cited as causes of such irritation. Saemisch has mentioned cases which were caused by the imprisonment of sensitive nerve filaments in cicatrices. In neuralgia of the different branches of the fifth nerve sensitive points can be found, pressure upon which will often arrest the spasm. These spots may be situated at the point of exit of the nerves from their foramina, or may be located some distance from the affected muscle, as at the back of the neck, over the spines of the vertebræ. Romberg found that pressure upon the facial nerve at its exit from the stylo-mastoid foramen would arrest the spasm in some cases. The patient often discovers where these pressure points are situated, and will avail himself of this knowledge to obtain relief. Pressure upon certain parts of the body has been known to bring on blepharospasm, as in the case reported by Zehender, in which pressure in the region of the first cervical vertebra induced it. Cases like this one are undoubtedly of hysterical origin. Indeed, not a few cases of blepharospasm are of hysterical nature. The spasm may be caused primarily, in these subjects, by traumatism, by a carious tooth, or by a foreign body in the conjunctiva, cornea, auditory canal, etc. Its continuation after removal of the cause and disappearance of all irritation would indicate its hysterical character. It is usually binocular, tonic in character, and rarely preceded by clonic move-ments. Its disappearance is as sudden as its invasion, and its duration varies greatly. Dr. Charles Lasègue cites a case of monocular hysterical blepharospasm, caused by traumatism, which lasted four months, while the immediate effects of the traumatism lasted but twentyfour hours. A constant twitching of the upper lids re peated about twice a second is characteristic of hysteria, and is believed by Knies to be due, like nystagmus, to a weakening of the motor cortical innervation of the muscles. Anæsthesia of the palpebral skin may be noticed as an accompanying symptom, as shown by Gilles de la Tourette. In anæmic and nervous children blepharospasm occurs as the commencement of general chorea. The habit-chorea (Weir Mitchell), which commences in childhood, ceases after a few months or years, although it occasionally goes on to middle life. When it commences in middle life it is generally permanent. It is more common in females, following some impairment of the general health, fright, injury or overwork, and in boys, as the result of masturbation. Imitation can bring it on and observation increases it. Refractive errors, follicular conjunctivitis, and blepharitis are also found as frequent causes. It is often associated with symptoms of hysteria in young women, making it difficult to de termine to which disease the spasm properly belongs. Anæmic women occasionally present a clonic monocular spasm, due to the general debility induced by uterine

Prognosis.—The prognosis in blepharospasm is uncertain except where it is due to hysteria, traumatism, conjunctival or corneal disease. Prolonged contraction may involve serious consequences to the eye, through the pressure of the lids causing definite lesions of the choroid or retina.

TREATMENT.—The treatment of blepharospasm resolves itself into treatment of its causative conditions. A careful search should be made for foreign bodies in the conjunctiva, cornea, nose, and ear. If conjunctivitis and keratitis, particularly of the phlyctenular variety, are present, they should be carefully treated. Cocaine, while often of value in relieving blepharospasm and rendering the examination of the eye easier, should be avoided in cases in which there are corneal ulcerations; holocain should be used instead, in one-per-cent, solution. The dilatation of the pupil with consequent increase of the photophobia, owing to the hyperæsthesia of the retina and the softening of the corneal epithelium following the use of the cocaine, are avoided by the substitution of the holocain, the latter being primarily an anæsthetic and secondarily an antiseptic. In cases in which the spasm persists after the conjunctival and corneal disease has been cured, forcible opening of the pal-

pebral fissure, during chloroformization, with canthotomy if necessary, and the dropping of iced water on the exposed eyeball at half-hour intervals, will usually suffice to produce a cure. These children should not be allowed to remain in the dark, nor should dark glasses be given. Fissures of the canthi may be touched with a crystal of sulphate of copper or with nitrate of silver, and the accompanying nasal disease, when present, should be In cases in which eserin is seemingly indicated it may be found that the spasm is increased by its use, eserin having been known to cause violent blepharospasm. De Wecker recommends its use as a curative agent, believing that it diminishes the tendency to reflex trans-Errors of refraction must be corrected under atropinization, and muscular errors should be carefully remedied. In cases due to irritation of some branch of the fifth nerve, careful search must be made for pressure points. Hypodermic injections of morphine, in doses of from gr. $\frac{1}{16}$ to $\frac{1}{3}$, may be made at these points. Conium, in the form of the fluid extract, may be given in doses of ten drops, from three to six times daily, until the physiological effects of the drug are shown. The extract of conium may at the same time be used externally in the form of an ointment. Gelsemium may be found of benefit in the cases of true tic doloureux. Galvanism, used after the method of Remak, the negative pole being applied over the muscle and the positive over the fifth cervical vertebra, is sometimes efficacious.

The careful examination of the mouth and teeth by a competent dentist should always be insisted on, the patient often being unaware of the presence of dental or buccal trouble. Other remedies having failed, and pressure upon sensitive points having been found to give relief, division of the offending nerve may be prac-This operation was first performed by von Graefe in a case following the lodgment of a foreign body in the folds of the conjunctiva. The nerve divided was the supra-orbital, and success followed the operation.

