loss in either ear of more than 40 decibels at any one of the three frequencies 512, 1024, and 2048.[33]

Hearing Standard No. 4

28. The candidate must be able to hear a conversational voice, using both ears and standing with his back towards the examiner, at a distance of 2.50 metres (about 8 ft.) from the examiner.

Footnotes

(1) A Private or Commercial Pilot who holds, or wishes to hold, an Instrument Rating will require to reach the Hearing Standard appropriate for a Flight Radio Operator.

(2) Where the holder of a license fails to meet Hearing Standard No. 1 but is able to meet Hearing Standard No. 2 and the competent aeronautical authorities are of the opinion that his aeronautical experience, ability and judgment compensate for his hearing deficiency having regard to the nature of the equipment he requires to operate the license may be renewed being limited, if necessary, as to the type of operation, the type of radio equipment or the period before medical re-examination.

Note

In several countries, owing to the lack of suitable equipment and facilities at the present time, the authorities may be unable to arrange compliance with Hearing Standards Nos. 1, 2, and 3 as detailed above. In such countries the authorities should, as an interim measure, set alternative standards and means of testing which they are satisfied are the equivalents of these detailed.

PART B

CAA Medical Requirements

Part B contains the current medical requirements of the Civil Aeronautics Administration (CAA) of the Department of Commerce, U.S.A. The following source materials have been used:

(A-1) HANDBOOK FOR MEDICAL EXAMINERS, SECOND EDITION, REVISED OCTOBER 15, 1944.

(A-2) SUPPLEMENT TO SECOND EDITION OF HANDBOOK FOR MEDICAL EXAMINERS, APRIL 1946.

(B-1) PART IV TO HANDBOOK FOR MEDICAL EXAMINERS AIRLINE TRANSPORT PILOT, SECOND EDITION, NOVEMBER 1, 1942.

(B-2) SUPPLEMENT TO HANDBOOK FOR MEDICAL EXAMINERS AIRLINE TRANSPORT PILOT, APRIL 1946.

The above materials have been rendered in single form as follows: PART III, PHYSICAL REQUIREMENTS of A-2 supersedes certain portions of PART III, PHYSICAL REQUIREMENTS of A-1. The superseding paragraphs of A-2 have been inserted in A-1 accordingly. PART IV, PHYSICAL REQUIREMENTS of B-2 similarly supersedes corresponding paragraphs of PART IV, PHYSICAL REQUIREMENTS of B-1 and has received similar treatment.

The PART III, PHYSICAL REQUIREMENTS of A-1 and A-2 applies to 2nd and 3rd class pilots. PART IV, PHYSICAL REQUIREMENTS of B-1 and B-2 applies to 1st class pilots (Airline Transport Pilots).

The CAA materials listed above have been amended by a directive dated Monday, November 11, 1946, from the office of T. P. Wright, Administrator of Civil Aeronautics. This item directs the omission of Eye Refraction Tests as a part of the physical examinations of Commercial Pilots. Requirements pertaining to Eye Refraction Tests have been deleted from the above materials in accordance with this directive.

The original CAA materials, prepared as indicated above, have been rendered in RED, and the insertions have been printed in PURPLE.

It is to be noted that the CAA materials are presented only on the left hand pages. On the right hand pages, opposing the CAA materials, are presented the sections from the PICAO report. It should again be noted that the direct comparability between the CAA and PICAO materials presented in juxtaposition is far from perfect because of the diversity of the two sets of materials. The PICAO materials have been organized as far as possible as they pertain to (1) vision, (2) ear, nose, throat, and equilibrium; (3) general physical condition, and (4) nervous system. These are the categories in terms of which the CAA materials are organized. However, it should

be made clear that direct comparability of reference between CAA and PICAO materials within these general categories is not necessarily implied.

Furthermore, it should also be emphasized that the class designations of physical, visual, color perception, and hearing standards, as presented in the PICAO materials, do not always correspond to the "pilot class" certificate as presented in the CAA materials. For example, the CAA third class certificate may be held by private pilots. According to the PICAO requirements, as presented on page 8, the private pilot must attain Physical Standard No. 3, Visual Standard No. 2, Color Perception Standard No. 2, and Hearing Standard No. 4. Similarly, the CAA requirements for a commercial pilot require a second class medical certificate. According to the PICAO requirements, a commercial pilot must attain Visual Standard No. 1. However, despite this fact the presentation of PICAO Standards No. 1 has been placed in juxtaposition with the CAA requirements for the transport pilot. This has been done because the PICAO materials require the airline transport pilot to attain the Standards No. 1 in all cases. Both the PICAO Standards No. 1, and the CAA first class requirements represent the most strict specifications in the PICAO and CAA materials, respectively.

It should also be observed that in Part B, footnote references in the PICAO material refer back to the explanatory footnotes in Part A where the PICAO requirements are presented fully and in context.

PART III - PHYSICAL REQUIREMENTS

SECOND & THIRD CLASSES

To preserve uniformity of expression in this part of the Handbook, the following are listed as disqualifying limits and conditions.

When in doubt issue a lower class certificate or refer the decision to the Medical Director.

(A) EYE

1. HISTORY[34]

History of significant ocular diseases or injury is evaluated individually in connection with other findings. See 'special issue' certificates.

2. VISION

SECOND CLASS - Less than 20/20[35] each eye separately without correcting lenses of any kind (including contact lenses) is disqualifying. If the vision of either eye is less than 20/20 but not less than 20/50 it must correct to at least 20/20 in each eye separately, in which case the lens requirement must be entered on the report of examination and on the medical certificate.

THIRD CLASS - Less than 20/50 each eye separately without correction of any kind (including contact lenses) is disqualifying. If the vision is less than 20/50 in either eye it must correct to at least 20/30 in each eye separately, in which case the lens requirements must be entered on the report of examination and on the medical certificate.[36]

3. DEPTH PERCEPTION[37]

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[34]Certain characteristics encountered in eye examinations are suggestive of the presence of or history of disease elsewhere in the body. (History is the past medical record of the examinee.)

[35]In this fractional method of noting visual acuity the numerator (first number) represents the distance (in feet) that the examinee stands from the test chart, and does not change. The denominator (second number) represents the distance from which a "normal" eye could read the smallest line of type read by the examinee. Thus, 20/20 is normal vision. An eye yielding a score of 20/50 can read, from 20 feet, a line of type which could be read from a distance of 50 ft. by a normal (20/20) eye.

[36]When glasses are worn this is known as corrected vision. The above specification requires correction to normal vision.

[37]The Howard-Dolman apparatus is specified. The examinee is required to adjust a movable rod to a position opposite a fixed rod 20 feet distant so that the two are equally distant from him. Prescribed rules guard against judgment by other means than depth perception. The average score is derived from not less than 5 nor more than 10 determinations.

PICAO REQUIREMENTS

VISUAL REQUIREMENTS FOR LICENSES

18. The measurement of the visual acuity **(keenness of vision)** will be made by means of a series of optotypes **(test letters)** of Landholt, or similar optotypes, illuminated at not less than 12 lux **(meter-candle)** and not more than 20 lux, and placed at a distance of 6 metres (20 feet) from the candidate.[25]

Visual Standard No. 2

20. The candidate must have:

20.1 A visual acuity of at least 6/12 (20/40) in each eye separately, without correction, provided that if the vision in either or both eyes is poorer than 6/12 (20/40) but not poorer than 6/60 (20/200) and can be brought up to 6/6 (20/20) or better in each eye by glasses, the candidate may be admitted upon condition that correcting glasses be worn while exercising the privileges of his license. **(See text of paragraph 19.1 and footnote 26 for technical terminology, page 19.)**

Visual Standard No. 3

21. The candidate must have:

21.1 A visual acuity of at least 6/12 (20/40) in each eye separately, without correction, provided that if the vision in either or both eyes is poorer than 6/12 (20/40) but not poorer than 6/24 (20/80) and can be brought up to 6/6 (20/20) or better in each eye by glasses, but the candidate may be admitted upon condition that correcting glasses be worn while exercising the privileges of his license. **(See text of paragraph 19.1 and footnote 26 for technical terminology, page 19.)**

SECOND & THIRD CLASSES - Average error over 30 mm. (about 1-3/16 inches) is disqualifying. If correcting lenses are required to secure adequate vision, this requirement must also be met with those lenses, and the lens requirement entered upon the report of the examination and upon the medical certificate.

4. OCULAR MUSCLE BALANCE[38]

a. Diplopia:[39]

SECOND CLASS - If present in any part of the field bounded by an angle of 35 degrees from directly ahead, disqualifies.

THIRD CLASS - If present in any part of the field bounded by an angle of 35 degrees from directly ahead, disqualifies, unless overcome by the applicant's correcting lenses, in which case the lens requirement must be entered upon the report of examination and the medical certificate. If lenses are required to meet the visual and depth perception requirements the red glass test for diplopia must be accomplished with those lenses.

b. Heterophoria:[40]

SECOND CLASS - Hyperphoria (latent tendency for one eye to point higher than the other), right or left, exceeding one diopter, disqualifies.

THIRD CLASS - No requirements. Recorded only.

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[38]The ocular muscles attached to the eye control eye movement and eye position. Normally the line of vision, or visual axis, of one eye intersects that of the other eye at the object under regard.

