REMARKS ON THE PHYSICAL REQUIREMENTS OF THE PUBLIC SERVICES.

By KENNETH MACLEOD, M.D., LL.D.,

Brigade-Surgeon-Lieutenant-Colonel, Indian Medical Service (Retired).

THE examination of candidates for employment in Government and other services has, in recent years, become an important item in medical practice. The duty of examining arises in various ways. The medical officers of Government constitute boards and committees for this special purpose, convened under authority and acting under written and traditional rules and regulations. The Civil Service Commissioners appoint special medical examiners to ascertain the physical fitness of candidates for the various civil duties for the performance of which they are entrusted with the selection of competent agents. Sometimes this function is delegated to medical practitioners, who are provided with forms indicating the points regarding which inquiry is to be made and opinions recorded. Medical men are also retained by corporations, societies, companies, and other employers of labour at home and abroad, to ascertain the fitness of candidates for the special work to be required of them under known conditions of locality, climate, and occupation. These conditions constitute the ground of selection, and both employers and examiners are guided by knowledge and experience regarding these in framing standards of competence. The subsequent service history of *employés* supplies an important indication of the propriety of these standards. In the Services, medical officers have had opportunities of observing and being personally subjected to the conditions affecting efficiency; and their duties as regards the treatment of the sick and invaliding enable them to bring to bear upon the question of selection the advantage of the knowledge and experience thus gained. Other special examiners may or may not be in possession of similar qualifications, but they gain valuable aid in training their judgment from the exercise of their functions and from the knowledge which comes to them of the result of their selection.

All medical men are, however, liable to have the duty of examining youths purposing to enter the public services or the employment of agencies requiring evidence of physical fitness entrusted to them. Recruiting officers often submit recruits, in the absence of military doctors, to civil practitioners; and parents and guardians frequently consult their medical advisers regarding the probability of youths being passed by medical boards and examiners.

Family doctors and medical officers of public schools are more likely to be consulted on this subject; but in doubtful cases the opinion of experts is often sought, and the duty of advising as to physical fitness is thus one which any medical man may be called upon to perform. Indeed it cannot be too strongly urged that every youth intended to be educated for any service or employment for which evidence of physical fitness is required should, before entering on the course of study or training necessary for qualifying for such, be subjected to a very careful medical examination. The regulations of the Navy and Civil Service Commission explicitly recommend this course. Loss of time and money, disappointment, perplexity, and damaged life prospects too frequently result from the rejection on medical grounds of a candidate otherwise well qualified, or who has actually passed the necessary literary and technical examinations.

In view of this preliminary physical examination, the necessity of which is becoming yearly more apparent, a knowledge of the physical requirements of the public services, and of the best and easiest methods of ascertaining whether a boy is likely to pass the ordeal of medical boards or special examiners, has become indispensably necessary for the medical practitioner. Having obtained both at home and abroad a large and varied experience in examining candidates for military and civil service, and being in a position to watch the effects of climate and employment on those selected, I propose in this paper to offer such information and suggestions resulting therefrom as may perhaps guide and assist civil practitioners in exercising the very important duty of advising parents and guardians as to the probability of their sons being found physically qualified by official examiners.

THE OBJECTS TO BE HELD IN VIEW.

The points to which an examination of this kind tends are threefold—competency, efficiency, and pensionary liability. In deciding on these issues some knowledge of the nature of the occupation, and of the circumstances and risks, climatic and otherwise, under which it is to be pursued is essential. The proceeding resembles an examination for life insurance, and turns on similar considerations; but viability is the dominant question in the one case, efficiency in the other. A man's life prospects may not be impaired by blindness, deafness, or the loss of a limb, but his competence for work is in most cases ruined by either infirmity. The formula laid down in the regulations for the Indian Civil Service defines the matter tersely and clearly; they require that a candidate "has no disease, constitutional affection, or bodily infirmity unfitting or likely to unfit him for the Civil Service of India." Similarly the Army Regulations require candidates "to be in good mental and bodily health, and free from any physical defect likely to interfere with the efficient performance of military duty." Naval cadets "must be in good health and free from any physical defect of body, impediment of speech, defect of sight or hearing, and also from any predisposition to constitutional or hereditary disease or weakness of any kind, and in all respects well developed and active in proportion to age."

