

worker's output for the long and short shifts respectively showed a lower hourly output during the later hours of the long shifts. The investigation afforded no evidence of a detrimental effect of night work in comparison with day work. The second report, by Dr. C. S. Myers, F.R.S., gives an account of a remarkable experiment carried out, with the consent of the workers, by Mr. Vincent Jobson, managing director of the Derwent Foundry Company, Derby. The first step was to analyze the various jobs in order to arrive at the best method, by the elimination of all superfluous movements. This involved the proper arrangement of the tools and materials, the establishment of standard sets of movements for the process, and the training of the men. When the system was not going the number of hours of work was reduced and a special system of payment devised. The result was an enormous increase of output in spite of the reduced hours of work. The increased output, combined with the diminished cost of production, has been beneficial to the firm and largely increased wages of the employees, without causing any increase in fatigue, but rather on the whole, apparently, a decrease.—*British Medical Journal*.

#### SCIENTIFIC BOOKS

*Mortality Statistics of Insured Wage Earners and Their Families.* Experience of the Metropolitan Life Insurance Company Industrial Department, 1911 to 1916, in the United States and Canada. By LOUIS I. DUBLIN, Ph.D., Statistician, with the collaboration of EDWIN W. KOPF and GEORGE H. VAN BUREN. Pp. 397. New York, Metropolitan Life Insurance Company. 1919.

This volume represents a painstaking and well-planned analysis of the 635,449 deaths which have occurred among the industrial policy holders of the Metropolitan Life Insurance Company in the years 1911 to 1916. Because of its great scope and wealth of detail it is of unique value to all who are interested in public health, as well as to physicians in their study of disease. The area covered by the data includes nearly all of the

states of the United States and the provinces of Canada. This geographic range is much greater than that of the Registration Area of the United States Bureau of the Census. The report presents a study of the mortality of industrial workers and their families. The data are classified according to color, age and sex. They comprise 54,000,000 years of life, of which 47,000,000 are white and 6,700,000 are black. Thus in addition to a presentation of the mortality experience of industrial workers as a whole, we have here a comparative study of the mortality of whites and blacks of the same economic status. Previous statistical comparisons of white and black mortality compared all whites to all blacks, ignoring their different social status, and the resultant effect of this on disease.

The mortality classification is that of the "International List of Causes of Death." This, while admitting of many imperfections, had to be used in order to render the statistics comparable with those of the Registration Area of the United States Census. The occupational classification follows the "Classified Index to Occupations." U. S. Bureau of the Census, 1910. The material was very carefully compiled, especial attention being given to the avoidance of clerical errors. The diagnoses of death, whenever they were doubtful, were controlled by follow-up letters to the physicians who had certified to the death. This resulted in a greatly increased accuracy of the statistics.

Some of the more important results of this study are worthy of mention. Among whites the mortality of males is much greater than that of females. Among negroes the male mortality is less than the female below the age of 25, with the exception of children from 1 to 4 years of age. After the twenty-fifth year the male mortality exceeds the female mortality, but the excess is moderate compared to that found in whites. Following the presentation of these general considerations, the authors proceed to a detailed analysis of the principal causes of death, giving the rates for the two races in the different age groups and sexes, as well as a comparison of the Metro-

politan mortality with that of the Registration Area. Some of the more interesting facts which have been established by this study may be summarized.

The mortality rate for pulmonary tuberculosis of the children of wage earners is not higher than that of children of the general population. This is all the more striking when we consider that about one half of the children in the Registration Area live in rural communities. The decline in the death rate from pulmonary tuberculosis during the years 1911 to 1916 is greater in the insured than in the general population. The mortality from organic heart disease is higher in wage earners than in the population at large, especially during the working ages. This higher rate persists to old age but to a less degree. Contrary to the general belief, there has been no increase in the death rate for organic heart disease in the period 1911 to 1916. Bright's disease too is a more frequent cause of death in the insured.

Accidents rank fifth in the causes of death. How serious this problem still is, and how great the field for prevention is, is shown by a comparison of the statistics of England and Wales with those of the United States. In 1913, that is before the war, the accident mortality for England and Wales for the ages from 35 to 45 was 62.4 per 100,000. In the United States it was 139.6 per 100,000 in the Registration Area and 154.3 per 100,000 in the insured males at the same ages. Industrial policy holders suffer from a higher accident rate at the ages where the occupational factor plays a part, and where too their death works the greatest hardship to their families. There has been little reduction in the accident rates in the six years under study. During the working years the suicide rate of male workers is greater than that of the general population. It is interesting to note that the colored rate is one half of the white rate. However the homicide rate for negro males is seven and a half times as great as for the entire group of insured wage earners. In the age period 25 to 34 it ranks next to pneumonia as a cause of death of negro males.

The study of the diseases incident to pregnancy and the puerperium is of the utmost importance. The statistics are based on the age group 15 to 45, the child-bearing period. In this age period these diseases cause more deaths than any class of disease except pulmonary tuberculosis. The rates are 66.1 per 100,000 for whites, and 82.3 per 100,000 for blacks. Puerperal sepsis caused 43 per cent. of all the deaths, albuminuria and convulsions 26.4 per cent. The figures for the Registration Area are almost the same. There has been some decline in the maternal death rate in the six years under study. The decline in the insured was 10.7 per cent., which was greater than that in the general population. The authors consider this a vindication of the Metropolitan Life Insurance Company's system of visiting nurses. These figures point out a very important field for preventive medicine.

The analysis of the cancer mortality rates for the period 1911 to 1916 is instructive, for it shows how unsafe it is to generalize. The necessity of considering age groups, the sex and race, as well as the site of the cancer, before drawing inferences as to the increase or decrease of cancer mortality is well brought out. The statistics of the Metropolitan Life Insurance Company show no definite increase in cancer mortality in the six years under study.

I have mentioned but a few of the valuable facts brought out in this volume. The authors are to be congratulated on having made an important and unique contribution to the study of the incidence of disease among wage earners, a study which will be of great assistance to all who labor for the prevention of disease, be they doctors, economists or social workers.

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#### SPECIAL ARTICLES

##### THE INTERACTION OF GRAVITATING AND RADIANT FORCES<sup>1</sup>

1. *Atmospheric Temperatures.*—These relations are so interesting, not to say perplexing,

<sup>1</sup> Advance note from a Report to the Carnegie Institution of Washington, D. C.