[39]Diplopia is double vision. The two visual axes are misaligned and do not intersect at the object under regard. The image of the outside world in one eye is differently placed from that in the other eye. The two do not fuse into one, and double vision occurs. A piece of red glass is placed before one eye and the examinee looks at a distant white light. If two images appear, one white and the other red, diplopia is present.

[40]Heterophoria is a latent tendency to misalignment of the visual axes (footnote 38). The visual axes are properly aligned (or nearly so) when both eyes see the object under regard. When the vision of one eye is obscured the latent tendency to misalignment becomes a real misalignment and the obscured eye wanders out of line. The same result can be obtained by the prescribed apparatus, the Maddox Rod, which produces dissimilar images of the test object (point of light) when placed before one eye. The extent of latent tendency to misalignment is measured by the strength of the prism required to correct it. The strength of prisms, which bend light, is measured in (prism) diopters. A 1 diopter prism bends light 1 centimeter out of line 1 meter from the eye, a 2 diopter prism, 2 centimeters, etc.

PICAO REQUIREMENTS

Visual Standard No. 2

20.2 Satisfactory ocular muscle balance. **(See text of paragraph 19.3 to 19.5 and footnote 28 for technical terminology, page 20.)**

20.3 Normal fields of vision, due allowance being made, where errors of refraction exist, concerning those areas not covered by the correcting lenses. **(See text of paragraph 19.7 and footnote 30 for technical terminology, page 21.)**

Visual Standard No. 3

21.2 Normal fields of vision, due allowance being made, where errors of refraction exist, concerning those areas not covered by the correcting lenses. **(See text of paragraph 19.7 and footnote 30 for technical terminology, page 21.)**

c. Duction:[41]

SECOND CLASS - Divergence (prism base in, abduction) less than 3 prism diopters disqualifies.

Convergence (prism base out, adduction) less than 6 prism diopters, disqualifies.

THIRD CLASS - No requirements. Recorded only.

5. ACCOMMODATION[42]

SECOND CLASS - Failure to read V = 1.00 at 18 inches without correction on the Civil Aeronautics Administration Test Card, disqualifies. Test performed binocularly.

THIRD CLASS - No requirements. Recorded only.

6. CENTRAL COLOR VISION[43]

SECOND CLASS - Inability to differentiate readily the dominant hues of red, green, yellow, blue, and brown, disqualifies for pilots, Airport Traffic Controllers.

THIRD CLASS - No requirements. Recorded only.

7. VISUAL FIELDS[44]

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[41]This is a measure of the examinee's ability to diverge (abduct) and converge (adduct) the visual axes to maintain a single image when a prism, placed in front of one eye, bends the two images (progressively) further away from each other. The prism is rotated until the distant light becomes double. The strength of the prism that would be required to correct such a degree of misalignment of the eyes is the measurement of the examinee's power of duction.

[42]This requirement deals with the focusing power of the eye. The normal eye at rest is focused for objects 20 feet or more distant. When an object is nearer than 20 feet the normal eye must focus the light so that a clear image of it falls on the light sensitive membrane in the eye. The range of accommodation is greatest in young people and decreases with age. In the above test both eyes are used (binocular performance) without glasses.

[43]The term "CENTRAL" implies objects seen when looking directly at them as distinguished from objects off to one side, above, or below, which are designated PERIPHERAL. Different colored yarns are used to perform such a test. Holmgren Test, Set No. 70, is specified.

[44]In normal eyes the field of vision extends 90° or more from the line of vision to the side on a horizontal plane and to a like extent for some distance below. Above, below, and medially the field of vision is limited

PICAO REQUIREMENTS

Colour Perception Standard No. 2

23. The candidate must be able to distinguish easily signal red, signal green, and white.

a. Finger and Fixation Test, (check defects with perimeter and campimeter, include record with report).

SECOND & THIRD CLASSES - Significant field defects disqualify.

8. INSPECTION[45]

SECOND & THIRD CLASSES - Strabismus, nystagmus, and any pathological condition likely to grow worse, or which may interfere with function, disqualify.

9. INSPECTION (Continued)[45]

SECOND & THIRD CLASSES - Abnormal associated movements; abnormal pupillary reactions of pathological significance, or likely to interfere with function, disqualify.

10. OPHTHALMOSCOPIC EXAMINATION[46]

SECOND & THIRD CLASSES - Fundus and media - Any pathological or morphological condition of significance, likely to interfere with function, or likely to progress to that degree will disqualify.

(B) EAR, NOSE, THROAT, AND EQUILIBRIUM

11. HISTORY[47]

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[44](Continued) by eyebrow, cheek, and nose, respectively. In the finger test the examiner sits facing the examinee and judges the distance offside, above, below, etc. at which a finger can no longer be seen. This test serves to reveal decreases in the size of the fields or abnormal blind spots. The perimeter is an instrument designed for localization and mapping of the defect. The campimeter is an instrument similarly used when defects near the line of vision require very exact localization.

[45]Strabismus is a lack of parallelism of the direction in which the two eyes are looking when at rest; squint, cross-eyedness, etc. Nystagmus is an involuntary rhythmical oscillation of the eyeballs. Abnormal associated movements, which resemble a "tic" or St. Vitus' dance, are generally regarded as indications of nervous instability. The pupillary reactions are those involving changes in the size of the pupil.

[46]The ophthalmoscope is an instrument designed for examination of the interior of the eyeball. A bright beam of light is directed into it and the reflected light is observed by the examiner. The fundus is the part of the interior of the eye which can be observed with an ophthalmoscope. The media are the transparent structures through which light normally passes to stimulate the light sensitive membrane. Changes due to disease (pathology) or structural (morphological) abnormalities can be observed by this technique.

[47]A radical mastoidectomy is an operation on the mastoid process, located behind the ear, in which the ear drum and certain of the small conducting bones of the ear have been removed. Otitis media is inflammation of the middle ear.

PICAO REQUIREMENTS

Physical Standard No. 2

16.5 Eye Examination. The candidate must present no active nor chronic pathological condition of either eye or adnexae which might interfere with its proper function. The details of the visual standards for candidates for licenses shall be as set out in Section III and those of the colour perception standards as set out at Section IV. **(See text of paragraph 15.5 and footnote 19 for technical terminology, page 14.)**

Physical Standard No. 3

17.5 Eye examination. The candidate must present no active nor chronic pathological condition of either eye or adnexae which might interfere with its proper function. The details of the visual standards for candidates for licenses shall be as set out at Section III and those of the colour perception standards as set out at Section IV. **(See text of paragraph 15.5 and footnote 19 for technical terminology, page 14.)**

SECOND & THIRD CLASSES - Radical mastoidectomy or recurrent chronic otitis media are disqualifying. Other significant history will be evaluated in connection with associated findings.

12. DRUM MEMBRANE (EAR DRUM)

SECOND CLASS - Perforations of any degree, unless waived, disqualify.

THIRD CLASS - Simply perforation will not disqualify. Other pathological conditions are to be referred to the Medical Director.

13. OTITIS OR MASTOIDITIS[48]

SECOND & THIRD CLASSES - Either acute or chronic is disqualifying until cured. Other significant conditions are to be referred to the Medical Director.

14. HEARING[49]

SECOND CLASS - Must hear the whispered voice in each ear separately without the use of hearing aids at 8 feet or present an audiogram showing no loss in either ear greater than 40 decibels at frequencies from 512 to 2896, inclusive.

THIRD CLASS - Less than 3 feet (whispered voice) in both ears, tested separately disqualifies. (Minimum of 3 feet required in one ear only.)

WAIVERS - May be granted by the Medical Director to applicants who fail to meet these requirements provided their long experience in aviation and actual flight tests indicates that hearing is adequate under flying conditions and provided that a hearing aid is worn on the ground with which the stated hearing requirements can be met. Refer cases for waivers to the Medical Director, Civil Aeronautics Administration, Washington, D. C.

15. NOSE & SINUSES[50]

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[48]Otitis is inflammation of the ear. Mastoiditis is inflammation of the mastoid process, the bony prominence behind the ear, containing air cells which communicate with the middle ear.

[49]Audible frequencies range from 32 per second (lowest audible pitch) to about 20,000 per second (highest audible pitch). Ordinary conversation occupies frequencies of from 300 to 3000 per second. The decibel is a unit used to measure the intensity values of audible sound. In general, decibel loss may be regarded as percentage loss.

[50]The nasal septum is located in the midline and divides the nasal cavity in two, each portion communicating with the outside by a nostril. Perforations of this septum sometimes occur. Nasal polypi are growths into the nasal cavity, attached by a stalk of tissue.

PICAO REQUIREMENTS

Physical Standard No. 2

16.6 Ear examination. The candidate must have: **(See text of paragraph 15.6 and footnotes 20-23 for technical terminology, page 14.)**

(1) No active pathological process, acute or chronic, of the internal ear or middle ear cleft.

(2) No unhealed (unclosed) perforation or perforations of the tympanic membrane.

(3) No obstruction of the Eustachian tubes.

(4) No disturbances of the vestibular apparatus.

The details of the hearing standards shall be as set out at Section V.

