

which formerly received the bulk of European emigrants. One effect of such restriction in the United States is labour shortage, resulting in an increased internal migration of negroes and Mexicans. Higher wages and improved hygienic and social conditions tend to increase the duration of life and reduce the infantile mortality of the negro, and this, with the absence of European immigration, must raise the proportion of negroes in the population. This view was not accepted by several of the American delegates, one of whom instanced the fact that birth control clinics were now being opened and considerably used by the negro population of the Harlem district of New York.

Dr. G. W. Kosmak dealt with the position of the obstetrician in relation to certain aspects of the population problem. He expressed the opinion that certain developments in the practice of obstetrics at the present time may have a not inconsiderable effect in reducing the birth-rate; for example, the increase in operative deliveries, which result in a higher mortality, and at the same time undoubtedly produce increased sterility through infection. He pointed out that the dread of maternal mortality played its part in the encouragement of women to have recourse to birth control.

In a paper on the future of the Belgian population, Prof. Baudhuin, of the University of Louvain, concludes that the population is now approaching its maximum, which it will attain about 1940, when it will number 8,110,000; and that after this there will be a gradual decline, so that in the year 2000 it will be only 5,760,000.

Further interesting papers on this subject were presented by Mr. Lotka, Dr. Wicksell, and others,

and, in the concluding sessions, papers dealing with the broader biological aspects of the population problem were presented by Mr. Elton, who dealt with the cyclical variation in the numbers of lemming, Arctic fox, and field mouse population, and by Mr. J. A. Fraser Roberts, who discussed the significance of the results of mass selection in the improvement of the breeds of domesticated animals.

The function of the Union is to discuss such matters as the above dispassionately and scientifically, and it is doing its best to carry out this duty, though somewhat hampered by want of funds. Much of the money which has hitherto been spent on the work of the Union has been presented by generous individuals and institutions in America; it is the turn of other countries to follow such a good example, especially as an excellent opportunity now offers itself. The chairman of the American National Committee, Dr. Louis I. Dublin, informed the general assembly that certain sources in the United States would be prepared to pay to the Union the sum of 5000 dollars a year, for three years, on the condition that a similar total sum was presented to the Union by individuals, or institutions, in other countries. This offer was gratefully accepted by the general assembly. Will not those who are interested help by their subscriptions to make this generous offer available? Subscriptions may be sent to the General Secretary, International Population Union, 46 Catherine Street, Westminster.

Prof. Eugen Fischer extended an invitation, which was unanimously accepted, to the Union to hold its third general assembly in Germany in 1934.

Obituary.

MR. W. F. DENNING.

AS announced in *NATURE* for June 20, the veteran astronomer, Mr. William Frederic Denning, died at Bristol, mainly as the effect of the weakness of age, on June 9 last.

Mr. Denning was world-famous, having a reputation based on careful and assiduous use of the telescope, but known more especially for his naked-eye observation of the flight of meteors and his deduction from them of radiant points that form a large part of contemporary knowledge of this byway of science.

Denning was born on Nov. 25, 1848, at Redpost, near Radstock, in Somerset. When quite a boy the aspect of the night sky had an attraction for him, and at the age of seventeen he became possessed of a 4½-inch refracting telescope, which was followed in 1871 by a 10-inch reflector, with which his more important observations were made. At the period when Denning began his astronomical career, the medium for publications relating to the science was the *Astronomical Register*, a monthly periodical started in 1863, in which astronomers made public their views and observations; and to this Denning began to contribute in 1868, his earliest communications being on the

surface of Jupiter and the appearance of its satellites, and others on the visibility of Mercury with the naked eye, which was a subject to which he gave much attention throughout his life. A letter in the issue of December 1868 on his observation of the Leonid meteors of that year is interesting as foreshadowing the main work of his life. In 1869 an organisation known as the Observing Astronomical Society was formed under the auspices of the *Register*, which numbered more than forty active members in its second year, and of this Denning was secretary and treasurer. The pages of the periodical show how well he fulfilled the duties of his office during the few years of the existence of the Society. He was president of the Liverpool Astronomical Society in 1887-88.

