

children drink no cow's milk. Overcrowding and absence of sunlight in the living room, along with the prevailing habit of expectorating at all times and places, may sufficiently account for this mortality. A large amount of general surgery is done both at the Civil Hospital and at the University Clinic under Prof. Kenelm Digby, who is now conducting a weekly out-patient clinic. Much work is done at the public mortuaries, for approaching 5000 autopsies were reported on during the year by the acting government bacteriologist. After pneumonia, bronchopneumonia, bronchitis, and tuberculosis, the largest figures are shown for various forms of infantile death—congenital syphilis, marasmus, atelectasis, debility at birth; exceptional opportunity appears to be presented here for research in connexion with these deaths. The examination of rat corpses is also conducted at the mortuaries; out of more than 100,000 examined during the year only seven were found infected with plague. Seven Chinese women trained in midwifery attend the poorer classes of Chinese in the colony, and it has just been found possible to substitute Chinese for Japanese staff nurses. At the Bacteriological Institute a large amount of anti-meningococcal serum is prepared; 64 litres were in stock at the end of the year. Rabies vaccine is now being maintained locally, and contagious abortion vaccine is supplied on demand from the Dairy Farm Company.

Particular interest attaches to the new chair of medicine at Hong-Kong University which is shortly to be filled. The conditions of tenure may be seen in our advertisement columns. The University is only ten years of age, and was founded on the initiative of Sir Frederick Lugard with a view to educating Chinese students in European arts and practices, including specially medicine and engineering. Last spring the offer was announced of a gift of 500,000 Hong-Kong dollars, approximately £60,000, for the creation of a modern school of medicine with chairs of medicine and surgery, and a prospect of a further donation for a chair of obstetrics. This gift has enabled the separation in the curriculum of anatomy from surgery. Prof. Digby will continue to hold the latter chair, while Prof. J. L. Shellshear, of Sydney, has been appointed to the chair of anatomy. The chairs of physiology and pathology are now occupied respectively by Prof. H. G. Earle and Prof. C. Y. Wang. In the selection of a professor of medicine preference is to be given to a candidate not exceeding 35 years of age, and the election will be in the hands of a committee of the Board of Education, including two recently appointed professors of medicine in London University. The salary is £800, rising to £1000 a year, which may be supplemented by fees for consultation; it may be added that there is no income tax in Hong-Kong. The chair of medicine should afford abundant scope for teaching and research to anyone interested in the promotion of European medicine in the East.

MEASLES EPIDEMIC IN MANCHESTER.—During the week ending Sept. 16th 293 new cases of measles and 3 deaths were reported. A few weeks ago the new cases were over 500 per week, and in the early summer the average for several weeks was over 1000, with numerous deaths, so that the epidemic is apparently at last on the decline.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The first of the new series of post-graduate lectures for the autumn session will be given in the West Lecture Hall, Royal Society of Medicine, 1, Wimpole-street, London, W. 1, on Oct. 11th, at 5 P.M., by Sir James Galloway, the subject being the Symptoms and Treatment of Certain Unexplained Granulomatous Diseases. Further lectures have been arranged as follows:—Dr. Eric Pritchard: The Feeding of Infants from Birth to the End of the Second Year. Dr. C. E. Lakin: Indigestion. Mr. Zachary Cope: Some Important but Ignored Symptoms in Acute Abdominal Disease. Dr. S. A. Kinnier Wilson: The Old Motor System and the New. Mr. J. D. Mortimer: The Medico-Legal Position of the Anæsthetist. Copies of the detailed programme can be obtained from the Secretary to the Fellowship at the above address.

"EXPECTATION OF LIFE" NOW AND SEVENTY YEARS AGO.

BY MAJOR GREENWOOD, M.R.C.P. LOND.,
READER IN MEDICAL STATISTICS, UNIVERSITY OF LONDON.

IN the annual report of the chief medical officer of the Ministry of Health for 1921 the following sentence occurs: "Seventy years ago (the mortality of 1838–54) men of 45 had, on the average, 22·76 more years to live. There was no improvement on this figure for 30 years; on the contrary, it seemed to decrease. In 1901–10 it improved to 23·27 years and in 1910–12 to 23·92 years." In commenting on this report the medical correspondent of the *Times* remarked that "the life expectation of men of 45 is but little better to-day than it was 70 years ago." In a letter printed in the *Times* of August 9th Mr. George King, the famous actuary, stigmatised the comment as a "mistake, based on a fallacy, and caused by serious defects in the old mortality tables." He further stated that "could a correct table based upon the statistics of 70 years ago be constructed, the tale would be very different."