Physical Standard No. 3

17.6 Ear examination. The candidate must have: **(See text of paragraph 15.6 and footnotes 21-23 for technical terminology, page 14.)**

(1) No active pathological process, acute or chronic, of the internal ear or middle ear cleft.

(2) No unhealed (unclosed) perforation or perforations of the tympanic membrane larger than pin point in size.

(3) No obstruction of the Eustachian tubes.

(4) No disturbances of the vestibular apparatus.

HEARING REQUIREMENTS FOR LICENSES

24. The measurement of the auditory acuity **(keenness)** in the first three standards will be made by means of a standard pure tone audiometer **(an electrical instrument for recording the "minimum audible" for pure sounds of various pitches)** in a quiet room, that is, a room in which the intensity of the background noise is less than 50 decibels as measured by a sound level meter.[32]

Hearing Standard No. 2

26. The candidate must not have a loss in either ear of more than 20 decibels at any one of the four frequencies 256, 512, 1024, and 2048 cycles per second.[33] **(See text of paragraph 25 and footnote 33 for technical terminology, page 22.)**

Hearing Standard No. 3

27. The candidate must not have a loss in either ear of more than 40 decibels at any one of the three frequencies 512, 1024, and 2048.[33]

Hearing Standard No. 4

28. The candidate must be able to hear a conversational voice, using both ears and standing with his back towards the examiner, at a distance of 2.50 metres **(about 8 ft.)** from the examiner.

SECOND & THIRD CLASSES - The following will be regarded as disqualifying.

a. Deformity, malformation or obstruction of the nose sufficient to interfere with nasal respiration.

b. Septal perforations until proven non-syphilitic.

c. Post nasal adenoids or nasal polypi sufficient to interfere with nasal respiration, or when associated with progressive middle ear disease.

16. MOUTH & THROAT[51]

SECOND & THIRD CLASSES

The following will be regarded as disqualifying:

a. Harelip unrepaired, or cleft palate.

b. Other malformation or any condition of the tongue producing interference with speech.

c. Perforation or extensive loss of substance of the hard or soft palate; extensive adhesions of the soft palate to the pharynx; or paralysis of the soft palate.

17. HISTORY OF SWING, TRAIN, SEA, OR AIR SICKNESS

Consider in connection with other findings.

18. SELF-BALANCE[52]

SECOND & THIRD CLASSES - Failure on three trials disqualifies. Consider also any history of internal ear disease of Meniere's Syndrome. Refer to the Medical Director.

19. TEMPERATURE

If abnormal, defer examination.

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[51] Harelip is a cleft in the upper lip, usually running from the mouth to the nostril. It is sometimes accompanied by cleft palate, which causes communication between the nasal cavity and the mouth. Clear speech is difficult in either condition. The hard palate has a bony structure and forms the front part of the roof of the mouth. The soft palate, lacking bone, forms the posterior part of the roof of the mouth.

[52] Joint-muscle sense is in part responsible for the maintenance of equilibrium. The prescribed test requires the examinee to stand on one foot with eyes closed for 15 seconds. Falling or swaying indicates poor self-balance. Meniere's Syndrome is due to disease of the equilibratory (vestibular) apparatus in the inner ear and is characterized by paleness, dizziness, disordered eye movement and auditory symptoms.

PICAO REQUIREMENTS

Footnotes

(1) A Private or Commercial Pilot who holds, or wishes to hold, an Instrument Rating will require to reach the Hearing Standard appropriate for a Flight Radio Operator.

(2) Where the holder of a license fails to meet Hearing Standard No. 1, but is able to meet Hearing Standard No. 2 and the competent aeronautical authorities are of the opinion that his aeronautical experience, ability and judgment compensate for his hearing deficiency having regard to the nature of the equipment he requires to operate the license may be renewed being limited, if necessary, as to the type of operation, the type of radio equipment or the period before medical re-examination.

Note

In several countries, owing to the lack of suitable equipment and facilities at the present time, the authorities may be unable to arrange compliance with Hearing Standards Nos. 1, 2, and 3 as detailed above. In such countries the authorities should, as an interim measure, set alternative standards and means of testing which they are satisfied are the equivalents of those detailed.

Physical Standard No. 2

16.7 Nose, throat, and mouth examination. The candidate must possess free nasal and tubal air entry on both sides and must have neither serious malformation nor serious, acute or chronic, affection of the buccal cavity or upper respiratory tract. **(See text of paragraph 15.7 and footnote 24 for technical terminology, page 15.)**

Physical Standard No. 3

17.7 Nose, throat, and mouth examination. The candidate must possess free nasal and tubal air entry on both sides and must have neither serious malformation nor serious, acute or chronic, affection of the buccal cavity or upper respiratory tract. **(See text of paragraph 15.7 and footnote 24 for technical terminology, page 15.)**

(C) GENERAL PHYSICAL CONDITION

20. MEDICAL HISTORY

SECOND & THIRD CLASSES - Individually evaluated. Overweight will be considered only as related to constitutional pathology or as it interferes with the safe operation of aircraft.

23. BONES & JOINTS

SECOND & THIRD CLASSES - Spinal column - Marked curvatures, ankylosis (restriction of movement), deformity; disease of the vertebrae.

Pelvis - Malformations and deformities sufficient to interfere with the safe operation of aircraft.

Extremities (arms and legs) - Any abnormalities in the form, number, proportions, or movements which interfere with normal function.

a. Any limitation of motion of the shoulder, elbow, wrist, hip, knee, or ankle joints, or any deformities of the hands or feet which interfere with the safe operation of aircraft.

b. Any atrophy (wasting) of the muscles or any part of the body which is progressive, or is sufficient to interfere with function.

c. Tremors (trembling or quivering) of sufficient degree to interfere with function.

d. Any unlimited fractures with shortening or deformity; dislocations unreduced or partly unreduced, ankylosis of a joint, partial or complete, relaxed annular (circular) ligaments permitting frequent or involuntary displacement.

e. Amputation of any portion of a limb, except fingers and toes, or resection (partial removal) of a joint. A sufficient number of fingers must be present on each hand to insure the ability to manipulate all controls of aircraft properly. See 'special issue' certificates.

f. Disease of the bones or joints; chronic edema (swelling of tissues); chronic or obstinate neuralgias (nerve pain), particularly sciatica. Recent history of rheumatic or arthritic infection.

24. - 25. CARDIOVASCULAR SYSTEM

SECOND CLASS

c. Orthostatic tolerance test:[53]

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[53]Pulse rate and blood pressure are determined with the examinee lying down and then, again, after standing for 3 minutes. Orthostatic tolerance refers to the individual's response to erect posture. Orthostatic tachycardia means a rapid pulse rate upon standing. Orthostatic hypotension means low blood pressure upon standing. Orthostatic syncope means faintness or actual fainting on standing.

PICAO REQUIREMENTS

Physical Standard No. 2

15.4 General medical examination. The candidate must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the performance of his duties. He must have no organic cardiac lesion. He must be in a state to withstand the effects of altitude. He must be free from kidney disease and must not present any clinical sign of syphilis. **(See text of paragraph 15.4 and footnotes 12-18 for technical terminology, pages 12-13.)**

15.3 General surgical examination. The candidate must neither suffer from any wound, or injury, nor have undergone any operation, nor possess any abnormality, congenital or acquired, which might interfere, in the case of piloting, with the safe handling of the aircraft at any altitude even in the case of prolonged or difficult flight, or in the case of air work other than piloting, with the efficient performance of the duties for which a license is being sought. **(See text of paragraph 15.3 and footnotes 10-11 for technical terminology, pages 11-12.)**

The response to the test, unless due to recent illness, is disqualifying if

(a) Pulse rate increases to more than 120 beats per minute (ORTHOSTATIC TACHYCARDIA).

(b) Blood pressure falls to values less than 90 mm. H.g. systolic, of 54 mm. H.g. diastolic (ORTHOSTATIC HYPOTENSION).

(c) Examinee displays faintness or syncope (ORTHOSTATIC SYNCOPE).

SECOND & THIRD CLASSES

a. Blood pressure. Systolic in excess of 150 mm., or diastolic in excess of 100 mm., disqualifies for second class. Systolic in excess of 160 mm., or diastolic in excess of 100 mm., disqualifies for third class.[54]

b. Valvular disease of the heart.[55] See appendix for report form.

c. Hypertrophy (overgrowth) dilation of the heart.

d. Pericarditis; endocarditis; myocarditis; or coronary disease with or without angina pectoris.[56]

e. Heartblock, auricular flutter, auricular fibrillation, paroxysmal tachycardia or thyroid toxicosis.[57]

f. Arteriosclerosis (hardening of the arteries) or hypertension.

g. Aneurism, any location (bulging of arterial walls).

h. Intermittent claudication; Burger's disease, Reynaud's disease; or

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[54]The blood pressure rises and falls with the heartbeat. The thrust of the heart muscle increases the pressure (systolic pressure) which falls between heartbeats (diastolic pressure).

[55]When the valves of the heart are diseased this permits flow of blood in the wrong direction causing circulatory inefficiency.

[56]Pericarditis means inflammation of the membranes covering the heart; endocarditis refers to a like condition of the lining membranes; and myocarditis to inflammation of the heart muscle itself. Angina Pectoris is a constricting pain in the chest and arm due to impaired coronary circulation of the heart.