The supra- and infra-orbital nerves should be divided at their exit from their respective foramina, the temporal branch of the malar in the temporal fossa, and the inferior dental in the mouth. The nerve should be completely cut through; in fact, some authorities think that a better result is obtainable by the excision of 1 to 2 cm. of the nerve. The relief given by section of the nerves is not always permanent, the spasm after a short period returning and being accompanied by the development of new pressure points. This is particularly true in senile blepharospasm. Excision of a portion of the nerve is productive of more lasting relief, although it gives rise to a prolonged anæsthesia of the region supplied by the nerve. Stretching of the nerves has been advocated by Panas. Dieffenbach practised subcutaneous division of the orbicularis muscle, but without much success.

Treatment of hysterical blepharospasm is decidedly unsatisfactory. Tonics, sea bathing, the use of the appliance devised by Mathewson and used with success by Strawbridge, and the application of the Charcot magnet with suggestion, may be tried. The device of Mathewson consists of a rubber band fastened to the upper lid below, and to the forehead above. The constant traction eventually overcomes the resistance offered by the muscle. Arsenic given internally, or hypodermically, as suggested by Weir Mitchell, appears to be the most efficacious remedy in the cases of habit-chorea.

C. Cole Bradley.

BLINDNESS.—(Lat., Cacitas; Ger., Blindheit; Fr., Areuglement.) Amaurosis is sometimes used synonymously with blindness, and in selected cases—the cause of which is obscure, or is located in the nervous apparatus—this is admissible, with the same limitations that apply to blindness. Blindness is a misleading term, being a symptom only, and should not be used in scientific language (except in a generic sense) without a qualifying phrase which describes the condition upon which it depends—as blindness from optic-nerve atrophy. A strict application of the term would include only such

eyes as are not possessed of light perception. It is, however, usually understood to embrace all eyes incapable of recognizing the outline or shape of objects; and practically it should include all eyes with vision less than $\frac{1}{2^{\frac{1}{20}}}$, i.e., all eyes which are able to count fingers at only one foot, for such individuals have to be led around.

Economic Effects of Blindness.—Blindness is a misfortune not only to the individual, but to a community, for a blind person has to be supported, and, too, he is not a producer. To illustrate the importance of these two factors, let us apply them to the United States, which, according to the census of 1890, had 50,411 blind inhabitants. The cost of supporting one blind person in an economical manner may be placed at \$132 annually (\$2 per week for board, \$28 for clothing), so that the cost to this country for caring for its blind is \$6,654,252 annually. The producing capacity of a man at \$1.20 for each working day and of a woman at \$0.40 a day would be \$404 and \$256 respectively annually, which would give \$17,024,480 as the annual earning capacity lost to this country by its blind—cost and loss together amounting to \$23,678,732.

The GEOGRAPHICAL DISTRIBUTION of blindness as shown in Table I., compiled by Mayr, of Munich, in 1877, has been subject to slight changes by later statistics, so far as the proportion of the blind to the population is concerned

TABLE I.

Country.	Population.	Total number of blind.	Number of blind in 10,000.
England and Ireland	31,631,212	31,159	9.85
Denmark	1.864,496	1.465	7.86
Norway	1,701,756	2,320	13.63
Sweden	4.168,525	3,359	8.06
Finland	1,732,621	3,891	22.46
Austria	20,394,980	11,329	5.55
Hungary	15,417,327	18,523	12.01
Switzerland	2,669,147	2,032	7.61
Netherlands	3,575,080	1,593	4.46
Belgium	4,529,560	3,675	8.11
France	36,102,921	30,214	8.37
Spain	15,658,531	17,379	11.26
Italy	26,413,132	26,826	10.16
United States of America	38,558,371	20,320	5.27
Argentine Republic	1,743,199	3,529	20.24
North America	583,535	361	6.19
West Indies	905,730	2,030	22.41
Africa	330,460	416	12.53
Australia	305,730	116	3.79
Germany	39,862,133	35,048	8.79
Totals	248,148,446	215,585	8.74

The population of the United States in the above table is taken from the census of 1870. The census for 1880 shows a population of 50,155,783; number of blind, 48,928; number of blind in ten thousand, 9.73. A striking difference is the great increase of blindness in the United States in the subsequent decade, as is shown in the figures for 1880. Various causes must be considered in determining the reasons for this increase in blindness, the most important of which are the following: 1. The census returns were more complete for the last census than they have been heretofore. 2. Injuries more or less remote from the eye, sustained during the late war, continue to swell the ranks of the blind, and with pensions in view a considerable number make the claim unjustly 3. The foreign element in our population adds to the percentage of blind: for natives of the United States furnish 9.13 blind to 10,000 inhabitants, while 13.45 blind are found in the same number of our foreign population. 4. The increase of manufacturing interest and its spread to localities remote from competent professional care.