The question in relation to life insurance is: Is the applicant likely to live for so many years? The questions with reference to the public services are: Is the individual fit to perform the work for which he tenders himself? Is he likely to retain health and strength during a certain number of years? And, is there any undue risk of loss of service by sickness or premature pensioning from failure of health and capacity? But though the issues differ somewhat, the data and methods by which they are tried are the same. In life insurance the decision turns on facts relating to (1) family history, (2) personal history, (3) present condition, and (4) previous and probable future occupation, habits, and environment. These are precisely the points which have to be considered in examining candidates; but as a matter of practice greater weight is attached to the result of personal examination and the nature and circumstances of employment, and less to family and personal history than in insurance cases. In some instances candidates have to fill up forms and declarations in which these points are included; but the testimony sought is less elaborate and searching than that demanded by life offices. In all cases of doubt inquiry should be made and is made regarding these matters even if formal documentary evidence is not asked for. The physical requirements of the public services may therefore be considered under the heads of heredity, previous illness, physique, and soundness, and on each of these subjects I shall offer a few practical remarks, taking the rules issued by the Army, Navy, and Civil Service Commission as a basis.

HEREDITY.

Constitution is mainly a matter of inheritance, especially in the adolescent, and a transmitted proclivity to disabling disease is unquestionably a strong ground of caution and increased care in examining. A small chest with insufficient expansion, subclavicular flattening, and increased vocal resonance over either apex has a very different significance when there is a tuberculous family history than similar con-

ditions in a puny overworked, and perhaps underfed, lad of healthy parentage. An irritable heart in a subject belonging to a rheumatic or gouty family is a more serious matter than when these predispositions are absent. A "nervous" manner acquires a peculiar interpretation when there is a family history of insanity.

Illustrations might be multiplied, but, while it would be unwise to lay too great stress on inherited proclivities and the probabilities of reappearance of parental infirmities, the question of inheritance of physical traits and tendencies can never be overlooked, and may turn the balance one way or other in a particular case, say, of glandular cicatrices or puffy joints. The regulations of the Navy require a candidate to be "free from any predisposition to constitutional or hereditary disease," and the rules of the Civil Service Commission indicate "a weak constitution arising from imperfect development or weakness of the physical powers of the body, hereditary or otherwise," as a probable cause of rejection. Many of the special diseases and infirmities included by the rules of the Army, Navy, and Civil Service among disqualifying conditions are of the constitutional and inherited class. The importance, therefore, of paying strict attention to the family history of candidates is obvious.

PREVIOUS ILLNESS.

This may be—(1) a manifestation of constitutional vice; (2) of a kind which is liable to recurrence, and therefore likely to give rise to inefficiency; (3) a cause of permanent and disabling organic disease or functional derangement; or, (4) on account of its nature, severity, or long duration, the source of irretrievably damaged general health. From these points of view the necessity of gaining information regarding the medical history of the individual is clear. The forms and declarations required by some services are framed to procure evidence of this sort, and the Army and Navy instructions for the examination of candidates require the examiner to take notice of indications of previous injury and disease. These indications should lead to careful questioning, and the bearing of the result of such observations and inquiries on the question of selection ought to be well weighed. Signs of blistering over heart or lungs, or of leeching or cupping over the liver, would obviously render examination of these organs doubly searching; and similar marks on the loins would render an examination of the urine imperative. The exanthemata constitute an ordeal by which constitutional soundness is tried, and survival, unscathed, of the incidents and diseases of infancy, childhood, and puberty is justly accounted evidence of good life. Some ailments, such as hæmoptysis, dropsy, or jaundice are of peculiarly sinister significance, and if confessed or discovered should lead to very special inquiry and caution.

Generally, the subject of previous illness and its probable influence on efficiency must in all cases command an important share of the examiner's attention, and bring into exercise his knowledge and experience with special reference to the objects of his examination.

PHYSIQUE.

