maintain and develop the normal work of the Ministry, and that the main indexes of progress in health and public welfare during 1938 show no faltering in the upward tendency of every recent year.

Compared with the previous year, the standardized death-rate fell by 0·8 to 8·5 per 1,000 population. This is the lowest figure on record, and compares with a rate of about 12 twenty years ago. Infantile mortality fell by five points from the 1937 figure to a new low record of 53 per 1,000 live births. That most regrettable form of death, maternal mortality, fell for the first time below 3 (2·97) per 1,000 total births. The slight upward trend in the birth-rate, which first became apparent after the low record of 14·4 in 1933, carried the figure for 1938 to 15·1 per 1,000 population, though the latter figure is still below that of every year before 1933. Deaths from tuberculosis, numbering 26,176, were actually fewer by 2,353 than in 1937, the biggest fall in one year since 1934. The anti-tuberculosis service of local authorities, together with better general hygiene and housing, sanitary environment and protection of the milk supply, appear to be exerting a continuous and satisfactory effect in the reduction of this disease.

On the other hand, cancer mortality still gives cause for anxiety, for the total number of deaths attributable to cancer in 1938 is estimated provisionally at 68,600 as compared with 66,991 in the previous year. Cancer deaths, in fact, have been steadily increasing in every year, from 27,487 in 1901 to the present time. Cancer is, however, a disease to which young persons are less susceptible than the middle-aged or old, and it is common knowledge that the young are becoming proportionately less numerous in the population, and the increase in cancer mortality in recent years may, therefore, be more apparent than real. A disturbing factor is that investigations pursued by the Ministry show that, in spite of recent developments in cancer treatment, a large proportion of sufferers who could benefit from treatment, if it were given sufficiently early, either do not receive treatment at all, or receive it under unsatisfactory conditions or at so late a stage in the disease that cure, or even temporary relief, is impracticable. There is, moreover, a deficiency of accommodation at hospitals possessing adequate facilities for all forms of treatment. It is to be hoped that a new Cancer Act, passed in March last, may remedy this unfortunate position.

Of the infectious diseases, the number of notified cases of the enteric fevers decreased from 2,149 in 1937 to 1,322 in 1938, and the deaths from 206 to 163, the lowest ever recorded, except for 1934. Notified cases of pneumonia were considerably less than in the previous year, but an exceptionally large number of cases of acute poliomyelitis (infantile paralysis) occurred, namely, 1,489 compared with 768 in 1937, and still fewer in the previous three years. There were 65,000 notifications of diphtheria, 4,000 more than in 1937, though the deaths (nearly 3,000) remained practically the same. An efficient method of artificial immunization for the prevention of diphtheria is now available, by means of which this disease has been almost stamped out in certain American and Canadian cities. It is regrettable that immunization is not more widely practised in Great Britain, particularly as welfare authorities have, and local authorities can obtain, powers to adopt it. Eighteen cases of smallpox were notified in 1938, with three deaths, the first deaths from this disease to have occurred since 1934. Here again it is disturbing to find that infantile vaccination has been steadily declining, so that in 1937 only 34 per cent of that year's infants were vaccinated.

Much information is given in the report upon housing and town planning. Slum clearance and rehousing has been proceeding and continues to grow, together with abatement of overcrowding. The total number of houses completed by local authorities during the year was 101,744, the highest number in any year since 1927–28. The Housing (Financial Provisions) Act, 1938, which has come into operation, contains provisions for the encouragement of the building of new houses for the agricultural population, and should improve the conditions of agricultural workers and benefit agriculture, for "the lack of cottages supplied with modern amenities is one of the main factors which accounts for the desertion of the land, especially by the younger generation".

Other developments recorded during the year include the passing of the Food and Drugs Act, which brings together for the first time the statute law relating to the purity and soundness of food and drugs, and the receipt of 652,899 initial applications for admission to the new pensions scheme for 'black-coated' workers.

For the first time, a chapter on civil defence is included. This contains two sections, one on evacuation, providing for the movement of some 3,000,000 people in an emergency, which has been successfully carried out since the report went to press, and another on the Emergency Medical Services for the treatment of air raid casualties, which will provide 290,000 emergency beds in England and Wales.

PROGRESS IN SEISMOLOGY

THAT the study of earthquakes has been actively pursued in Great Britain during the year September 1938–September 1939 is indicated in the report of the Committee for Seismological Investigations to the British Association meeting at Dundee, which for the first time since 1912 is without the name of Sir Frank Dyson. His death has been a severe loss to the committee, as his wise counsel was always greatly appreciated by his colleagues.

This forty-fourth report of the committee has been edited by the chairman, Dr. F. J. W. Whipple, who states that another Milne-Shaw seismograph has recently been made for the British Association and sent, together with a high-precision clock, on loan to the Fiji Government at Suva. The need for this to replace the old Milne instrument was brought to the notice of the British Association by the newly formed Seismological Investigations Committee of the Australian and New Zealand Association for the Advancement of Science; and brings the number of such instruments owned by the British Association up to seven.

The records from the Suva station are particularly important for the study of deep-focus earthquakes,

since these are frequent in the region to the south-east of Fiji. In the new Suva instrument and other Milne-Shaw seismographs of recent date, Mr. J. J. Shaw has made an improvement by having the agate cups surrounded by light aluminium bands so that the seismograph is not jerked out of action by severe local shocks.