5. The increase of those competitive trades that bring bodily and mental strain, which are liable to produce changes in the nervous system, in which the eves partici-

The last decade—census for 1890—shows a gratifying reduction in the proportion of blindness: population,

62,622,250; blind, 50,411; number of blind in 10,000, 8.1; number of natives blind in 10,000, 7.4; number of foreigners blind in 10,000, 10.1. This improvement is due to two causes: first, the proportion furnished by the late war has been depleted by death, and the proportion of foreigners has been lessened by laws restricting emigration; second, people are being educated to seek proper relief for diseases and injuries of the eyes.

The latest foreign statistics, as obtained from Eulenburg's *Real-Encyclopādie*, p. 502 (1894), show the number of blind to 100,000 inhabitants of the countries referred to as follows:

Tane I

Holland 44 Canada 62	Prussia 83 France 84	Norway 134 Spain 148
Poland 70	Germany 85	Caucasia 150 Argentina 202
Switzerland 76	Austria 94	European Russia 210 Finland 211
Sweden 80	Ireland 120	Portugal 219
Relgium S1	Hungary 198	Iceland 340

The statistics in Prussia, according to Guttstadt, show that in 1871 there were 22,977 blind—i.e., 9.5 per 10,000—whilst in 1880 there were 22,678, or 8.2 to 10,000. This shows a diminution of 1.3 per 10,000, although the population had increased 10.6 per cent. In Saxony the figures declined from 7.9 to 7.1.

The latest blind census in Austria, on December 31, 1890, showed 81 blind to 100,000, there being 907 females to 1.000 males.

The CLIMATIC INFLUENCE, as illustrated in Europe, is shown in Table III., from Magnus, of Breslau, 1883.

TADIR III

Between	latitudes	30°	and	40°	the	number	of	blind	in	10,000	is	11.09
44	**	50		60		**	-	**	-	10,000		7.55
46		60	44	70	46		44	66	44	10,000	-	10.04

It is true also of the United States that the proportion of blindness gradually increases from the north to the south. The proportion of blindness is greatest in the Eastern portion of the United States, less in the middle, and least in the Western.

And for the Western continent the same author gives Table IV.

TABLE IV.

Between latitudes 10° and 20° the number of blind in 10,000 is 22.41
" 20 " 30 (vacant).
" 30 " 40 the number of blind in 10,000 is 8.96
" 10,000 " 5,38

The hot southern latitudes are injurious, because of their dry, sandy interiors (in which the glare and the prevalence of high winds, accompanied by clouds of a fine sandy dust, exert an irritating influence upon the eyes), and their moist, swampy, miasmatic borders and water-courses. The cold northern latitudes are injurious, because confinement in badly ventilated quarters is a necessary concomitant; and, the days being short during the long winters, the work of the eyes is crowded into a limited time, or is prolonged in insufficiently lighted rooms, where work becomes injurious. The most temperate zone presents the least number of these objections, hence we find here the smallest percentage of blindness. There are also geological causes which influence the percentage of blindness; for instance, it is more frequent on one side of the Jura Mountains than on the other.

It has been asserted that blindness was more frequent in cities than in rural districts, and this, aside from such causes as lead to blindness from injuries, trades, etc.; but investigations in Russia, and by Howe in this country, would seem to refute that claim under the present existing circumstances. Investigation of the number of blind in cities of the United States containing fifty thousand and upward inhabitants showed that the proportion was thirty-three per cent. less than in the country; and still further investigation by Howe seemed to show that this improvement was due to the

more general use of preventive measures against ophthalmia neonatorum in cities than by the country practitioners.

That there are RACE PECULIARITIES is shown by the fact that out of 10,000 Christians there are only 9.4 blind, while the same number of Jews furnishes 13.3 blind. One reason for this large percentage of blindness in Jews is the great frequency with which they suffer from glaucoma. It is said that the sclera is more dense and less elastic in people of this race than in others, and that this condition favors the development of glaucoma. It has been further claimed that dark eyes are more prone to amaurotic affections than light ones, and that Jews, who usually have dark eyes, are therefore more liable to suffer from blindness. This, however, is not borne out by facts, for dark races are usually possessed of deeply pigmented eyes, yet the percentage of blindness is not great with them. It should be remembered, however, that the so-called amaurotic affections constitute but a small proportion of the causes of blindness; and the fact should not be overlooked that overcrowding and bad ventilation are often found in the class to which the majority of Jews belong—and such surroundings are prolific sources of external inflammations of the eye. Consanguinity in marriage is another cause which renders the Jewish race more prone to blindness than others. They too, almost invariably live in cities, where the percentage of blindness has heretofore been higher than in rural dis-The number of blind negroes in the United States in 1890 was 7,160 out of a population of 7,470,040; or 9.5 to 10,000. Lack of care for diseases and injuries is the probable cause of much blindness with them. rather than any other racial difference.