From the last quoted sentence it would seem that Mr. King, in the haste of writing, had overlooked the fact that he himself has provided data from which the error of the old table *can* be approximately measured. In calculating English Life Table No. 3 (mortality of 1838–54) Dr. Farr assumed that the average value of the central death-rate in an age interval is the same as that of the middle year of the interval. Mr. King showed that this assumption was unsound, and, in a paper¹ published in 1908, tabulated the probabilities of dying within a year at each age from 5 to 105 (a) as shown by Farr in E.L.T. No. 3, (b) as deduced from the original data by a more accurate method.

If the probabilities of dying are given, it is, of course, a simple arithmetical operation to calculate the expectations of life at the different ages. Using Mr. King's improved values, I find the expectation of life at 45 for the 1838–54 mortality data to be approximately (I have made the usual assumption that the complete expectation of life at age x exceeds the curtate expectation at that age by 0·5 years—an approximation which is extremely close to the truth at all ages from 2 to 80) 22·70 years, so that Farr's original value is only in excess by about 22 days, or 0·26 per cent. Even so late as age 60 the error is less than three months (original value 13·53 years, corrected value 13·30). At ages over 70 the error is serious—e.g., at 75, corrected value 6·08 years, value given by Farr 6·49 years.

Obviously any argument which was valid when the average upon which it was based was taken to be 22·76 years is not materially weakened by the substitution of 22·70 years; hence, as it seems to me, the medical correspondent was reproved with undue emphasis and perhaps the value of Farr's pioneer work unduly depreciated in the eyes of the non-medical reader. The arithmetical reason why even very serious relative errors in the rates of mortality at the later ages—the errors were very serious, involving an under-statement of more than 20 per cent. at age 90—has so little effect upon the average after life-time of the life table population at 45, is that the numbers surviving to the later ages are, relatively, so few that their contribution to the average is small. Thus, the number of complete years lived by 100,000 persons alive at 45 after that age is 2,220,413 on the basis of the improved probabilities for E.L.T. No. 3. Only 661,613 of these years are lived after attainment of 64, less than 30 per cent. of the total; only 195,314 after attainment of 74, less than 10 per cent. of the total.

Yet the question remains to be asked whether we should not discourage the use of "Expectations of Life" for comparative purposes. Their only justi-

¹ Jour. Inst. Act., 1908, xlii., 272.

fication has been that they are convenient means of summarising the effects of mortality beyond a certain point in life. We have just seen that they are not sensitive to quite serious modifications of such rates; actuaries speak of them with some contempt and their partisans are mostly medical men or journalists. Thus Mr. Henry, Deputy Government Actuary, recently spoke² of the expectation of life as a "horrible term," and added that "it had no practical meaning, and it had caused more trouble in the minds of laymen, he thought, than almost any other actuarial function."

My own view is that no useful purpose is served by going behind the death-rates at ages. The simple comparisons between rates of mortality (males) of 10.5 per mille in 1846-50 and 5.3 per mille in 1906-10 at ages 25-35, and between 33.2 in 1846-50 and 31.2 in 1906-10 at ages 55-65, set beside the contemporaneous Swedish rates (at ages 25-35, 8.9 in 1846-50, 6.0 in 1906-10; at ages 55-65, 36.9 in 1846-50, 20.1 in 1906-10) are as cogent evidence in support of the conclusion that our rates of mortality in later adult life are relatively unfavourable as the ostensibly more scientific "expectations of life" at ages.

INDUSTRIAL HYGIENE AND INDUSTRIAL MEDICINE.

CONSIDERABLE interest was excited a year or two ago by an announcement that one of the well-known London undergraduate medical schools was initiating a fund to establish a Chair of Industrial Medicine. The scheme has not yet borne fruit; it is not surprising that in a period of depression it should be difficult to collect money for an objective that is not very clearly defined, and, moreover, lies outside the undergraduate curriculum. Doubtless the Institute of Hygiene to be established in London, with the support of the Rockefeller Foundation, will devote energy to the solution of industrial problems and to the development of an issue of medicine still in a state of dependent infancy.