Dr. A. E. M. Geddes has been making observations with the Milne-Shaw instruments at Aberdeen, using the method developed by Dr. A. W. Lee at Kew, to see whether the free motion of the seismograph was in accordance with the mathematical theory of damped periodic motion, and to find whether or not the period could be determined by removing the damping magnets. He found that the agreement with the theory was very satisfactory, but that an increase of the order of 10^{-1} sec. in the period may have been due to damping. Dr. Geddes suggests that this may have been on account of the boom of the pendulum being somewhat paramagnetic.

The Jagger shock recorder built for the Association at Bristol under the supervision of Dr. C. F. Powell has been installed at Dunira, Comrie, Perthshire, in a croquet house, through the courtesy of Mr. W. G. Macbeth. Its position is lat. 56° 23′ 19″ N., long. 4° 2′ 41″ W., three miles north northwest of the Highland boundary fault. The pendulum oscillates in a vertical plane orientated N. 76° E., is adjusted to a period of nearly a second, and is damped by means of a metal fin dipping into an oil bath. It is intended to record only local shocks; the records are obtained on smoked disks, which are changed every twenty-four hours. An anonymous donor has offered to provide for some years an honorarium to the keeper, and this has been gratefully accepted by the committee. During the year the chief local shocks recorded at Comrie have been October 15, and November 12, 1938, January 23, May 26, 31, and June 11, 1939. None of these was recorded by other seismographs in Great Britain or felt by people. They may be supposed to have been due to movements at the boundary fault. British tremors probably due to subsidences have been reported to Dr. Dollar as having occurred at Brierly, Yorkshire, on November 12, 1938, and at Porth, Glamorganshire, on December 18, 1938. From October 1939 Dr. Dollar will be pleased to receive observations of British earthquakes at the Geology Department, University of Glasgow.

At Oxford the work of the International Seismological Summary has continued, and through the courtesy of the American Museum of Natural History in New York, two Mollweide projection maps centred on 160° longitude have been prepared, one for deep focus epicentres and the other for all epicentres used in the I.S.S. during the years 1913–1933. Copies of these maps were sent to Washington for the meeting of the International Union of Geodesy and Geophysics held last month, and it is noteworthy that at this meeting a seismological committee under the chairmanship of Dr. S. W. Visser was to discuss technical details concerning the I.S.S., including the possible use of geocentric co-ordinates instead of geographic co-ordinates. Dr. H. Jeffreys, who has been appointed a member of this international committee, has been active recently in computation, chiefly from the data of deep-focus earthquakes, of the travel times of various phases of earthquake waves, including those reflected and refracted at the core. For this latter purpose the radius of the outer core had to be evaluated from the available data, and this is now estimated to be 3473 ± 4 km. Dr. R. Stoneley has continued his study of Rayleigh waves and Love waves, and now believes that significant differences in the relative frequency of these in different earthquakes imply differences in the types of initial movement at the foci. One of the pioneers of British seismology was the late Dr. John Milne, who wrote the book "Earthquakes and other Earth Movements". As a result of the progress made, often as the result of work initiated by Milne himself, Dr. A. W. Lee has practically had to rewrite this book though keeping to the form devised by Milne. The revised book has been published during the year under the title "Earthquakes and other Earth Movements" by J. Milne and A. W. Lee (see NATURE, 143, 872; 1939).

THE ETHYL-THIOGLUCOSIDES AND A NEW MONOACETONEGLUCOSE

IN attempting to synthesize disaccharides from glucosediethylmercaptal, Brigl, Gronemeier and Schultz (*Ber. deutsch. chem. Gesell.*, May 1939) have obtained an ethyl-thioglucoside with properties very different from those of the α- and β-forms described by Schneider and Sepp (*Ber.*, 1916 and 1918). It is now maintained that the new strongly dextro-rotatory compound and the lævo-rotatory so-called β-form both possess the pyranose ring structure, whilst the dextro-rotatory α-form must be a furanoside. Convincing proof of the structure of this furanoside is obtained from experiments with acetone derivatives in which the 5.6 positions must be occupied by the *iso*-propylidene group. By condensation of glucose diethylmercaptan with acetone in presence of a finely powdered preparation of copper sulphate from which just half the normal water of crystallization had been removed, 5.6-monoisopropylidene mercaptal was prepared, from which, with the aid of mercuric chloride and cadmium carbonate, 5·6-acetonethioglucoside was formed.

Any doubt as to the positions occupied by the isopropylidene group is removed by the elimination in one stage of the two mercaptan groups of the mercaptal with formation of a hitherto unknown 5.6-monoacetoneglucose, which reacts with more acetone to give the well-known 1.2.5.6-diacetone derivative. Thus Schneider and Sepp's α-compound must be a furanoside and the new monoacetoneglucose a glucofuranose, since the possibility of forming a pyranose ring is definitely excluded.

An interesting reaction occurs between this glucofuranose and Schiff's reagent. The colour is restored slowly but clearly within a few minutes and fades again after long standing. This is explained by the tendency of the furanose to revert first to the aldehydic open-chain structure and later, after fission of the acetone group in the presence of acid,