INFLUENCE OF SEX.—The United States has a population of 32,067,880 males and 30,554,870 females, which gives a preponderance of 1,513,510 in favor of males. The number of blind males is 27,983, and of females 22,428, which gives a preponderance of 5,555 in favor of the male blind. The number of blind in 10,000 males is 8.7 and in the same number of females 7.8. This difference is a slight one, and can be easily accounted for by the accidents arising from exposure of the eyes to the injurious influences of the trades followed by men. An interesting fact bearing upon this point is the comparative diminution in the percentage of blindness in males after they reach an age which recalls them from pursuits that endanger the eyes to surroundings more nearly like those of females. Table V., prepared by Magnus from the Prussian census, illustrates this condition most aptly.

TABLE V.

		Black of the				
Age.		MBER ND, 1871.	NUMBER OF BLIND, 1880.			
	Males.	Females.	Males.	Females.		
Under 10 years	664 1,113 2,572 5,752	558 845 3,336 7,100	572 992 3,565 6,148	488 823 2,989 6,975		

See in this connection Table X. for the causes which produce blindness at different ages.

TABLE V

Age.	Percentage of blind between the ages given.		Number of blind in 10,000.
1 to 10 years	3.7	24.9	1.75
10 to 20 years	4.6	19.9	2.36
20 to 30 years	9.8 11.1	16.4 13.0	3.25 3.81
30 to 40 years	15.2	11.1	6.84
50 to 60 years		7.5	11.50
30 to 70 years	19.7	4.7	26,23
0 to 80 years		1.8	92,44
80 to 90 years	4.3	.3	207.00
90 to 100 years	.27	.02	373.20

Table VI. gives the percentage of blind of different ages in column 2, and the percentage of population at different ages in column 3 (Katz), while column 4, which has been adapted from Meyr's table, shows the number of blind in 10,000 at different ages.

This table, which is a very interesting and instructive one, deserves attention for its own merits; yet it becomes more instructive when considered in connection with Table X., which gives the causes that produce blindness at different ages.

The following table from Eulenburg's Real-Encyclopädie, p. 505 (1894), shows the percentage of blindness at different ages in the countries referred to, as follows:

TABLE VII.

Ages.	Thirteen German States.	England, Wales, and Ireland.	Finland.	Nether- lands.	Belgium.	United States.
1 to 5	1.45	1.61	1.70	0.69	0.47	0.58
	2.63	2.30	2.39	1.00	.79	1.66
	2.42	3.23	3.21	.98	1.60	2.75
16 to 20	3.73	3.76	4.30	1.92	1.87	3.38
	4.40	5.12	17.00	1.93	3.19	3.30
	6.41	7.81	12.52	2.95	5.51	4.17
	9.90	10.95	126.31	4.31	14.11	6.55
Over 50	33.18	37.39	103.49	16.59	25.85	23.73
Not stated	50.82	13.27	19.31	12.76		13.56

INFLUENCE OF OCCUPATION.—The causes of blindness incidental to occupation may be divided into two classes, viz., *traumatic* and *non-traumatic*.

Traumatic.—Under this head are included such occupations as necessitate exposure of the eyes to the direct influence of injurious agents from without, which result from the work performed—as machinists, who are constantly exposed to flying bits of metal, which often produce injury of the eye and blindness; and the same is true of blacksmiths, locksmiths, stone-cutters, and miners. The last named are also exposed to the dangers of premature or careless explosions. Cases of monocular blindness almost invariably arise from the causes just considered.

Cohn found 535 men with 554 blind eyes, and 241 women with 446 blind eyes. Preference is shown for neither eye. The United States census reports for 1890 show 93,988 cases of monocular blindness—or 15.1 to 10,000. The males show 21.7 to 10,000; females, 8.3 to 10,000. The greater frequency of binocular blindness in females is another argument in favor of the accidental occurrence of blindness from the injurious trades followed by men.

Non-traumatic.—Under this head are included such occupations as produce blindness indirectly—as myopia, from over-use of the eyes. Professional men, whose duties necessitate much study; and others, who, from necessity or preference, do much reading, or much fine work, which requires close and long-continued use of the eyes, are liable to suffer from myopia and the train of symptoms which in this disease lead to blindness. Workers in lead are liable to suffer from neuro-retinitis or atrophy of the optic nerves; and workers in India rubber are exposed to the same dangers, from sulphide of carbon. It is claimed that optic-nerve atrophy sometimes occurs in workers who are exposed to the fumes of tobacco or of alcohol. Soldiers in crowded barracks are apt to suffer from conjunctival diseases, and the exposure to wind, dust, glare, and inclemencies of weather, when marching, may also cause the same trouble. Sailors who are constantly exposed to the vicissitudes of weather are liable to suffer from conjunctival and other forms of eye disease, and their crowded quarters and often meagre fare are also conducive to eye affections.

Causes of Blindness.—Table VIII. gives an anatomical grouping of the causes of blindness, compiled by Magnus from 770 cases.