This is a question of quantity and quality—bulk and power. It has been found impossible to lay down very precise rules, or fix very rigid standards on the subject. Attempts have been made by means of anthropometry to define the typical man, and lay down a system of "physical equivalents" for different ages. But human beings present such great variations in adaptation to such varied conditions of existence—which variations become in time stereotyped into racial, national, and family distinctions—that a large latitude must be allowed in applying figures representing size, bulk, and weight to the determination of physical aptitude. To take an illustration from India, where racial characters are more sharply defined than in Britain, it would be absurd to apply the same standard to the Gorkha, the Jat, the Sikh, and the Pathan; and even in this country, where races originally distinct have become so complexly blended, more or less typical representatives may still be found of, say, the Scandinavian and the Celt, whose physical equivalents, each admirable in their way, are profoundly different. It is necessary, therefore, in endeavouring to arrive at a

just estimate of physique, especially of the prospective physique of young subjects, to bear questions of race, nationality, and parentage in mind. For example, the youngest members of large families and the offspring of aged parents are apt to be less robust than children begotten in the prime of parental vigour. Still greater difficulty has been found in trying to frame standards of alacrity, power, and endurance, qualities which are not necessarily proportionate to size and bulk. It was at one time thought feasible to appraise physical and physiological excellence by a system of marks, but the evidence collected by Lord Sandhurst's Committee clearly established the impracticability of this. The examiner must, therefore, be guided in forming an opinion of a candidate's physique not by rigid anthropometrical standards, but by every consideration which reveals the strength, soundness, and capacity of the stock to which he belongs, and the extent to which the life-history of the individual has caused maintenance thereof or departure therefrom. In the Army it has only been found possible to lay down minimal standards of the three cardinal physical equivalents of height, chest girth, and weight for the age at which recruits are usually enlisted, namely, 18 to 25. The minima are—height, 5 ft. 4 in.; chest girth, 33 ins.; and weight, 115 lbs. These standards apply to commissioned officers of all arms, who are expected to have attained it when they are commissioned. When examined some time before obtaining commissions, as at entry to Sandhurst or Woolwich, they must present such a degree of development for age as to offer reasonable prospect of the standard being attained or exceeded by the time they are commissioned. The physical requirements for soldiers vary according to the arm for which they are recruited. While a height of 5 ft. 3 in. and chest girth of 33 in. is sufficient for admission into the Army Service Corps, Ordnance Store Corps, and Medical Staff Corps, a minimum height of 5 ft. 11 ins. and chest girth of 36 ins. are required for the Household Cavalry. These are the extremes. Intermediate standards are laid down for other branches, and the chest girth rises with the height. The data are laid down in orders, which vary from time to time as the supply of recruits is plentiful or the reverse. These measurements are made by the recruiting staff rather than by the medical examiner, but the latter should, in all cases, make and record them.

In measuring the chest the upper margin of the tape should lie just below the inferior angles of the scapula behind, and the lower margin just above nipple in front. It should not be drawn so tight as to compress or indent the surface. The girth should be read and noted at the extremes of ordinary respiration or at the moment of emptying and filling of the chest with the tidal air. The lesser figure, which represents a resting chest, which is always empty, is taken as the chest measurement for recruits; and the difference between the two represents the play or expansion of the chest in breathing. It is usual to signify the result of measurement fractionally thus— $33\frac{1}{2}$. Sufficient emptying can be obtained by causing the recruit to count from 1 to 10 slowly. Forced respiration, or the admission and expulsion of the so-called complementary air, gives wider extremes, and a mean between them represents the average chest, thus $33\frac{1}{2}$ —34. Fractions below $\frac{1}{2}$ are disregarded. The height is taken with the feet uncovered, heels together touching the floor, and heels, calves, buttock, scapulae, and occiput touching the backboard. The headpiece should touch, but not compress, the scalp. The weight recorded should be that of the unclothed body.

The bulk and hardness of the muscles, symmetry and shape of trunk and limbs, texture and colour of skin, expression of face and eyes, state of hair and teeth, and tone of circulation will aid in forming a just estimate of physique. For some employments, such as that of postman, the Civil Service Commissioners insist on a robust constitution, even if signs of previous or present disease are absent.

The following statement, condensed from a table quoted from Charles Roberts, F.R.C.S., in Sir William Aitken's work on *The Growth of the Recruit and Young Soldier*, may be useful in indicating the physical equivalents of different ages. It also shows the amplitude of variations from the mean and how these physical equivalents depend on the conditions of birth, and the upbringing of the subject.

