

ual acuity or otherwise, who constitute the "human" as distinguished from the "environmental" factor in accident prevention and industrial efficiency and who need appropriate attention.

Their handicap may be merely a low visual acuity incompatible with their tasks. It may be, however, a lack of depth perception; defective color vision, congenital or acquired; defective light sense, or defective indirect vision, and accompanied perhaps by a normal visual acuity. They are unable to perform certain tasks effectively and become unsafe in those operations particularly which require speed. Thus, lack of depth perception makes flying and driving any motor vehicle extremely hazardous, and the finer mechanical work and artistic and drafting work difficult. Defective color vision is also a hazard in flyers and drivers and a handicap for signalmen, embroiderers, and in the chemical industry. Flyers, drivers of motor vehicles, sailors, miners and night watchmen need especially good light sense and indirect vision, and photographers and x-ray technicians find their absence crippling.

This group also offers a problem in Workmen's Compensation administration. When they meet with an accident damaging their eyes, they are, in the absence of knowledge of their antedating condition, perforce given the benefit of doubt. We must not, however, exaggerate the extent of their overcompensation. It is balanced moreover by the undercompensation of a considerable element endowed originally with a visual acuity of 20/15 or even of 20/10 for whose loss, when they meet with an accident reducing their vision to 20/20, there is rarely provision under the law. This is obviously not the best kind of justice.

It is clearly the duty of Labor, Industry, State Departments of Labor and other State Agencies to take cognizance of this group of defectives and, for medicolegal justice, of the supernormals, and to come to their relief. Our knowledge of the real size of the two groups, and of the frequency distribution of the causes of defective eyesight in the industrial population, is incomplete. The National Safety Council is at present "unwilling to estimate eye injuries in occupational accidents without further study." Such knowledge, necessary for proper vocational guidance and advice, can be secured, without great expense, by the routine examination of the industrial population by ophthalmologists to screen out the defectives and classify them as to cause. Merely determining the visual acuity and the mechanical application of eyesight testing methods by non-ophthalmologists are not adequate for the purpose.

A survey of the examinations of eyes for compensation in New York City in 1939, from the vantage point of a rather large material and a uniform method of examination, is presented here. As an introduction to it, let us examine the available data as to the eye capital which the worker brings into industry and the inroads which industry makes on it. Both differ widely between countries and regions, as to whether they are industrial or agricultural, from the presence of endemic diseases such as trachoma. The data also vary with age, due to progress in the art of refraction and correction of its errors, in diagnostic methods, and to better nutrition, all unequal in different localities. It is to be noted that the data are in terms of visual acuity only.

Eye Capital of the Worker

In 1925 Collins' figures for New York, Delaware, North Carolina and Maryland, when analyzed, show among male school children of 16 (less defective than younger boys and girls), with only 10 per cent fully corrected for errors, as follows:

20/20 in either eye, 70.8 per cent.

Less than 20/20 in one eye, 10.7 per cent.

Less than 20/20 in either eye, 18.5 per cent.

Serious defects in the last two groups combined, 8 per cent.

In 1939 an analysis by Blankstein of 920 visual acuity determinations of school children in Chicago, 7-19, to screen out defectives, shows the following:

20/20 in either eye, 68 per cent.

Less than 20/20 in one eye, 22 per cent.

Less than 20/20 in either eye, 10 per cent.

Allowing for a large proportion of defective eyesight correctable to normal by glasses; of other defectives not entering industry of their own choice; and of still others rejected by industry, the eye capital which the worker brings into industry must be considerably better than 70 per cent good eyesight.

New York State Figures

Averages For	Blind	Permanent Partial*	Temporary Disability	Permanent Eye Disabilities % of All Permanent Disability
1925-30.....	8	766	2189	3%
1930-34.....	9	574	1930	2.56%
1934-39.....	8	520	1265	2.74%
In 1939.....	11	467	1190	2.24%

The Present Situation

	Blind	Permanent Partial*	Temporary Disability	Total in Round Figures
Past Annual.....	240	15,600	37,950	54,000
Present.....	80	5,700	12,650	18,000
Annual or on Basis of 20,000,000 workers.....	4	260	632	900
	Per Million	Per Million	Per Million	Per Million

*Includes unilateral industrial blindness.

In 1928 McAuliffe reports defects, some correctable, among 5000, 20.5 per cent.

In 1929 a New York Central Lines survey finds defective, 20 per cent.

In 1933 Murray among miners finds defects, some correctable, 28.3 per cent.

In 1937 Rainey among 15,000, in Chicago found defects, 14 per cent.

Illiteracy among the miners is stated to account for the higher figure, and a rigorous selection by industry since the depression probably accounts for the lower figure. Rainey moreover succeeded in correcting to normal more than half of the defectives and in improving some of the others. True defective eyesight for Chicago today among workers should be accordingly not over 6 per cent.

With due allowance for both the depression and increase of population, the eye toll has been reduced to 1/4 in 15 years. Available fragmentary figures for the rest of the country indicate a reduction to about one-third for the past three decades. Multiplying the New York State Figures by 10, one can visualize the past and present situation. See table, "The Present Situation."

The following summary of New York City Eye Examinations for 1939 includes

examinations for accidents occurring in 1938 as well as in earlier part of 1939, hence does not cover the same material necessarily shown in the New York State table.

Number of examinations (1 and 1/4 per person).....3414

Number of persons (7% females; 495 old cases reexamined).....2663

Persons examined for first time (509 subject to reexamination).....2168

A. Persons with normal visual acuity in either eye.....1340

B. Persons with subnormal visual acuity in one or either.....828

C. Persons with permanent partial or total compensable defects.....440

(Non-compensable defectives among uninjured eyes.....17 per cent

D. Persons with non-compensable pre-existing defects.....388

(Constitutes in relation to group "A," defective group of.....22 1/2 per cent

The distribution in Rainey's study is upon analysis somewhat as follows: Development, 49%; Injuries, 8%; and Systemic, 43%.

From the data available for the country as a whole it appears that the potential in-