[57]In heartblock the beat of the lower chambers of the heart does not follow that of the upper chambers in proper sequence. Auricular flutter and fibrillation both imply departure from the normal regular beat of the upper chambers of the heart. Paroxysmal tachycardia implies rapid pulse the onset of which is sudden. Thyroid toxicosis is overactivity of the thyroid gland producing toxic symptoms.

PICAO REQUIREMENTS

Physical Standard No. 3

17.4 General medical examination. The candidate must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the performance of his duties. He must have no organic cardiac lesion. His lungs must be in a state to withstand the effects of altitude. He must be free from kidney disease and must not present any clinical signs of syphilis. **(See text of paragraph 15.4 and footnotes 12-18 for technical terminology, pages 12-13.)**

thrombophlebitis, if there is evidence of circulatory obstruction.[58]

26. RESPIRATORY SYSTEM

SECOND & THIRD CLASSES[59]

The following will be regarded as disqualifying:

a. Active pulmonary tuberculosis; extensive fibrosis; cavitation; pneumothorax; hydrothorax; thoracotomy; pneumothorax, spontaneous or artificial.

b. Chronic bronchitis; unresolved pneumonia; pulmonary emphysema; bronchiectasis; marked silicosis.

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[58]Intermittent claudication is characterized by pain in the legs brought about by exercise and relieved by rest. The underlying pathology is impaired circulation of the extremities.

[59]Tuberculosis is described as pulmonary when the lungs are attacked by this disease. Fibrosis indicates the presence of fibrous (scar) tissue. Cavitation implies the presence of abnormal cavities in the lung substance. When air or fluid collects between the chest wall and the lung this is known as pneumothorax or hydrothorax, respectively. Thoracotomy is surgical incision of the wall of the chest. When air is purposely introduced between the chest wall and the lung this is known as artificial pneumothorax. If such a condition occurs without such technique it is known as spontaneous pneumothorax.

Bronchitis is inflammation of the bronchial air tubes in the lung. Unresolved penumonia is that in which the tissues have not been restored to the normal state. Pulmonary emphysema is a condition in which air is present in the connective tissues of the lung where no air normally exists. Bronchiectasis means enlargement of the bronchial air tubes.

In silicosis the inhalation of the dust of stone, sand or flint has caused a diseased condition involving fibrous hardening and pigmentation.

A membrane (pleura) covers the lungs and lines the inner surfaces of the chest walls and other tissues with which the lung comes into contact. Inflammation of this membrane is called pleurisy. Fluid may be given off (effusion) and pus may be formed to collect in the pleural cavity (empyema). Fibrinous pleurisy (dry pleurisy) is characterized by the presence of the blood clotting substance (fibrin) and tends to seal the lung to the surrounding structures where it would normally be freely movable.

Cysts are sac-like structures usually containing fluid and are abnormal for the lung. The mediastinum is the fleshy partition separating the two lungs. It contains the heart and the large vessels connecting with the heart.

Allergic reactions occur due to abnormal sensitivity to certain proteins. The best known allergy is hay fever, in which case the irritating proteins are found in the pollen of various plants, etc.

c. Acute fibrinous pleurisy; pleurisy with effusion or empyema. (26, p. 19)

d. Cysts; abscess or tumors of the lung, pleura or mediastinum.

e. Asthma.

f. Allergic reactions of a degree sufficient to interfere with safe piloting of aircraft. Minor allergy will not disqualify for the third class if a detailed report accompanies the examination report. See supplement for report form.

27. - 28. ABDOMEN - GASTRO-INTESTINAL SYSTEM

The following will be regarded as disqualifying:

a. Wounds, injuries, cicatrices (scars), or ruptured abdominal muscles sufficient to interfere with function.

b. Hernia, any variety, (may be approved for third class if properly fitted truss is worn while operating aircraft).[60]

c. Undescended testicle, when the testicle is in the inguinal canal, or outside of the canal but lying against the pubic bone. (If the testicle is in the abdominal cavity or if it has been removed, it may be disregarded.)[61]

d. Large tumors of the abdominal wall.

e. Chronic peritonitis; peritoneal adhesions which cause symptoms.[62]

f. Gastric or duodenal ulcers.[63] See supplement for detailed report form.

g. Chronic diseases of stomach or intestines.

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[60]A hernia is the protrusion of some part of an internal organ through an abnormal opening in the wall of its containing cavity. The commonest type of hernia in men is the inguinal (groin) in which the protruding organ may enter the scrotum and rest near to the testicle.

[61]During development before birth the testicle develops in the abdominal cavity. It gradually descends into its final position in the scrotum, but may be arrested in its descent. Its pathway extends through the inguinal canal which opens, beneath the skin and fatty tissue, in front of the hip bone near the midline of the body.

[62]The peritoneum is the membrane which covers the organs of the abdominal cavity and the inner surfaces of the abdominal walls. Under normal conditions the peritoneum is smooth and moist, permitting gliding movement between contiguous structures covered by it. Inflammation of the peritoneum (peritonitis) may cause contiguous surfaces to fuse, this condition being known as adhesion.

[63]The duodenum is the first portion of the small intestine into which the stomach empties. Gastric pertains to the stomach.

PICAO REQUIREMENTS

Physical Standard No. 2 (Excerpt from section 16.3)

When palpation of the abdomen reveals any swelling or distinct pain, the abdominal examination must be completed by a radioscopic and radiographic examination. Any anatomical lesion in the walls of any part of the digestive tract, any stricture of its calibre, any calculus or foreign body, any peritoneal lesion, established by clinical or laboratory examinations, will entail rejection. Exception may be made for spasmodic strictures not accompanied by other troubles and for ptoses compensated by a good abdominal musculature. Any candidate who has undergone a surgical operation on the biliary passages or the digestive tract, except for appendicitis, involving a total or partial excision or a diversion of any of these organs, shall be declared unfit unless a period of two years has elapsed since the surgical operation and the effects of the operation are not deemed liable to cause sudden incapacity in the air, or an attestation made by a surgeon, having knowledge of the nature of the disease which necessitated the operation, certifies that no immediate or future after-effects are to be feared.

Diseases of the liver (including those of the biliary passages) and of the pancreas will in cases where it is deemed necessary, be verified by laboratory and other examination, particularly by radiography as well as by an examination of the blood and of the urine, and will entail rejection only if they afford indication of the existence of a calculus, tumour or lesion involving a persistent impairment of function of these organs.

Physical Standard No. 2 (Excerpt from section 16.4)

Candidates of the female sex must present a normal uterus and appendages. Cases in which surgical operation has taken place will be considered individually. Any presumed pregnancy will entail rejection until, at least, after the pregnancy has been terminated. Following confinement or miscarriage a candidate of the female sex will be allowed to resume her duties only after having undergone a new medical examination.

h. Enlargement of spleen or liver.

i. Chronic or persistent jaundice.[64]

j. Fistulae from visceral or bony lesions or following operations or due to congenital defects.[65]

k. Acute or chronic diseases of liver, gall bladder, or pancreas.

l. Painful or bleeding hemorrhoids.[66]

29. GENITO-URINARY SYSTEM

SECOND & THIRD CLASSES

The following will be regarded as disqualifying:

a. Nephritis (inflammation of the kidneys), acute or chronic.

b. Hydronephrosis, pyonephrosis, pyelitis, tumors of the kidney, renal calculi, floating kidney, nephrectomy.[67]

c. Cystitis (inflammation of the bladder), acute or chronic.

d. Vesical calculi (stones in the bladder), tumors of bladder.

e. Tuberculosis of any part of genito-urinary tract.[68]

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[64] Jaundice, characterized by yellowness of the eyes, skin, and urine, is due to the presence of bile in the blood. The term may be loosely used to designate any yellowing of the eyes, skin, etc.

[65] Fistulae are abnormal passageways from an organ to the surface or to another organ. The viscera are the internal organs. Congenital defects are those present at birth.

[66] Hemorrhoids are a twisting or tortuous condition of veins in the anal area, causing painful swelling and sometimes bleeding.

[67] Hydronephrosis is a dilatation of the larger urine containing passageways of the kidney due to obstruction of the flow of urine. Enlargement of the same areas with pus is called pyonephrosis. In pyelitis there is kidney inflammation, involving especially the area which conducts urine from the organ. Renal calculi are stones in the kidney. A floating kidney is one which is unduly movable. Nephrectomy is removal of the kidney.

[68] The genito-urinary tract includes the sexual organs, both external and internal, and the urinary system of organs, including the kidneys, ureters, bladder, and urethra.

PICAO REQUIREMENTS

Physical Standard No. 3

17.3 General surgical examination. When palpation of the abdomen reveals any swelling or distinct pain, the abdominal examination must be completed by the radioscopic and radiographic examination. **(See text of paragraph 15.3 and footnotes 10-11 for technical terminology, pp. 11-12.**

Any candidate who has undergone a surgical operation on the biliary passages, or the digestive tract, except for appendicitis, involving a total or partial excision or a diversion of any of these organs, shall be declared unfit unless a period of two years has elapsed since the surgical operation and the affects of the operation are not deemed liable to cause sudden incapacity in the air, or an attestation made by a surgeon, having knowledge of the nature of the disease which necessitated the operation, certifies that no immediate or future after-effects are to be feared.