TABLE VIII.	
	Per cent.
Conjunctiva	. 16.364
Cornea	
Uveal nerve	. 22.208
Retina	
Optic nerve	
Glaucoma	. 12.597
Congenital deformities of the eye	. 2.468
Unclassifiable	. 2.857

Table IX., compiled by the same author from a study of 2,528 cases reported by various writers, gives the causes of blindness, arranged in *pathological* groups, and the percentage of each individual cause.

TABLE IX.	
A.—Congenital blindness.	Per cent
Anophthalmus and microphthalmus	
Megalophthalmus	435
Congenital cataract	119
Atrophy of optic nerve, congenital	751
Retinitis pigmentosa congenitalis	751
Congenital blindness with retinal atrophytumors.	
" amaurosis, not specified	237
B.—Acquired blindness—(a) From idiopathic diseases of the eye.	f
Ophthalmia neonatorum	. 10.876
Trachoma and blenorrhoea of adults	. 9.492
Diphtheritic conjunctivitis	356
Diseases of the cornea. Irido-choroiditis, cyclitis, iritis	. 8.068 . 8.860
Choroiditis myopica	949
Choroiditis, choroido-retinitis	. 1.107
Retinitis pigmentosa, acquired	. 1.266
Neuroretinitis	791
Detachment of retina	4.746
Glaucoma Idiopathic optic-nerve atrophy	. 8.978 . 7.751
Tumors of the eye and its surroundings	356
Unclassifiable	. 3.368
C.—Acquired blindness—(b) Injuries.	
Direct injury of the eye	4.034
Unsuccessful operations	. 1.938
Injuries of head	. 4.509
D.—Acquired blindness—(c) The eye disease being in consequence of disease of the body.	
Diseases of the eye from syphilis	470
Scrofulous diseases of the eye	910
Irido-choroiditis with meningitis	1 494
Atrophy of optic nerve, cerebral	6.961 2.333
" " of neuritis following hæma-	4.000
temesis	396
Atrophy from hemorrhage from piles	.079
". after facial erysipelas	079
" with insanity " epilepsy	039
" dysentery	.158
Retinitis nephritica	. 198
Diseases of the eye from typhus	949
measies	
" " variola	9.916
exanthemata (?)	.235
" heart disease childbirth and pregnancy	.039
Intoxication amaurosis	.039
Blindness from disease of the orbit	.039

Congenital anomalies constitute nearly four per cent. of the causes of blindness. The majority of instances occur as a result of consanguineous marriages, or where there is an hereditary tendency toward defects of the eye, or as a result of syphilitic manifestations in intra-uterine life. They are usually hopeless—cataract being the only cause in this category which is amenable to treatment. Among 34 children, the offspring of 14 marriages in which one or both parties were blind from birth or childhood, Magnus found 8 cases, i.e., 23.5 per cent., of blindness or bad sight.

The various ages at which other causes of blindness arise are well shown in Table X. from Magnus, which gives the percentage of causes at the ages when they are developed.

TABLE X.

Canse	PI	PORTERCE GES.	NTAG	OF E C	BLIN F I	DNES C	AUSE	10, S A	000, T Di	AND	THE
of blindness.	1 to 5 years.	6 to 10 years.	11 to 15 years.	16 to 20 years.	21 to 25 years.	26 to 30 years.	31 to 40 years.	41 to 50 years.	51 to 60 years.	61 to 70 years.	71 to 80
Ophthalmia neona-											
torum	1.99										
Trachoma		0.04		1111	2000			0.07	0 02	0.05	0.12
Injuries		.04	0.02	0.05	0.10	0.21	0.13	.19	.05		
Optic-nerve atro-	-	-	-	-	-	-	-	-			
phy of all forms. Uveal tract with choroido - retini- tis, retinitis pig-		.26	.27	.26	.30	.28	.69	.61	.47	.26	.12
mentosa	.27	.11	9.14	.13	.27	.28	.25	.29	.32	.49	.12
Detachment of											
retina	.01	.04	.07	.05	.20	.24				.10	
Glaucoma							.07	.27		1.50	1.30
Operations							.01				.2
Corneal diseases						.14			.14	.10	
Variola		-04		.02				.02			
Measles		04									
Scarlatina		.04	or	15	00	00					
Typhus	.01	-04	-04	-19	.05	.03					

The various causes of blindness, as given in Table IX., will now be considered individually, with such remarks and deductions as are of general interest.