*Height, Weight, and Chest Girth in relation to Age.
Non-labouring Classes:*

Age.	Height (in inches).			Weight (in pounds*).			Empty Chest Girth.		
	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.
17	76.5	67.8	56.5	189	141	87	40.5	33.98	27.5
18	77.5	68.3	59.5	203	146	101	41.5	34.44	29.5
19	77.5	68.7	60.5	203	148	108	41.5	34.77	29.5
20	76.5	69.1	63.5	189	152	115	41.5	35.25	29.5
21	74.5	69.2	62.5	203	152	115	42.5	35.42	30.5
22	75.5	68.9	62.5	189	155	115	40.5	35.30	30.5
23	74.5	68.5	64.5	178	152	115	40.5	35.50	30.5
24	73.5	68.9	64.5	203	149	115	41.5	36.10	31.5
25-30	74.5	69.1	63.5	203	155	115	42.5	35.96	30.5

Labouring Classes:

Age.	Height (in inches).			Weight (in pounds*).			Empty Chest Girth.		
	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.
17	71.5	64.5	56.5	157	116	73	33.5	29.38	24.5
18	71.5	65.5	55.5	178	123	73	34.5	30.07	25.5
19	71.5	66.1	61.5	178	128	101	35.5	30.56	26.5
20	71.5	66.3	62.5	157	131	101	34.5	30.86	26.5
21-22	71.5	66.6	62.5	171	135	104	35.5	31.61	29.5
23-30	72.5	66.7	61.5	189	139	101	36.5	32.38	29.5

* Subtract 7 to 10 pounds for clothes.

SOUNDNESS.

Organic integrity and functional rectitude are the end and aim of the personal examination which constitutes the principal duty of the examiner. To catalogue all the conditions of disease or disorder which may reasonably be held to disqualify for service—naval, military, or civil—were to detail a complete nosology. Grave changes of structure and disturbances of action present no difficulty and require no notice. It is those slight, or temporary, or remediable ailments—more especially functional disturbances—which stand on or near the uncertain boundary separating health from disease, which give trouble and hesitation as to whether they incapacitate or are likely to incapacitate. Holding this general principle in view, a few practical remarks on the points specified by the published regulations of the services may be usefully arranged under the anatomical and physiological systems of the body.

CUTANEOUS SYSTEM.

The general aspect of the skin, its smoothness, colour, and firmness, is a good indication of constitution and health. Scars or marks caused by suppurated glands, injuries, ulcers, eruptions, or remedial applications should be carefully noted, and the suspicions which they may suggest followed up by inquiry. As regards eruption the Army regulations pronounce "inveterate skin disease and chronic ulcer," the Navy "skin disease unless trivial or temporary," and the Civil Service "chronic eruptions on skin or scalp," to be disqualifications. These definitions permit considerable latitude for the exercise of discretion. Traces of corporal punishment should be looked for in recruits, and noted if found. Tumours or glandular swellings should, if present, be specially examined and considered. A small simple tumour, if successfully removed, would probably not disqualify. Glandular swellings, unless caused by a temporary local irritation in a person otherwise of sound constitution, are always looked upon with suspicion, and would probably lead to rejection or conditional acceptance. Marks of vaccination should be carefully examined, and their character noted as good, bad, or indifferent. In the Army and Navy revaccination is resorted to unless the marks are thoroughly satisfactory and recent.

NERVOUS SYSTEM.

A thorough examination of the scalp and skull, with a view to the detection of scars and signs of fracture, should be made. Fits of any sort are a disqualification as also paralysis of motion or sensation or any defect or disorder of intellect. Spinal disease or deformity also disqualifies. A question

may arise as to the probability of a slight degree of stoop or lateral curvature being held to disqualify for sedentary employment such as that of clerk, typewriter, or the like. The point would probably be considered in relation to age, general health, and constitution. For the Army or Navy any but the very slightest degrees of such conditions, due to bad habit and remediable by gymnastics and drill, would ensure rejection, and for such services as the customs, police, etc., the same rule would probably apply.

RESPIRATORY SYSTEM.