The existence of a calculus, tumour, or lesion involving a persistent impairment of function of the liver or the pancreas will entail rejection.

(Excerpt from section 17.4)

Candidates of the female sex must present a normal uterus and appendages. Cases in which surgical operation has taken place will be considered individually. Any presumed pregnancy will entail rejection until, at least, after the pregnancy has been terminated.

f. Venereal diseases (see superseding section on VENEREAL DISEASE on p. 54.) Syphilis in any stage: gonococcus infections, including arthritis; chancroid, bubo; granuloma inguinale.

g. Diabetes mellitus. (A metabolic disorder characterized by inadequate oxidation of carbohydrates thereby producing elevated blood sugar, excess urinary sugar, excess urine, increased thirst and loss of weight.)

h. Diabetes insipidus. (A disease characterized by excess urine formation without an increase in sugar due to an abnormality of the posterior lobe of the pituitary gland or hypothalamus.) - Refer to the Medical Director with full information.

(D) NERVOUS SYSTEM

30 - 33. NERVOUS SYSTEM

SECOND & THIRD CLASSES

The following will be regarded as disqualifying:

a. Multiple stigmata (marks or signs) of degeneration.

b. Chronic alcoholism.

c. Drug habit.

d. Dementia praecox.[69]

e. Manic-depressive insanity.[70]

f. General paresis.[71]

g. Tabes dorsalis.[72]

h. Syphilis in any form (see superseding section on VENEREAL DISEASE on p. 54.)

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[69]Dementia praecox is a term for a large group of psychoses often recognized during adolescence but not infrequent in later maturity, characterized usually by disorientation, loss of contact with reality or splitting of the personality.

[70]Manic-depressive insanity is also known as cyclic insanity. It is characterized by alternating stages of melancholia (depression) and excitement with great activity, rapid passing of ideas, etc. (mania).

[71]General paresis is a chronic syphilitic disease of the central nervous system characterized by progressive dementia and a diffuse generalized paralysis.

[72]Tabes dorsalis is a chronic syphilitic disease of the central nervous system characterized by muscular incoordination, sensory loss and pain.

PICAO REQUIREMENTS

Physical Standard No. 2

16.1 The candidate must have a good family and personal history with particular reference to nervous stability. Information as to this history must be given in a statement made and signed by the candidate.

16.2 Examination of the nervous system. The candidate must be free from any disability, congenital or acquired, of the nervous system causing such degree of functional incapacity as might interfere, in the case of piloting, with the safe handling of the aircraft at any altitude even in the case of prolonged or difficult flight or, in the case of air work other than piloting, with the efficient performance of the duties for which the license is being sought. **(See text of paragraph 15.2 and footnotes 3-9 for technical terminology, pages 9-11.)**

Injuries of the head will be dealt with as follows:

(1) Cases of simple concussion or simple fracture of the skull, without associated intracrauial damage, will entail temporary unfitness for a period of, at least, two months from the date of concussion or fracture. After the candidate has resumed his duties, his license may be rendered valid only for a reduced period, or periods, until the after-effects no longer appear liable to produce a sudden incapacity during flight.

(2) Severe intracranial injuries, the presence of local lesion of the brain, trepanning with loss of bony substance involving the two tables of the cranial vault or a lesion of the dura mater will involve permanent rejection.

Any presumed nervous syphilis will require to be investigated by an examination of the blood and an examination of the cerebro-spinal fluid, made with the consent of the candidate.

i. Multiple sclerosis.[73]

j. Paraplegia (paralysis of both legs and part of trunk).

k. Syringomyelia.[74]

l. Muscular atrophies and dystrophies.[75]

m. Multiple neuritis (simultaneous inflammation of many nerves).

n. Mental deficiency and moronic states.[76]

o. Constitutional psychopathic states (constitutional psychopathic states are mental disorders without clearly defined tangible cause or structural change).

p. Psychoneuroses (hysteria, neurasthenia, and psychasthenia).[77]

q. Epilepsy or marked epileptoid (resembling epilepsy) background.

r. Endocrinopathies. (Diseases traceable to the glands of internal secretion.)

s. Peripheral nerve injuries of a type that would interfere with function in handling aircraft.

t. Severe head injuries with or without persistent symptoms. (If there is a history of skull fracture of unconsciousness for any period of time, refer to the Medical Director. See supplement for detailed report form.)

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[73]Multiple sclerosis is the occurrence of patches of hardening in the brain and spinal cord causing various nervous symptoms depending on its location.

[74]Syringomyelia is due to cavity formation in the spinal cord. There is loss of some sensations and weakness of some muscles with incoordination of others.

[75]Both muscular atrophy and muscular dystrophy imply shrinkage and therefore weakening of the muscles.

[76]Mental deficiency is customarily indicated by comparing the intellectual powers of the examinee with that of normal children. The "mental age" of the individual is the chronological age of the normal child with comparable intellection. The "Binet age" defines idiots as less than 2 years; imbeciles, 2 to 7 years; and morons, 8 to 12 years.

[77]Psychoneuroses are minor diseases of the mind which are not actually insanities. Hysteria may vary from the state of excitement usually associated with the word to more radical states involving disorders of motor activities (convulsions) and loss of normal sensation. Neurasthenia is a condition of nervous exhaustion which may take many forms. Psychasthenia is relatively mild, being characterized by lack of self-control, morbid fears, etc.

PICAO REQUIREMENTS

Physical standard No. 3

17.1 The candidate must have a good family and personal history with particular reference to nervous stability. Information as to this history must be given in a statement made and signed by the candidate.

17.2 Examination of the nervous system. The candidate must be free from any wound, or injury, nor have undergone any operation, nor possess any abnormality, congenital or acquired, which might interfere with the safe handling of the aircraft under ordinary conditions. **(See text of paragraph 15.2 and footnotes 3-9 for technical terminology, pages 10-11.)**

30. VENEREAL DISEASE

SECOND CLASS

LYMPHOGRANULOMA VENEREUM WITH ACTIVE LESIONS - Disqualify until complete healing has occurred, whether spontaneously or as a result of treatment, and for three months thereafter. Persons with a history of the disease, but not evidence of it except positive cutaneous (Frei) of complement fixation tests, may qualify.[78]

GRANULOMA INGUINALE (groin ulcer) WITH ACTIVE LESIONS - Disqualify until complete healing has occurred and for one year thereafter. Persons with scars of the disease may qualify.

GONORRHEA, UNCOMPLICATED, ACUTE OR CHRONIC - (1) If treated with penicillin, disqualify only for the day of treatment. Tests of cure are not required. (2) If treated with sulfonamides, disqualify during entire period of sulfonamide treatment and until tests of cure, (three negative urine cultures at weekly intervals) are complete.

GONORRHEA, COMPLICATED (EPIDIDYMITIS, PROSTATITIS, ARTHRITIS, ETC.)[79] - (1) If treated with penicillin, disqualify for duration of symptoms only Tests of cure are not required. (2) If treated with sulfonamides, disqualify until symptoms disappear and, in addition, during sulfonamide therapy; and until tests of cure, as above, are completed.

Gonorrheal arthritis which has produced permanent ankylosis (restriction of movement) or deformity which might interfere with operation of aircraft will disqualify.

CHANCROID (infectious venereal sore), WITH OR WITHOUT BUBO (swollen lymph gland) - disqualify only during presence of active lesions and/or during sulfonamide therapy.

SYPHILIS - All active cases of syphilis are disqualifying.

Nothing in our present knowledge of syphilitic infection or its treatment leads one to believe that early syphilis, latent syphilis, or benign late syphilis (as defined above) affects the normal physiology of an infected person, whether or not under flying conditions. In general terms, therefore, persons with early syphilis, latent syphilis (whether congenital or acquired) or benign late syphilis, should be eligible for pilot's certification following adequate treatment, having due regard to possible disqual-

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[78] A tumor of lymphatic tissue of venereal origin is known as a lymphogranuloma venereum.

[79] The epididymis is a convoluted tube close to the testicle. The prostate is an organ of the genito-urinary system in the male, located close to the bladder. Inflammation of these organs is indicated by the suffix "itis." Arthritis refers to inflammation of the joints.

PICAO REQUIREMENTS

PICAO requirements regarding venereal disease include the following statements:

Excerpt from PICAO section 16.2; Physical Standard No. 2, presented previously (see p. 15).

"Any presumed nervous syphilis will require to be investigated by an examination of the blood and an examination of the cerebrospinal fluid, made with the consent of the candidate."

Excerpt from PICAO section 17.4; Physical Standard No. 3, presented previously (see p. 18).

"He must be free from kidney disease and must not present any clinical signs of syphilis." (See text of paragraph 15.4 and footnotes 12-18 for technical terminology, pages 12-13.)

ifying effects of treatment (discussed below). On the other hand, those phases of late syphilitic infection which may involve major anatomic structures (the eye, the viscera, the cardiovascular apparatus **(heart and blood vessels)**, or the nervous system) may seriously affect the patient's physical mechanism, whether or not under flying conditions. Therefore, persons with late ocular, visceral, cardiovascular, or neurosyphilis should be disqualified for certification; and in this case the disqualification should be permanent.