(1) Ophthalmia neonatorum furnishes 10.876 per cent.

of the blind, a larger proportion than any other single cause—which in itself invests it with grave importance; and this importance is greatly enhanced when it is considered that blindness from this cause means an entire life of blindness; that this disease can be practically prevented by proper prophylactic measures; and further, that even after it is developed, prompt, energetic, and appropriate treatment will usually bring it to a successful termination without impairment of sight. ple measure of washing the eyes of all infants with warm water as soon as they are born, and instilling a few drops of a two-per-cent. solution of silver nitrate into the conjunctival sac, and subsequent attention to cleanliness, would almost banish this disease from our lists, as has been lately proven in the Maternity Hospital in Vienna and other similar institutions. Ophthalmia neonatorum is almost always caused by the irritating discharges from is almost atways caused by the irritating discharges from the vagina, which gain access to the eye either during birth, or, later, by the careless handling of the infant with unwashed hands which have been about the vulva. And it should be borne in mind that these discharges may produce inflammation in any conjunctiva with which they come in contact. Furthermore, the contagiousness of conjunctival discharges should never be over-looked, and this action should always be explained to those who have to deal with any form of conjunctivitis. As a rule, the contagious material from a mild form of conjunctivitis will produce a slight attack in another eye, and vice versá for virulent forms. Yet this is not always the case.

(2) Trachoma and blennorrhæa of adults, with a percentage of 9.492, come next in order of importance. Trachoma occurs chiefly in the lower walks of life, where, from necessity or indifference, there are overcrowding, bad ventilation, lack of cleanliness, and a general disregard of the laws of hygiene. It is often seen in the poor and neglected of our city population, in the crowded barracks of military camps, and in the confined quarters of northern latitudes. Its development is favored by low and damp localities on the one hand, and by dry and sandy districts on the other. The contagiousness of the secretion is also an important element in the spread of the disease in crowded quarters. The presence of trachoma, even in a mild form, renders an eye very prone to take on an active form of inflammation (blennorrhæa), which will assume epidemic character if conditions favor its spread, as is seen in Egyptian or military ophthalmia. Once developed, trachoma becomes always an obstinate, and often a serious, disease; hence prophylactic measures

against it are of the utmost importance, and they are to be found in a correction of the sanitary conditions referred to. Its local treatment should be prompt, energetic, and persistent.

Blennorrhwa of adults may arise from the same conditions that produce trachoma, and it is often an outgrowth of the latter. It is frequently—in fact usually—the result of contagion. The discharge from any form of conjunctivitis, as also leucorrhoal or other irritative discharges, gaining access to the eye may produce the disease. The observance of care and cleanliness, with proper regard to hygiene, would cause both of these diseases to disappear, and appropriate treatment would cure most cases, even after the disease has developed.

(3) Diphtheritic Conjunctivitis.—Diphtheritic and membranous ophthalmia are sometimes caused by direct infection of the conjunctiva by diphtheritic material from the throat of another person, while in other cases the diphtheritic process creeps up the nasal duct from the nose, and thus reaches the lining membrane of the eye. But in the majority of cases of diphtheritic ophthalmia the disease is a local one, in which the inflammation takes on this special form. No doubt there is often something peculiar in the patient's health, or in the state of his eye tissues, which gives a proclivity to this particular pathological process. These cases are, for instance, seen with particular frequency after measles, and less commonly during or after scarlet fever, and are more likely to occur in children than in adults. The existence of old, granular disease of the conjunctiva also gives a strong tendency to a diphtheritic type of inflammation, and the same tendency is seen sometimes in a well-marked degree in ophthalmia neonatorum, and in gonorrheal ophthalmia.

(4) Diseases of the Cornea.—This furnishes rather a large contingent of blind, and it is not to be wondered at when we consider that transparency and regularity of curve of this membrane are essential to good vision. Keratitis, in its various forms, may leave opacity sufficient to cause blindness; and the same is true of superficial ulceration; while deeper ulceration may lead to prolapse of the iris, displacement or obliteration of the pupil, etc., and all are at times liable to be followed by softening of the cornea, with development of staphyloma, etc. Hypopyon keratitis furnishes a larger number of blind than all other corneal affections put together. Kerato-conus and kerato-globus are sometimes causes of

(5) Irido-choroiditis, Cyclitis, Iritis.—The different diseases enumerated under this heading are placed together, first, because they often combine; and, second, because the structure involved—the uveal tract—is common to each of the several anatomical parts designated. The term uveitis is often and advantageously employed to describe, collectively, inflammations in these parts. Iritis, uncomplicated, rarely causes blindness; yet it may do so if the pupil becomes glued down to the lens and the pupillary space becomes blocked with exudation (occlusion of pupil). Both this condition and that of exclusion of pupil (complete posterior synechiæ) are very apt to be followed by secondary glaucoma. More frequently synechiæ from previous inflammation cause recurrent attacks of iritis; and the inflammatory process, extending to the choroid, or to the ciliary body, or to both, gives rise to opacities in the vitreous, and later to detachment of the retina, cataract, etc. The trouble may begin in the choroid, or, less frequently, in the ciliary body, and, extending to other parts or remaining in either locality, may cause blindness in the same

(6) Choroiditis myopica (6) and detachment of the retina (11) will be treated of together under the head of the latter both being considered as effects of myopia.

latter, both being considered as effects of myopia.