Industrial medicine is perhaps an unfortunate term; the insignificance of any curriculum which could be built on foundations at present available might be a subject of reproach if we did not find constantly that it is on advances in physiology, rather than in medicine, that we have to wait. Industrial hygiene must be understood before industrial medicine can grow. It is therefore of interest to study in some detail the syllabus of the courses in industrial hygiene announced for the coming session by the Harvard School of Public Health at Boston, and published by the University of Harvard in their official register, Vol. XIX., No. 36.

The Development of Harvard University Courses in Industrial Hygiene.

Harvard University in 1918 received funds with which to establish facilities for the training of industrial medical personnel and for laboratory, clinical, and field research in matters relating to the health of industrial workers. The funds were contributed by New England manufacturing establishments and interested individuals, and the gifts were without special restriction.

The experience of three years has shown that, in so far as students are concerned, the greatest needs are for brief courses or groups of courses covering some special field in industrial hygiene, supplemented by longer programmes of study and research leading to higher degrees. A survey of the yearly bulletins issued by the Division of Industrial Hygiene shows the gradual trend toward concise and definite opportunities for work which has taken place as experience has accumulated. It has not, however, been possible until the present time to offer advanced work of varied and substantial type nor have the brief pro-

grammes been so concentrated and numerous as is desirable. In the summer of 1921 Harvard University received a generous endowment from the Rockefeller Foundation with which to establish a new School of Public Health. The Division of Industrial Hygiene at once became a part of this school, and, while maintaining all the work heretofore offered, has been able to broaden and extend its work.

Admission Requirements and Degrees.

Students entering for courses leading to a degree or for brief periods of special work must register in the School of Public Health and must satisfy the committee of their fitness to pursue an approved course. The School of Public Health recognises the desirability of admitting students for brief and highly specialised courses of study and practice, but considers it necessary to reserve these opportunities for persons whose academic or field training is recent and gives promise of success in the programme outlined. In the case of special students no degree is given—merely a statement of the work done and the grades attained.

The degrees offered in the School of Public Health are as follows: (1) Bachelor of Public Health; (2) Master of Public Health; (3) Doctor of Philosophy (in Hygiene); (4) Doctor of Medical Sciences; (5) Doctor of Public Health. Applicants for degrees are asked to submit a general outline of their plans to the Secretary.

Several fellowships are also available for award to those qualified to take up work in any of the medical sciences bearing upon public health, in vital statistics, or in the more directly practical divisions of public health work. The salaries are \$1200. Correspondence concerning these should be addressed to the Secretary of the Harvard School of Public Health, Boston, Massachusetts.

A Short Course.

An intensive course of industrial hygiene, extending for one month, is under the general direction of Dr. Wade Wright, Instructor in Industrial Medicine, with the coöperation of special lecturers and assistants. The course comprises 96 hours, of which half are devoted to didactic instruction, and half to clinic demonstrations and visits to industrial and mercantile establishments. The time of the student is allotted as follows:—

Industrial Medicine (22 hours).—Twelve lectures on industrial toxicology, four lectures on certain specific industrial diseases, and six attendances at Massachusetts General Hospital, where cases of industrial disease are observed and methods for the study of industrial morbidity demonstrated.

Industrial Medical Practice (12 hours).—Industrial medical service, including dispensary organisation, personnel, methods and records; physical examination, industrial psychiatry and health education extended over eight hours, while two hours are devoted to the discussion of nutrition and industrial cafeterias and two hours to mercantile health work.

Factory Hygiene (14 hours).—Ventilation, exhaust systems, humidity and dust determinations are the subject of four lectures and one demonstration; illumination and photometric determinations, two lectures and one demonstration; sanitary installations and restaurants, one lecture; and industrial seating, one lecture.

Factory Operation.—A course of eight lectures on industrial organisation and methods is given.

Labour Legislation.—Workmen's compensation laws and the problems specially concerning women and children in industry are discussed in four lectures.

Field Investigation.—Visits to representative industrial and mercantile establishments are estimated to take eight half-days and two whole days.

General Course.

For students who desire to prepare themselves for work in the field of industrial hygiene, programmes may be arranged extending over a full academic year, leading to the degree of Bachelor of Public Health. It is suggested that the following courses, in whole or part, would be of special value as preparation for industrial medical service: Industrial Toxicology, Ventilation and Illumination, Vital Statistics, Physiology.

² Jour. Roy. Stat. Soc., 1922, lxxv., 555.