A positive Wassermann (complement-fixation) test of any degree in the spinal fluid, discovered at any time and regardless of the presence or absence of symptoms or physical signs of neurosyphilis, should disqualify for pilot's certification.

34. REMARKS

Summarize the favorable or unfavorable factors of the applicant's intelligence, volition, and temperament.

SUPPLEMENTARY REPORTS

Diabetes

Diabetes of any degree is disqualifying for all classes. The presence of a glycosuria **(presence of sugar in normal urine)** may necessitate a glucose tolerance test with periodic blood sugar determinations to differentiate alimentary **(digestive)** glycosuria from true diabetes. If recent laboratory reports are available, forward with report; if not, they of necessity will be requested by the Medical Director in appropriate cases. A statement that the applicant is not using insulin in any form, and the original signed laboratory reports will be most helpful.

Nephrectomy

The adequacy of the remaining kidney tissue can be best determined by functional testing. In cases in which kidney function is a factor, the Medical Director will request a P.S.P. and a Mosenthal Test. Any recent functional report should be forwarded with your report of examination. The original signed laboratory reports should be submitted if possible.

Syphilis

Applicants who have contracted syphilis may be qualified by the Medical Director upon presentation of the original reports of negative serological reactions taken six months after completion of adequate treatment, if all other requirements are met. **(See superseding paragraph on VENEREAL DISEASE above.)**

Neuro-Psychiatric (both neurological and mental) conditions

In neuro-psychiatric conditions a supplemental report giving a brief history, with dates, including any remedial measures employed together with the name and address of any physician or institution giving treatment, will be of great assistance.

PHYSICAL REQUIREMENTS

FIRST CLASS PILOTS

An applicant presenting any of the following listed conditions will be considered as having failed to meet the physical standards of the first class (Airline Transport Pilot). In any case in which a doubt exists, or where instructed, the medical examiner will not issue a medical certificate but will forward his report to the Chief, Aviation Medical Division, for decision.

The physical requirements in this section apply to FIRST CLASS PILOTS. The general outline of these requirements follows those prescribed for SECOND AND THIRD CLASS PILOTS, which outline precedes this one. In cases where technical terms have previously been defined, reference is made to footnotes occurring in the preceding pages. Technical terms not already explained are clarified by footnotes, etc. in the pages following.

(A) EYE

1. HISTORY

History of significant ocular disease or injury is evaluated individually in connection with other findings. **(Footnote 34, p. 28.)**

2. VISION

Less than 20/20 each eye separately without correcting lenses of any kind (including contact lenses). If the vision of either eye is less than 20/20 but not less than 20/50 it must correct to at least 20/20 in each eye separately, in which case the lens requirement must be entered on the report of examination and on the medical certificate. **(Footnotes 35, 36, p. 28.)**

3. DEPTH PERCEPTION **(Footnote 37, p. 28.)**

Average error over 30 mm. If correcting lenses are required to secure adequate vision, this requirement must also be met with those lenses, and the lens requirement entered upon the report of the examination and upon the medical certificate.

PICAO REQUIREMENTS

Physical Standard No. 1

15.5 Eye examination. The candidate must present no active nor chronic pathological condition of either eye or adnexae[19] which might interfere with its proper function. The details of the visual standards for candidates for licenses shall be as set out in Section III, and those of the colour perception standards as set out at Section IV.

Visual Standard No. 1

19. The candidate must have:

19.1 A visual acuity of at least 6/9 (20/30)[26] in each eye separately, without correction (no glasses); provided that if the vision in either or both eyes is poorer than 6/9 (20/30) but not poorer than 6/18 (20/60), and can be brought up to 6/6 (20/20) or better in each eye by glasses, the candidate may be admitted upon condition that correcting glasses be worn while exercising the privileges of his license.

19.2 In the case of application for an original license, not more than +2.25 dioptres of hypermetropia.[27]

19.3 Not more than 1 dioptre of hyperphoria in either eye.[28]

19.4 Not more than 10 dioptres of esophoria.[28]

19.5 Not more than 5 dioptres of exophoria.[28]

19.6 An accommodation of at least V = 1.00 at 30 cm. with each eye separately without the use of correcting lenses. Where the candidate is over 40 years of age, correcting glasses may be used to provide the same character of near vision, if he already holds a license.[29]

19.7 Normal visual fields.[30]

4. OCULAR MUSCLE BALANCE (Footnote 38, p. 30.)

a. Diplopia: (Footnote 39, p. 30.)

If present in any part of the field bounded by an angle of 36 degrees from directly ahead.

b. Heterophoria: (Footnote 40, p. 30.)

Hyperphoria (latent tendency for one eye to point higher than the other), right or left, exceeding one diopter.

Lateral phoria - Esophoria (latent tendency for the eyes to converge) exceeding 10 degrees.
Exophoria (latent tendency for the eyes to diverge) exceeding 5 degrees.

c. Duction: (Footnote 41, p. 32.)

Divergence (prism base out, abduction) less than 3 prism diopters.

Convergence (prism base out, adduction) less than 6 prism diopters.

4d. OCULAR MUSCLE BALANCE UNDER CONDITION OF NEAR VISION[80]

FIRST CLASS - Phorias at 13 inches

Esophoria..... 10 prism diopters, maximum
Exophoria..... 18 prism diopters, maximum
Hyperphoria..... 1.5 prism diopters, maximum

Prism divergence at 13 inches 15 prism diopters, minimum
Prism convergence at 13 inches Must exceed exophoria

5. ACCOMMODATION (Footnote 42, p. 32.)

Inability to read V = 1.00 on the special Civil Aeronautics Administration Test Card at 18 inches without correction, each eye separately.

6. CENTRAL COLOR VISION (Footnote 43, p. 32.)

Inability to differentiate readily the dominant hues of red, green, yellow, blue, and brown. If defective, report in detail giving also the edition number of the tests used.

7. VISUAL FIELDS (Footnote 44, pp. 32, 34.)

a. Finger and Fixation Test (check defects with perimeter and campimeter) Significant field defects.

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[80]These tests are made with the test object 13 inches distant from the examinee as compared to the 20 ft. distance of paragraph 4, OCULAR MUSCLE BALANCE.

PICAO REQUIREMENTS

Colour Perception Standard No. 1

22. The candidate must have normal colour perception as tested by means of Ishihara plates or isochromatic plates.[31]

8. INSPECTION (Footnote 45, p. 34.)

Strabismus, nystagmus, and any pathological condition likely to grow worse, or which may interfere with function.

9. INSPECTION (continued) (Footnote 45, p. 34.)

Abnormal associated movements. Abnormal pupillary reactions of pathological significance, or likely to interfere with function.

10. OPHTHALMOSCOPIC EXAMINATION (Footnote 46, p. 34.)

Fundus and media - Any pathological or morphological condition of significance, likely to interfere with function, or likely to progress to that degree.

10.5. NIGHT VISION[81]

FIRST CLASS - The greatest distance at which the character is correctly judged 4 out of 4 or 8 out of 10 readings, is recorded as the score. A score of 7 is considered as evidence of satisfactory night vision, a score of 9 of superior night vision. This score will be recorded under Paragraph 34 "Remarks."

(B) EAR, NOSE, THROAT, AND EQUILIBRIUM

11. HISTORY (Footnote 47, p. 34.)

Radical mastoidectomy; chronic otitis media. Other significant history will be evaluated in connection with associated findings.

12. DRUM MEMBRANE (ear drum)

Perforations of any degree.

13. OTITIS OR MASTOIDITIS (Footnote 48, p. 36.)

Either acute or chronic. Other significant conditions are to be referred to the Chief, Aviation Medical Division.

14. HEARING (Footnote 49, p. 36.)

Less than 8 feet (whispered voice) each ear separately. In case the hearing for the whispered voice is less than 20 feet an audiogram showing not less than 50 per cent of normal throughout useful speech and radio range, each ear separately will be required to qualify.

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[81]Night vision is tested in a totally dark room with the examinee fully adapted (eyes accustomed to the dark). A radium plaque Night Vision Tester is specified. This apparatus has a very dim self-luminous test object, the position of which is altered while obscured. The examinee is required to tell its position when it is exposed.

PICAO REQUIREMENTS

Physical Standard No. 1

15.6 Ear examination. The candidate must have:

(1) No active pathological process, acute or chronic, of the internal ear[20] or middle ear cleft.[21]

(2) No unhealed (unclosed) perforation or perforations of the tympanic membrane (ear drum).

(3) No obstruction of the Eustachian tubes.[22]

(4) No disturbances of the vestibular apparatus.[23]

The details of the hearing standards shall be as set out at Section V.

15.7 Nose, throat, and mouth examination. The candidate must possess free nasal and tubal air entry on both sides and must have neither serious malformation (structural defect) or serious, acute or chronic, affection of the buccal (mouth) cavity or upper respiratory tract.[24]

Hearing Standard No. 1

25. The candidate must not have a loss in either ear of more than 20 decibels at any one of the five frequencies 256, 512, 1024, 2048, and 4096 cycles per second.[33]

15. NOSE & SINUSES (Footnote 50, p. 36.)

a. Deformity, malformation or obstruction of the nose sufficient to interfere with nasal respiration.

b. Septal perforations until proven non-syphilitic.

c. Post nasal adenoids or nasal polypi sufficient to interfere with usual respiration, or when associated with progressive middle ear disease.