Denning did not become a fellow of the Royal Astronomical Society until June 1877, but he contributed several short papers to the *Monthly Notices* before that date, with Mr. Proctor, Mr. Main, or some other as sponsor—among these being notes on the visibility of Mercury as a naked-eye object in the twilight, and of the possibility of seeing Jupiter and Venus in sunshine, which he said he was frequently able to do. The majority of them, however, were records of his observation of luminous

meteors, and one communicated in April 1876 is specially to be noted, for it was a determination of twenty-seven radiant points that he had determined from his own observations, and was the first of a series of such papers that he contributed during his career. Reference is made in it to similar lists of radiant points by Greg, Tupman, Herschel (Alexander), and to a committee of the British Association on luminous meteors that had published full reports for several years past—for there were many workers in this field at the time, and Schiaparelli had already put forward his views on the relation between meteor-streams and cometary orbits. It is clear that at the beginning of the nineteenth century shooting stars were considered to be of electrical origin, though aerolites found on the earth were recognised as having come from without. It was not until about 1834 that the significance of meteor radiation was recognised as indicating direction in space, and hence later came the further conclusion that meteors move in orbits around the sun.

Denning evidently determined to associate himself with the band of workers in this new branch of science, and to take his full share in the arduous duty of observing. He has described his plan of working in his paper of May 1890, this being a catalogue of 918 radiant points of shooting stars observed at Bristol:

“All the observations were made in the open air and from the garden adjoining the house. Attention was almost invariably given to the eastern sky. In mild weather I sat in a chair with the back inclined at a suitable angle; but on cold frosty nights I found it convenient to maintain a standing posture, and sometimes to pace to and fro, always however keeping the eyes directed towards the firmament in quest of meteors.”

Denning's papers on meteors were many, and touch the subject at many points. Bare mention can only be made here of stationary radiants, a difficult subject depending largely on his observations as data. Almost the last of these papers was one in November 1923, which is a catalogue of 314 radiants from observations made at Bristol between the years 1912 and 1922, and, with those in three previous lists of which this is a continuation, brings the total of radiant points determined by him to nearly 1500. The number of meteors observed by him in the years specified was 6220, and of these the flights of 4008 were recorded. This paper contains some notes embodying items from his experience or his views on various meteoric subjects that make it valuable. A General Catalogue of more than 4000 radiant points determined by himself and others, compiled by him, is to be found in vol. 53 of the *Memoirs of the Royal Astronomical Society*.

Besides the large amount of naked-eye observing here indicated, Denning found time to use his telescope, and in this respect his success was noteworthy. The search for comets is a task requiring assiduity and patience, and he was rewarded for efforts of this kind by the discovery of five. His first was on October 4, 1881, and the comet then

discovered, after being further observed by himself and others, was believed to be periodic, but was, however, not seen afterwards. Comets discovered by him in 1890, 1891, and 1892 were not periodic, whereas for the fifth, discovered in 1894, a period of 7.3 years was computed. Many nebulae not previously known were found by him in the course of his search for comets, and the Nova in Cygnus of August 1920 is credited to him as its first observer.

It is difficult to summarise or comment on Denning's observations of Jupiter and the other planets, but they comprise many determinations of rotation period of the giant planet from observation of various spots. He gave to the world his knowledge so gained in a book, “Telescopic Work for Starlight Evenings”, published in 1890; and a brochure on the planets Mercury and Venus, a reprint of chapters contributed to the *Observatory* magazine, is a valuable summary of experience. In 1895 the Valz prize of the Paris Academy was awarded to him for his meteoric work, and in 1898 Denning was the recipient of the gold medal of the Royal Astronomical Society, the grounds for the award being his meteoric observations, his cometary discoveries, and other astronomical work. He received the degree of M.Sc. from the University of Bristol in 1927 *honoris causa*. In the year 1904 he was granted a Civil List pension of £150 a year for his services to science, for he followed no profession. In his youth he had worked with his father, who was Borough Accountant of Bristol, and it is somewhat unexpected to learn that at that time he was a cricketer of skill and reputation, and that he might have been included in the eleven representing his famous county. But he preferred a secluded life that he could devote to astronomy. Though not inclined to make friends personally, he had a large list of correspondents, whom he was always ready to help with advice, and one passes from among us who lived solely for the acquisition of abstract knowledge, for which he endured much self-sacrifice and sought no personal reward.

H. P. H.

WE regret to announce the following deaths:

Prof. Solon Irving Bailey, emeritus professor of astronomy in Harvard University, on June 5, aged seventy-six years.

Prof. Friedrich Becke, formerly general secretary of the Vienna Academy of Sciences, on June 18, aged seventy-six years.

Sir Hugh Bell, Bart., chairman of the council of Armstrong College, Newcastle-on-Tyne, and past-president of the Iron and Steel Institute, who occupied a prominent place in the industrial life of the north of England, on June 29, aged eighty-seven years.

Mr. E. W. Blair, senior scientific officer of the Royal Naval Cordite Factory, Holton Heath, who was killed in the explosion at the factory on June 23.

Dr. T. F. Chipp, assistant director of the Royal Botanic Gardens, Kew, on June 28.