(7) Choroiditis, Retino-choroiditis.—The choroid and retina are so intimately associated that it is difficult to have an affection of one of these structures without involvement of the other. Syphilis, acquired or inherited, is the usual cause; and blindness is produced by the

formation of opacities in the vitreous and disturbance or destruction of the retinal elements.

(8) Retinitis Pigmentosa, Acquired.—Though this affection may be developed at almost any period of life, it cannot be considered an acquired disease, for it occurs in particular groups of individuals who, from hereditary tendencies or from consanguineous marriages, show congenital deficiencies in this and in other ways. Such cases are hopeless; and even when the disease is recognized in an early stage little or nothing can be accomplished in the way of treatment.

(9) Retinitis Apoplectica.—The chief significance of this disease is the index which it furnishes of the condition of the blood-vessels in the brain; for it is usually but a precursor of similar trouble within the cranium.

(10) Neuro-retinitis, as an idiopathic affection, is almost unknown. It usually occurs as an accompaniment of some other disease—as syphilis, Bright's disease, intracranial disease, pregnancy, cardiac disease, etc.; but as these diseases are specially considered as sources of blindness further on, we are reduced to very narrow limits. It must be admitted that cases of neuro-retinitis are occasionally seen without apparent cause. And it is probable that such vague causes as prolonged exposure of the eyes to very bright light, with great heat, as the glare of a furnace, or to the reflection of the sun from the waters of the tropics, or from excessive use of the eyes by strong, artificial light, may produce the disease and thus lead to blindness.

and thus lead to blindness.

(11) Detachment of the Retina and (6) Choroiditis Myopica.—Myopia, the cause common to each of these conditions, is of great importance, and merits careful consideration. It may be said to be an outgrowth of civilization and education, and it may be taken as an index of the studious habits and of the close evework of a people. In this present busy age of progress and competition, which calls for work at high pressure, and necessitates the forcing process as soon as school days are begun, there are many causes at work which serve to swell the ranks of myopes, and to lay the foundation for its future increase. The long hours of confinement in the schoolroom, and the lack of proper out-of-door ex-ercise and fresh air, tend to cultivate sedentary habits and to lessen the resisting power of the tissues of the The close application of the eyes at near work, with badly constructed desks and insufficient illumination, which necessitate stooping over the pages and straining the eyes, brings on congestion of the fundus of the eye, with thinning and bulging of the sclera at the point of least resistance—the posterior pole; and the develop-ment of myopia is the consequence. This condition, once produced, is increased by a continuation of the causes which induced it; and, in unpromising subjects, even the removal of these causes does not put a stop to its

The development and increase of myopia during school life are nowhere better shown than in the following table, taken from Fuchs and prepared by Cohn. The village school corresponds to our lowest grade, and then follow in regular sequence the higher grades, until the last or university course is reached:

TABLE XI.

	Percentage of myopia.	
Village school. Elementary school Intermediate school High school Gymnasium (college). University.	6.7 10.3 19.7 26.2	1/24-4 1/22-7 1/21-9 1/19-6 1/18-7 1/12-2

It was furthermore noted that the percentage of myopia increased in each school from class to class. Among theological and medical students, whose term of study is prolonged beyond the ordinary university course, the percentage of myopia is still further increased, reaching in the case of theological students seventy-eight per cent. And in reference to confinement and indoor life on the one hand, and out-of-door life and exercise on the other, Erisman found the percentage of myopia in resident scholars to be forty-two per cent., and in day scholars to be thirty-five per cent. Dor found even a greater difference—thirty-three per cent. against eighteen per cent.

Myopia abounds among studious people, and is almost unknown among the ignorant and illiterate. It is not congenital, yet the tendency to its development is certainly transmitted from parent to child. The prophylactic measures against myopia are of the utmost importance. First and foremost are: A proper amount of out-of-door exercise during school life; well-ventilated schoolrooms, with good illumination, properly constructed desks, so that the light will fall to best advantage upon the page, and avoidance of the habits of stooping or bending the head over the work, and of holding objects close to the eyes. After the development of myopia, much can be done for its relief by the use of atropine and the wearing of properly selected glasses. It should be remembered that myopia fosters sedentary and studious habits; and it at times becomes advisable to discontinue the use of the eyes for near work altogether; and it not infrequently falls within the province of the physician to decide upon the child's future mode of life and employment.

A few cases of myopia with choroiditis occur independently of the causes here ascribed to it; yet they are so infrequent that they may be left out of consideration. And, too, detachment of the retina is sometimes seen in eyes that are not myopic; but it rarely occurs in such as a primary affection, and when secondary to some other pathological lesion, that, and not the detachment, is the cause of blindness.