16. MOUTH & THROAT (Footnote 51, p. 38.)

a. Harelip unrepaired, or cleft palate.

b. Other malformation or any condition of the tongue producing interference with speech.

c. Perforations or extensive loss of substance of the hard or soft palate; extensive adhesions of the soft palate to the pharynx; or paralysis of the soft palate.

d. Acute or chronic disease of the larynx (voice box).

e. Paralysis of the vocal cords.

17. HISTORY OF SWING, TRAIN, SEA, OR AIR SICKNESS

Consider in connection with other findings.

18. SELF-BALANCING (Footnote 52, p. 38.)

Failure on three trials. Consider also any history of internal ear disease or Meniere's Syndrome. Refer to the Chief, Aviation Medical Division.

19. TEMPERATURE

If abnormal, defer examination.

(C) GENERAL PHYSICAL CONDITION

20. MEDICAL HISTORY

Individually evaluated in all cases and in connection with other findings.

21. - 22. SKIN, LYMPHATICS - ENDOCRINE SYSTEM

Individually evaluated.

23. BONES & JOINTS (Paragraph 23, p. 40.)

PICAO REQUIREMENTS

Physical Standard No. 1

14. The candidate must have the complete use of his four limbs, must be free from any active or latent (concealed), acute or chronic (of long duration), medical or surgical disability or infection, which would entail any degree of functional incapacity which might interfere with the safe handling of an aircraft at any altitude even in the case of prolonged or difficult flight.

Spinal column - Marked curvatures, ankylosis, deformity; disease of the vertebrae. (Paragraph 23, p. 40.)

Pelvis - Malformations and deformities sufficient to interfere with the safe operation of aircraft.

Extremities - Any abnormalities in the form, number, proportions or movements which interfere with normal function.

a. Any limitation of motion of the shoulder, elbow, wrist, hip, knee, or ankle joints, or any deformities of the hands or feet which interfere with the safe operation of aircraft.

b. Any atrophy of the muscles or any part of the body which is progressive, or is sufficient to interfere with function.

c. Tremors of sufficient degree to interfere with function.

d. Any ununited fractures with shortening or deformity; dislocations unreduced or partly unreduced, ankylosis of a joint, partial or complete, relaxed annular ligaments permitting frequent or involuntary displacement.

e. Amputation of any portion of a limb, except fingers and toes, or resection of a joint. A sufficient number of fingers must be present on each hand to insure the ability to manipulate all controls of aircraft properly

f. Disease of the bones or joints; chronic edema; chronic or obstinate neuralgias, particularly sciatica.

24. BUILD

Considered only as it affects the safe operation of aircraft. If there is any disproportion between height and weight determine whether it is due to pathological condition.

25. - 26. CARDIOVASCULAR SYSTEM

a. Blood pressure. Systolic over 135 mm., or diastolic, 95 mm. (Footnote 54, p. 42.)

b. Valvular disease of the heart. (Footnote 55, p. 42.)

c. Hypertrophy (overgrowth) or dilation of the heart.

d. Pericarditis; endocarditis; myocarditis; or coronary disease with or without angina pectoris. (Footnote 56, p. 42.)

e. Heartblock, auricular flutter, auricular fibrillation, paroxysmal tachycardia or thyrotoxicosis. (Footnote 57, p. 42.)

f. Arteriosclerosis (hardening of the arteries) or hypertension.

PICAO REQUIREMENTS

Physical Standard No. 1

15.4 General medical examination. The candidate must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the management of aircraft. His muscular power must be adequate for the handling of the types of airplanes he will have to pilot or the apparatus he is to use. The heart must be normal, with normal function, and only respiratory arrhythmia **(irregular heart beat due to breathing)** increase of pulse rate from excitement or exercise and a general slow pulse not associated with auriculo-ventricular dissociation[12] will be allowed. He must not have any signs of aneurism **(aneurism; a sac formed by the dilatation or swelling of the walls of an artery and filled with blood)** of the large arterial trunks.

The candidate must not suffer from any acute disability of the lungs, nor possess any cicatricial lesion **(a wound or injury containing scar tissue)** of the lungs, and must be free from tuberculosis capable of being diagnosed by the use of clinical methods and, in the cases of examinations for original acceptances, by radioscopy, from tracheo-bronchial **(pertaining to the windpipe or its larger branches)** disease of the glands and from pulmonary emphysema[13], even if slight. However, with regard to the maintenance of efficiency of the pilot, pulmonary emphysema will entail rejection only when marked. In addition, each examination shall include a radiographic record in doubtful clinical cases. When the examination of the spleen and of the ganglionic tract[14] reveals hypertrophy **(enlargement)** of these organs, the candidate shall be declared unfit unless a hematological **(pertaining to the blood)** examination has shown that it is not a case of an original impairment of the hematopoietic **(blood forming)** organs. Hemoglobinury **(presence, in the urine, of hemoglobin, a substance normally found in red blood corpuscles)**, hemophily **(hemophilia, characterized by profuse uncontrollable bleeding)** and purpuras **(affections caused by bleeding into the skin, membranes or internal organs)** shall also entail rejection, unless a hematological examination shows that it is a case of only transitory impairment. The candidate must not present any signs of organic disease[15] of the kidneys; these latter must be insensitive to palpation and be of normal size. The urine must not contain any pathological element. Affections of the urinary passages[16] and of the genital organs, even blennorrhoea **(mucous discharge from the organs of generation)**, may entail temporary unfitness, an exception being allowed as regards the maintenance of efficiency in the case of tuberculous orchi-epididymitis[17] in its mild and localized form.

g. Aneurysm, any location (bulging of arterial walls).

h. Intermittent claudication; Burger's disease; Reynaud's disease; or thrombophlebitis, if there is evidence of circulatory obstruction. (Footnote 58, p. 44.)

i. Schneider index rating persistently less than 8.[82] In such cases special tests will be required by the Chief, Aviation Medical Division.

27. RESPIRATORY SYSTEM (Footnote 59, p. 44.)

a. Active pulmonary tuberculosis; extensive fibrosis; cavitation; pneumothorax; hydrothorax; thoracotomy.

b. Chronic bronchitis; unresolved pneumonia; pulmonary emphysema; bronchiectasis; marked silicosis.

c. Acute fibrinous pleurisy; pleurisy with effusion or empyema.

d. Cysts; abscess or tumors of the lung, pleura or mediastinum.

e. Asthma.

f. Allergic reactions of a degree sufficient to interfere with safe piloting of aircraft.

28. - 29. ABDOMEN GASTROINTESTINAL SYSTEM

a. Wounds, injuries, cicatrices (scars), or ruptured abdominal muscles sufficient to interfere with function.

b. Hernia, any variety (may be approved for private class if properly fitted truss is worn while operating aircraft). (Footnote 60, p. 46.)

c. Undescended testicle, when the testicle is in the inguinal canal, or outside of the canal but lying against the pubic bone. (If the testicle is in the abdominal cavity or if it has been removed, it may be disregarded.) (Footnote 61, p. 46.)

d. Large tumors of the abdominal wall.

e. Chronic peritonitis; peritoneal adhesions which cause symptoms. (Footnote 62, p. 46.)

f. Gastric or duodenal ulcers. (Footnote 63, p. 46.)

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[82] The Schneider Index is a measure of the efficiency of the blood circulation of the examinee. The score depends on pulse rate and blood pressure determinations taken with the examinee reclining and then standing. For second class pilots requirements of this nature are described under Orthostatic tolerance test (paragraphs 24-25, SECOND CLASS, c, pp. 40,42 footnote 53).

PICAO REQUIREMENTS

Physical Standard No. 1

15.3 General surgical examination. The candidate must neither suffer from any wound, or injury, nor have undergone any operation, nor possess any abnormality, congenital **(existing at birth)** or acquired, which might interfere with the safe handling of an airplane at any altitude even in the case of prolonged or difficult flight. He must be completely free from hernia **(rupture)**.

When palpation **(the act of feeling with the hand)** of the abdomen reveals any swelling or distinct pain, the abdominal examination must be completed by a radioscopic and radiographic examination.[10]

Any anatomical lesion in the walls of any part whatever of the digestive tract, and stricture **(narrowing)** of its calibre, any calculus **(concretion such as gall stone)** or foreign body, and peritoneal **(pertaining to the peritoneum)**[11] lesion, established by clinical or laboratory examinations will entail rejection. Exception may be made for spasmodic strictures **(temporary narrowing of the digestive tract due to muscular action)** not accompanied by other troubles and for ptoses **(a falling or sinking down of any organ below its normal position)** compensated by a good abdominal musculature.

Any candidate who has undergone a surgical operation on the biliary passages **(the system of tubes running from the liver and gall bladder to the digestive tube just beyond the stomach)** or the digestive tract, except for appendicitis, involving a total or partial excision **(cutting out)** or a diversion of any of these organs shall be declared unfit unless a period of two years has elapsed since the surgical operation and the effects of the operation are not deemed liable to cause sudden incapacity in the air, or an attestation made by a surgeon having knowledge of the nature of the disease which necessitated the operation, certifies that no immediate or future after-effects are to be feared.