Disease of the bones and cartilages of the nose and polypus are specified as disqualification. Perhaps a single mucous polypus, successfully removed, if rhinoscopy, scraping, or burning gave reasonable assurance of nonrecurrence, would not bar acceptance. Any decided organic disease of pleuræ, lungs, or air tubes, tuberculous or otherwise, would necessarily be prohibitive, but it is with regard to suspicious cases of delicate lung, indicated by defective girth and antero-posterior depth, insufficient expansion, local or general, sub-clavian flattening, increased vocal resonance, and perhaps prolonged expiration, that difficulties arise. The family and personal history should be made the subject of strict investigation in such cases, the general physique and condition looked to, the fauces, tonsils, and pharynx inspected, and inquiries made as to hæmoptysis, cough, and the effects of exercises and sports. Recurrent attacks of chest disease of any sort, even without any sign or trace of organic change, would probably be held to disqualify; and any actual present disease, even a slight bronchial catarrh, would probably cause hesitation and postponement of acceptance. Asthma, dyspnoea, aphonia, and chronic cough are specially mentioned in the naval regulations as causes of rejection. In short, sound lungs and normal respiration are required by all the public services, and would probably be expected in candidates for quasi-public or private services as well.

CIRCULATORY SYSTEM.

The regulations of the public services indicate functional disorders as well as organic diseases of the heart and blood vessels as disqualifications. Any organic lesion of pericardium, heart, or valves, even if neutralised by compensatory adjustments, would bar acceptance.

Lame and damaged hearts may be and often are consistent in civil life with useful employment and longevity; but under the physical and climatic exigencies of service such hearts are apt to give way, and the compensatory arrangements to fail. So called functional murmurs, or even excitability or irregularity of the heart's action, may cause rejection. The argument that the subject is out of health, or has been working or smoking hard, or suffers from indigestion, and that the disorder is temporary and due to such transient causes is met by the consideration that service conditions may prove even more potent and disastrous causes of disabling circulatory disturbance. Pure nervousness may, however, seriously disturb the working of a heart, and patience and repeated examination after rest and reassurance may be necessary. But it should be borne in mind that a heart and circulation which are sufficient for the demands of civil life in temperate latitudes are often unequal to the strain of military and naval service in tropical climates, and that undue palpitation or irregularity may of themselves justify rejection. Varicocele and varicose veins are disqualifications unless they are slight and remediable by operation. If the varicocele is small and unilateral, or the varicosity of superficial veins limited, candidates may be accepted conditionally on subsequently presenting evidence of complete cure.

DIGESTIVE SYSTEM.

The teeth must be carefully overhauled. They evidence soundness of the constitution or the reverse, assist in the determination of age, and their efficiency as organs of mastication is often put to severe test on service. The Army regulations require that "the teeth are in good order, loss or decay of many being considered a disqualification." The Navy regulations specify "many unsound teeth and unhealthy gums as a cause of rejection." The loss or decay of ten teeth disqualifies for the Navy, but the general condition of the whole set is also scrutinised. It cannot be too strongly

impressed that a periodical inspection of the teeth of young persons should be made by a professional dentist, and faults remedied as they arise. Artificial substitutes are not accepted in the Army or Navy, even when the loss, if excessive, has occurred through injury and the gums are sound. "Disease of throat, palate, or tonsils" is specified in the Civil Service and Navy rules as disqualifying. Probably severe, permanent, or constitutional disease is meant. Enlarged tonsils and adenoid vegetations should be dealt with by operation in the young, as they are so apt to give trouble in after-life, and if excessive would probably lead to rejection. The Naval and Civil Service regulations indicate "any disease of the stomach and bowels" as disqualifying. Slight and temporary disorder would probably not come under that definition. Fistula, prolapsus, or ulcer of rectum, or piles, would also disqualify, as also enlargement of liver, spleen, or mesenteric glands. For some employments a baggy, distended abdomen would disqualify without actual disease.

RUPTURE.

Rupture of any kind disqualifies absolutely for the Army or Navy, or even a tendency thereto, as indicated by unduly wide rings or perceptible impulse. The Civil Service rules state that "for clerkships and some other sedentary occupations a properly supported rupture may not be a disqualification." Question may arise regarding a rupture that has been apparently cured by operation. The degree of closure of ring and absence of impulse, the length of time that has elapsed since operation, and the tests or strain to which the part has been subjected would determine the completeness and permanence of the cure or otherwise.