(12) Glaucoma.—The importance of this disease, as indicated by its quota of blind, is forcibly increased when its usual amenability to treatment is considered While a well-marked case of glaucoma presents unmis-takable symptoms of the disease, which it would be unpardonable to overlook, there are other cases which are obscure and misleading. The very fact of this uncertainty should, however, put us upon our guard; and there are few cases indeed which would run the gauntlet of careful examination and close observation. Once recognized, prompt and energetic treatment is indicated; and there is no operation in the whole range of surgery that affords more brilliant results than does iridectomy in cases of acute glaucoma. Sclerotomy and eserine have their spheres of usefulness; and stretching the external nasal nerve has recently been much lauded in the treatment of certain obstinate forms of glaucoma. fortunately the more obscure cases attract but little at tention until the disease is far advanced, and medical advice is sought only after serious and permanent impairment of sight comes on. A more thorough knowledge of the disease and greater familiarity with its symptoms by the general practitioner will not only insure its more prompt recognition, but will lead the laity to a better understanding of the affection, and cause greater care in the observance of eye symptoms. "A few cases of glaucoma are strongly allied to optic-nerve atrophy, and these are very unfavorable.

(13) Idiopathic optic-nerve atrophy occurs most frequently in subjects who have inherited a tendency to nervous disorders. It is often a precursor of spinal cord or of cerebral disease; and as the length of time which may intervene between the development of optic atrophy and central changes is often considerable, the diagnosis is usually difficult and uncertain. The disease is one of the most obscure that we have to deal with, and the prognosis is unfavorable. It is much more frequent in men

than in women.

(14) Tumors of the Eye and its Surroundings.—Malignant diseases, as glioma of the retina, sarcoma of the choroid, of the ciliary body, and of the iris, and epithelioma or lupus of the conjunctiva, or of the cornea, may

produce blindness through destruction of the globe by their own growth; yet their chief importance is in their danger to life. Cysts of the iris, if they are not removed, may cause blindness by increase in size.

moved, may cause blindness by increase in size.

Gummata of the ciliary body and of the sclera may also produce blindness in the same way. Other tumors of the eye rarely cause blindness. Tumors arising from parts adjacent to the eye may produce blindness, directly by extension of the disease to the globe, or indirectly by pressure effects upon the globe or optic nerve, as is seen in vascular and cystic tumors of the orbit, and in tumor or distention of the frontal, ethmoidal, nasal, or maxillary sinuses

(15) Unclassifiable.—The percentage here given may be taken as a fair example of the proportion of the blind which present such complicated conditions as to preclude classification.

(16) Direct Injury of the Eyes.—The more important proportion of these cases occur in individuals whose labor necessitates exposure of the eyes to flying bits of metal or stone, as machinists, workers in stone, miners, etc., and in those who have to deal with explosives, as in blasting, the manufacture of explosive materials, etc. The use of protective glasses, preferably of mica, which combines perfect transparency with considerable strength, is a measure that would afford much protection to the eyes, though it has been but little adopted by workmen exposed to these dangers.

A certain number of cases occur from unavoidable and

A certain number of cases occur from unavoidable and unforeseen accidents, and of these it is unnecessary to

Injuries of the eye in the German army during the Franco-German war (1870-71) were met with in 786 cases—being 0.79 per cent. of the whole number of injuries, and 7.8 per cent. of head injuries; and affections of vision after head injuries were met with in 74 cases—or 0.7 per

cent. of head injuries.

(17) Unsuccessful Operations.—The percentage here furnished certainly appears small, when it is considered that many eye operations are attended with considerable risk to the eye, even in the hands of the most accomplished operators. Cataract extraction—the most important operation in ocular surgery, and at the same time the most formidable—is accountable for most cases of blindness from operative measures. As it is performed late in life, when the process of repair is impaired by age and often by disease, it is to be wondered that the proportion of unfavorable results is not larger.

(18) Injuries of the head produce blindness through lesions of the optic nerve, at or about the optic foramen. It is known that blows upon the head may cause fracture of the bones about the apex of the orbit, or at the optic foramen; and blindness ensues from injury to the optic nerve—immediately if the injury be severe, and more slowly if dependent upon secondary degenerative changes (atrophy). Meningitis following injuries of the head may cause optic neuritis or atrophy and blindness.

And injuries of the angular gyrus may produce blindness. (19) Traumatic Sympathetic Ophthalmia.—This is one of the most important of eye diseases, and, because of its insidious character and its intractable and uncertain course, merits the utmost care in its consideration at the hands of ophthalmologists, and general practitioners as well. Resulting, as it does, from previous mechanical injury which has greatly impaired or entirely destroyed the fellow eye, its treatment involves great responsibility. And as it not infrequently happens that the sympathizing eye is ultimately left in a worse condition than the exciting one, advice should be well and intelligently considered. The disease may appear within a few weeks, or it may not develop for years; and while its prodromes may extend over periods varying from weeks to months, it sometimes comes on unannounced, and quickly leads to blindness. Arising at times from wounds, apparently trivial, in the ciliary region, it occasionally fails to appear after extensive injury to this, the vulnerable zone. Treatment of the disease after it has developed is of course important, and while it is sometimes unsatisfactory, it is