Diseases of the liver (including those of the biliary passages) and of the pancreas will, in cases where it is deemed necessary, be verified by laboratory and other examination, particularly by radiography as well as by an examination of the blood and of the urine, and will entail rejection only if they afford indication of the existence of a calculus, tumour or lesion involving a persistent impairment of function of these organs.

g. Chronic diseases of stomach or intestines.

h. Enlargement of spleen or liver.

i. Chronic or persistent jaundice. (Footnote 64, p. 48.)

j. Fistulae from visceral or bony lesions or following operations or due to congenital defects. (Footnote 65, p. 48.)

k. Acute or chronic diseases of liver, gall bladder, or pancreas.

l. Painful or bleeding hemorrhoids. (Footnote 66, p. 48.)

30. GENITO-URINARY SYSTEM (Paragraph 29, pp. 48, 50.)

a. Nephritis (inflammation of the kidneys), acute or chronic.

b. Hydronephrosis, pyonephrosis, pyelitis, tumors of the kidney, renal calculi, floating kidney. (Footnote 67, p. 48.)

c. Cystitis (inflammation of the bladder), acute or chronic.

d. Vesical calculi (stones in the bladder); tumors of bladder.

e. Tuberculosis of any part of genito-urinary tract. (Footnote 68, p. 48.)

f. Venereal diseases: Syphilis in any stage; gonococcus infections, including arthritis; chancroid; bubo; granuloma inguinale. (See superseding section 30. VENEREAL DISEASE on pp. 54, 56 with footnotes 78 and 79.)

(D) NERVOUS SYSTEM

31. - 34. NERVOUS SYSTEM

a. Multiple stigmata (marks or signs) of degeneration.

b. Chronic alcoholism.

c. Drug habit.

d. Dementia praecox. (Footnote 69, p. 50.)

e. Manic-depressive insanity. (Footnote 70, p. 50.)

f. General paresis. (Footnote 71, p. 50.)

g. Tabes dorsalis. (Footnote 72, p. 50.)

h. Syphilis in any form. (See superseding section 30. VENEREAL DISEASE on pp. 54, 56 with footnotes 78 and 79.)

PICAO REQUIREMENTS

Physical Standard No. 1

Candidates of the female sex must present a normal uterus **(womb; the hollow muscular organ in which the impregnated ovum is developed into the child)** and appendages **(the internal organs of generation associated with the uterus)**. Cases in which surgical operation has taken place will be considered individually. Any presumed pregnancy will entail rejection until, at least, after the pregnancy has been terminated. Following confinement or miscarriage,[18] the holder of a license will be allowed to resume her air duties only after having undergone a new medical examination. The candidate must not present any clinical signs of syphilis.

Dysentery **(a disease characterized by the passing of frequent bloody stools)** shall be considered as an acute disease; provided that a presumption of dysenteric **(pertaining to dysentery)** infections shall entail rejection, unless the medical examiner considers that the clinical phenomena have disappeared.

Physical Standard No. 1

15.2 Examination of the nervous system. The examination of the nervous system of the candidate shall include a full inquiry into family and personal history. The information obtained shall be given in a statement made and signed by the candidate. He must be free from any history of morbid mental or nervous trouble. The candidate must not present any mental, or trophic **(nutritional)** impairment, pathological tremor **(trembling due to disease)**, or presumptive evidence of latent epilepsy. Motility **(movement)**, sensibility **(physical sensation)**, tendinous **(pertaining to tendons or sinews)**, cutaneous **(pertaining to the skin)** and pupillary **(pertaining to the pupil of the eye)** reflexes **(involuntary movements in response to stimulation)**, coordination of movements and cerebellar functions[3] must be normal. An exception may be made for local peripheral trouble due to accidental section of a nerve branch.[4]

i. Multiple sclerosis. (Footnote 73, p. 52.)

j. Paraplegia. (Paralysis of both legs and part of trunk.)

k. Syringomyelia. (Footnote 74, p. 52.)

l. Muscular atrophies and dystrophies. (Footnote 75, p. 52.)

m. Multiple neuritis. (Simultaneous inflammation of many nerves.)

n. Mental deficiency and moronic states. (Footnote 76, p. 52.)

o. Constitutional psychopathic states. (Unlocalized disorders of the mind.)

p. Psychoneuroses (hysteria, neurasthenia, and psychasthenia). (Footnote 77, p. 52.)

q. Epilepsy or marked epileptoid (resembling epilepsy) background.

r. Endocrinopathies. (Diseases traceable to malfunction of the glands of internal secretion.)

s. Peripheral nerve injuries of a type that would interfere with function in handling aircraft.

t. Severe head injuries with or without persistent symptoms. (If there is a history of unconsciousness for any period of time refer to the Chief, Aviation Medical Division.)

u. Neurocirculatory asthenia.[83]

32. VENEREAL DISEASE

FIRST CLASS

LYMPHOGRANULOMA VENEREUM WITH ACTIVE LESIONS - Disqualify until complete healing has occurred, whether spontaneously or as a result of treatment, and for three months thereafter. Persons with a history of the disease, but not evidence of it except positive cutaneous (Frei) or complement fixation tests, may qualify. (Footnote 78, p. 54.)

GRANULOMA INGUINALE (groin ulcer) WITH ACTIVE LESIONS - Disqualify until complete healing has occurred and for one year thereafter. Persons with scars of the disease may qualify.

GONORRHEA, UNCOMPLICATED, ACUTE OR CHRONIC - (1) If treated with penicillin, disqualify only for the day of treatment. Tests of cure are not required. (2) If treated with sulfonamides, disqualify during entire period

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[83] Neurocirculatory asthenia is also known as irritable heart or soldier's heart. Involving nervous and circulatory irregularities, it causes increased susceptibility to fatigue.

PICAO REQUIREMENTS

Physical Standard No. 1

15.1 The candidate will be questioned concerning his family and personal history.

Injuries of the head will be dealt with as follows:

(1) Cases of simple concussion **(brain injury due to a blow or violent shaking)**, or simple fracture of the skull without associated intracranial damage **(injury to the contents of the skull)** will entail temporary unfitness for a period of at least two months from the date of the concussion or fracture. After the candidate has resumed his duties, his license will be rendered valid only for successive periods of two months, until the after-effects no longer appear liable to produce a sudden incapacity in flight.

(2) In the case of severe intracranial injuries, the presence of local lesion **(wound or injury)** of the brain will entail permanent rejection. Any trepanning[5] with loss of the bony substance involving the two tables[6] of the cranial vault **(the rounded portion of the skull)** will entail rejection. The same will apply in case of lesion of the dura mater **(the tough outer membrane covering the brain)**, even after a bone graft.[7]

of sulfonamide treatment and until tests of cure (three negative urine cultures at weekly intervals) are completed.

GONORRHEA, COMPLICATED (EPIDIDYMITIS, PROSTATITIS, ARTHRITIS, ETC.) - (Footnote 79, p. 54.) (1) If treated with penicillin, disqualify for duration of symptoms only. Tests of cure are not required. (2) If treated with sulfonamides, disqualify until symptoms disappear and, in addition, during sulfonamide therapy; and until tests of cure, as above, are completed.

Gonorrheal arthritis which has produced permanent ankylosis (restriction of movement) or deformity which might interfere with operation of aircraft will disqualify.

CHANCROID (infectious venereal sore), WITH OR WITHOUT BUBO (swollen lymph gland) - Disqualify only during presence of active lesions and/or during sulfonamide therapy.

SYPHILIS - All active cases of syphilis are disqualifying. (Note discussion.)

Nothing in our present knowledge of syphilis infection or its treatment leads one to believe that early syphilis, latent syphilis, or benign late syphilis (as defined above) affects the normal physiology of an infected person, whether or not under flying conditions. In general terms, therefore, persons with early syphilis, latent syphilis (whether congenital or acquired) or benign late syphilis, should be eligible for pilot's certification following adequate treatment, having due regard to possible disqualifying effects of treatment (discussed below). On the other hand, those phases of late syphilitic infection which may involve major anatomic structures (the eye, the viscera, the cardiovascular apparatus (heart and blood vessels), or the nervous system) may seriously affect the patient's physical mechanism, whether or not under flying conditions. Therefore, persons with late ocular, visceral, cardiovascular, or neurosyphilis should be disqualified for certification; and in this case the disqualification should be permanent.

A positive Wassermann (complement-fixation) test of any degree in the spinal fluid, discovered at any time and regardless of the presence or absence of symptoms or physical signs of neurosyphilis, should disqualify for pilot's certification.

35. REMARKS

Summarize the favorable or unfavorable factors of the applicant's intelligence, volition, and temperament.

PICAO REQUIREMENTS

Physical Standard No. 1 (Excerpt from section 15.2)

Any syphilis, past or present, affecting the central nervous system (brain and spinal cord) or its blood vessels or its membranes[8] will entail the permanent rejection of the candidate. Any presumed nervous syphilis will entail rejection, unless the non-existence of such an impairment is proved by an examination of the blood and an examination of the cerebro-spinal fluid,[9] made with the consent of the candidate.

Marshall