URINARY SYSTEM.

"Disease of the kidneys or bladder and incontinence of urine" are mentioned as disqualifications in the Navy regulations, and fistula in perineo in the Army. Sound kidneys are required by the Civil Service rules. In any suspicious case the urine is examined. In private examinations this ought invariably to be done.

GENITAL SYSTEM.

The naval rules specify "any defect of genital organs" as a cause of rejection, and the Army regulations, "undescended testes and venereal disease." Stricture of the urethra, however slight, would certainly bar acceptance. A previous attack of gonorrhoea, if perfectly recovered from, would not disqualify; but very clear evidence of proper treatment and complete cure of syphilis, and absence of any active manifestation for at least a year, would probably be required.

MUSCLES, BONES, AND JOINTS.

The Army and Navy regulations, of course, insist upon the absence of deformity, malformation, or asymmetry of trunk or limbs—congenital, constitutional, traumatic, or otherwise; on the limbs being well formed and fully developed, the joint movements being free and perfect, and the hands and feet, fingers and toes being healthy, and in all respects efficient. An elaborate drill is laid down by the army regulations for examining recruits. The private practitioner will, however, be able to satisfy himself as to the soundness of the locomotor system without slavishly adhering to this drill. The examination should, however, be thorough, and the inspection conducted after all clothing has been removed. The state of hands and fingers, feet and toes should receive special attention. Any degree of talipes or pronounced flat foot, or any angularity or other distortion of toes, even bunions—any condition, in short, likely to interfere with marching—is held to be a disqualification for naval and military service. The condition of "hammer toe," unless completely cured by operation, would disqualify. I would here urge strongly the necessity of giving young people boots of easy fit and rational shape. The requirements of the Civil Service are not so rigid, but "the existence of any serious congenital or acquired defect or malformation (especially in head, hands, or feet), paralysis, weakness, considerable lameness, impaired motion or contraction of the upper or lower extremities from whatever cause, distortion of the spine and of the bones of the chest or pelvis from injury or constitutional defect," are specified as disqualifying conditions.

VISION.

The absence of present or progressive disease of the eye and ocular apparatus is essentially necessary, but some degree of refractive error, corrigible by glasses, is allowed for some occupations, and even slight impairment of vision of one eye caused by previous injury or disease, if there is no probability of aggravation or recurrence, is in some cases permitted. The Navy demands perfect sight for sailors and engineers—officers and men; chaplains, medical officers, and clerks are allowed some degree of refractive error, the kind and amount being left to the discretion of the medical board. Recruits for the Army are examined by means of dots corresponding, at 15 feet, to a target measuring 3 feet in diameter seen at a distance of 600 yards. Officers of the Army are tested according to the standard noted below. The Civil Service Commissioners permit a moderate degree of ordinary short sight "except for the Customs outdoor service." Loss of one eye by injury, the other being sound and likely to remain so, is made the subject of special consideration.

The public services of India have had standards of vision carefully prepared by Sir Joseph Fayrer, assisted by experts, and sanctioned by the Secretary of State for India. These standards are shown in the following statement, together with those for the Army, Navy, and Civil Services.

ROYAL NAVY.

Perfect form and colour sight and normal accommodation required. Refractive defects, squint, or defective action of the external muscles of the eyeball disqualify. [A moderate error of refraction is allowed for chaplains, medical officers, and clerks.]

INDIAN PILOT SERVICE.

Same as the Royal Navy.

INDIAN MARINE SERVICE.

(Including Engineers and Firemen.)

Refractive error up to 1 D + or - allowed. Colour blindness or paralysis of external muscles of eyeball disqualify.

ARMY.

Must read D = 36 (Snellen, 1892) at 6 metres or 20 feet, with each eye separately without glasses; and D = 0.8 with one or both eyes without glasses at any distance. Must read $\frac{1}{2}$ and $\frac{1}{4}$ with glasses. Squint, inability to distinguish the primary colours, or any morbid condition, subject to the risk of aggravation or recurrence, in either eye, disqualify.

INDIAN MEDICAL SERVICE.

Myopia up to - 5 D allowed if vision = $\frac{1}{2}$ and $\frac{1}{4}$. Myopia with posterior staphyloma, if corrected by - 2.5 D to same standard, permitted; also myopic astigmatism if corrected by combined lenses not exceeding 5 D and V = $\frac{1}{2}$ and $\frac{1}{4}$. Hypermetropia and hypermetropic astigmatism up to 5 D if V = $\frac{1}{2}$ and $\frac{1}{4}$. Same rules as regards colour blindness and paralysis of muscles. Nebula of one eye up to $\frac{1}{2}$ allowed if the other is emmetropic.

INDIAN CIVIL SERVICE

(Including Ecclesiastical, Education, Salt, and Opium.)

Must see $\frac{1}{2}$ with one eye and $\frac{1}{4}$ with the other, with or without glasses, if no morbid change in retina. Myopia with posterior staphyloma does not disqualify if ametropia in either eye does not exceed 2.5 D, and no active disease of choroid or retina be present. Nebula in one eye up to $\frac{1}{2}$ does not disqualify if the sight of the other equals $\frac{1}{2}$ with or without glasses. Paralysis of external muscles disqualifies. Amblyopia from cured strabismus and unequal ametropia, corrected by glasses up to $\frac{1}{2}$ and $\frac{1}{4}$, does not disqualify if movement of both good.

INDIAN PUBLIC WORKS,

(Telegraph, Forest, Railways, Factories, Police and Artificers.)

Myopia up to - 2.5 D allowed, provided vision equals $\frac{1}{2}$ and $\frac{1}{4}$, and accommodation with glasses is normal; same rule for myopic astigmatism, combined glasses not to exceed 2.5 D, accommodation with glasses good, and no progressive disease of choroid or retina. Hypermetropia (total) up to + 4 D allowed if sight with atropine equals $\frac{1}{2}$ and $\frac{1}{4}$; same

rule as regards hypermetropic astigmatism. Nebula up to $\frac{1}{2}$ allowed if other eye is emmetropic. Colour blindness and paralysis of external muscles of eyeball disqualify.

EXAMINATION OF VISION.

The examination of vision is conducted by means of Snellen's types, which are constructed on the principle of a visual angle of 5' for the whole letter and 1' for the strokes or lines forming the letter. The distance in metres at which each letter should be read is affixed to it, and the numerator of the fractions above given indicates 6 metres, or 20 English feet, the distance—a convenient one—at which the examinee is placed from the sheet on which the types are printed. The denominator indicates the particular type which can be read at that distance; $\frac{1}{4}$ indicates that type No. 6 can be read at 6 metres, and $\frac{1}{36}$ that type No. 36, which ought to be visible at 36 metres, is the smallest that can be seen at 6 metres. The fraction therefore indicates the amount of acuteness of form vision possessed by the eye; $\frac{1}{2}$ would indicate $\frac{1}{2}$, or 50 per cent. of normal vision. The examiner should possess some + and - lenses. The perception of colour is generally tested by means of Holmgren's wools, and the candidate should be made to match as well as name the colours. The correct perception of red and green is the most important point. The practitioner should have no difficulty in ascertaining and certifying normal vision; but in cases in which any abnormality of form or colour vision, refractive or otherwise, exists a thorough examination by an expert should be made, and his report, the exact refractive error of either eye and the glasses prescribed, should always be taken to the examining board by the candidate. Each eye ought of course to be separately examined by covering the other. Strong accommodation sometimes conceals a moderate degree of hypermetropia, and when accommodation is weakened by study or sickness defective vision, hitherto unsuspected, is revealed. This circumstance may lead to disappointment, and a special examination for possible hypermetropia by means of atropine or the use of a convex lens should always be made. The convex lens in such cases improves or at any rate does not impair vision.

HEARING.

"Impaired hearing, or discharge from one or both ears, or any disease of the external ear," is the formula used in the naval regulations. The Civil Service rules are almost identical, and the Army requires good hearing. The soundness of this sense is easily ascertained by ordinary conversation. If any doubt arises the hearing of each ear must be tested separately by means of a watch or tuning fork. The use of a second still watch may be advantageous in some cases.

SPEECH.

The importance of strong voice and ready accurate articulation in persons who have to give words of command quickly or under circumstances of emergency is obvious. The Army and Navy regulations, therefore, indicate "impediment of speech" as a cause of rejection. The Civil Service regulations are less absolute. "Stammering is in some respects a question of degree and of the duties of the proposed situation, but any considerable impediment in speech renders a candidate generally liable to rejection." A teacher or lecturer must necessarily possess a sound and ready faculty of speech.

DISCRETION.

Questions of physical fitness for various occupations under varying circumstances cannot all be anticipated or defined by rigid standards. A certain measure of discretion must therefore remain with examining boards and examiners regarding those minor infirmities which may or may not be held to disqualify, and the process of balancing is often a very delicate one. No doubt even as regards these, unwritten rules arise through practice and experience, and some degree of uniformity and continuity results, but a certain elasticity of judgment is inevitable in doubtful cases. Employers likewise reserve for themselves an option to accept or reject, and do not consider themselves necessarily bound by the advice received from medical boards and examiners. Parents and their advisers must be prepared for disappointment under circumstances of doubt.

CONFLICTING INTERESTS.

Official examiners act in the interests of their employers, and naturally incline to give them the benefit of well-founded doubts, while private medical advisers are prone to adopt the view most favourable to their clients; hence arises every now and then unpleasant criticism and antagonism. Official examiners, as far as my experience goes, are always ready and pleased to receive aid in the form of statements and certificates from family doctors and experts, and to give them due consideration and weight. Such statements should be representations of facts and not, as is too often the case, mere expressions of opinion or anticipations of a judgment which it is the business and duty of the examiners to form. The responsibility of advising selection or rejection rests with them, and they are generally in the best position to give due attention to the requirements of the service which they represent. In respect to these they indeed occupy the position of experts.

Differences of opinion between official examiners and private advisers arise not so much or often as regards questions of fact as with respect to the interpretation of, say, a cardiac murmur and the bearing of an admitted abnormality—defect or disease—on the question of future efficiency. When sound subjects can be obtained, it is unreasonable to expect employers to accept the unsound or doubtfully sound, and this consideration becomes of peculiar importance when the employer is the State and the servant a soldier or sailor.

Military and naval authorities will not willingly accept weedy, edentulous, or purblind officers or men when they can get robust youths with good instruments of mastication and sight. The best way of avoiding unpleasant conflict in these matters is to take measures that every fact relating to the physique and health of the candidate, whether favourable or unfavourable, shall be frankly and fully placed before the examiners, who are influenced by a generous desire to treat lads fairly and kindly as well as by a conscientious regard to the interests of the service on whose behalf they act. The worst thing that can happen in cases of rejection is the imputation to official examiners of incompetence or partiality—an attitude which is at once unjustified by the fact and inconsistent with that spirit of benevolent altruism which constitutes the ruling motive of the medical profession.

REMARKS

ON

THE NATURE AND TREATMENT OF PERNICIOUS ANÆMIA.

By RALPH STOCKMAN, M.D., F.R.C.P.E.,

Lecturer on Materia Medica and Therapeutics in the School of Medicine, Edinburgh; Assistant Physician to the Royal Infirmary.

(Continued from page 967.)

III.—THE IMMEDIATE CAUSE OF THE CONDITION.

SUCH causes as those mentioned in the first portion of this paper have generally been regarded as remote or predisposing, while the immediate cause has been set down by all writers hitherto, either to deficient blood formation or to excessive blood destruction.

Dr. Bradbury¹ thinks the destruction of red corpuscles so excessive that the blood-forming organs cannot regenerate them in sufficient amount. Pepper² has proposed the name "anæmatosis," for the condition to indicate his opinion that it is due to nonformation of blood, while Quincke is undecided which it may be. Pye-Smith holds it to result from a too rapid and extensive destruction of the red discs; and Mott,³ that it consists essentially in an excess of the normal blood-destroying function of the liver and spleen.

In passing I may protest against the assumption by Dr. Mott and others that the liver and spleen have ordinarily (or even in disease so far as we definitely know) any blood-destroying function. Red blood corpuscles probably disintegrate, just as any other tissue disintegrates, when they become old and effete, and there seems no special reason why they should be actively destroyed by any