fogs in London seems to have become definitely smaller in recent years, but it is difficult to say exactly why this is so. Unfortunately, the output of pollution does not seem to have decreased in the same ratio, although there was a substantial decrease in the years 1918–23.

One way in which we can get an estimate of the amount of domestic and industrial smoke is to measure the pollution on the different days of the week. On Saturday afternoon and Sunday, a great proportion of the industrial fires, including office heating, will be out or very low. On the other hand, domestic fires will go on as usual or may be slightly increased. It is found that there is a fall on Saturday afternoons and a marked drop on Sundays except in purely residential districts, the percentage drop varying between the residential and industrial parts of a town. On the average, the Sunday pollution in the centres of towns is about half to three quarters of the weekday pollution, and as a very rough estimate we may take the smoke pollution to be two thirds domestic and one third industrial in origin.

There is a greater reduction of sulphur than of smoke at week-ends. This is because a greater proportion of smoke is produced from open fires in houses. In central Leicester on winter weekdays, two thirds of the sulphur is of domestic origin whereas three quarters of the smoke is of domestic origin. This all shows how much more wasteful of fuel we are in the home than in the office or factory. If domestic heating and cooking were done as economically as industrial heating and steam-raising, we should use less coal in houses than industries, not more. These figures refer to peace-time, of course.

It may not be out of place finally to take a look at the problem with a view to the future and see what could reasonably be done to remove the evil. Of the three evils, 'smoke', 'ash' and 'sulphur', it is reasonably easy to prevent the emission of ash from industrial plants without placing too great a financial burden on industry, and one may hope that this will be made compulsory. The ash from domestic fires is probably too small to cause a serious nuisance.

The removal of 'smoke' depends on burning fuel in a proper manner. There seems no reason why most industrial plants should make any great amount of smoke, and even now the best plants are practically smokeless. Smoke means loss of fuel and it should be in the interest of the industries themselves to burn their fuel efficiently. A reduction in domestic smoke is likely to come about through the ever greater use of gas and electricity for cooking and heating, while smokeless fuel may replace some raw coal. If district heating is widely adopted, it should also help very much. Any method of increasing the efficiency of the open grate would improve matters, but short of abolishing open coal-fires altogether, the most effective reform would be to consume the smoke emitted during kindling and refuelling.

From time to time there have been suggestions that 'smokeless zones' should be established in the centre of cities where no coal could be burnt in such a way as to produce smoke. The results of the detailed work at Leicester allow us to make a rough estimate of the effect. While such efforts are greatly to be encouraged, no striking effect is to be expected unless the smokeless zone is large, owing to the smoke from the surroundings which will be carried into it.

To prevent the emission of sulphur dioxide may prove to be the greatest difficulty. However efficiently coal is burnt, the amount of sulphur dioxide formed depends only on the weight of coal consumed and the sulphur content of the coal. Unless some means is provided for absorbing the sulphur before the gases are discharged into the air, little improvement can be obtained, though washing the coal removes some of the sulphur. Some of the great electric power stations have means of absorbing the sulphur gases, but from by far the greatest amount of coal burnt all the sulphur dioxide formed is discharged into the atmosphere. There is some hope that, in the not too distant future, apparatus for absorbing sulphur gases may be practicable for much smaller plants, but it is perhaps too much to hope that such means could be generally adopted for the domestic fire. If communal or district heating were introduced on a wide scale, the central plants might be fitted with sulphur absorbers. The use of coal gas (where almost all the sulphur is removed) or of electricity (provided sulphur-absorbing plant is installed at the power stations) on a very much greater scale than at present may be the final solution.

It is greatly to be hoped that in planning the new Britain all practicable measures to reduce atmospheric pollution will be adopted.

OBITUARIES

Mr. Rollo Appleyard, O.B.E.

ROLLO APPLEYARD, whose death occurred on March 1, was one of those pioneer engineer-physicists who did so much during the last few decades of the nineteenth century to establish British electrical industry on a scientific basis. Born in 1867 and educated at Dulwich, he was fortunate, as a student at the City and Guilds Institute, to come under the influence of that great coalition Profs. Ayrton and Perry. Bedford College and Coopers Hill College in turn welcomed him afterwards on the physics side.

At the age of twenty-five, Appleyard joined the technical staff of the India Rubber and Gutta Percha Company at Silvertown, where he remained for twenty-two years. Among his colleagues at this time was Rymer-Jones, of world-wide submarine cable reputation, and during this period Appleyard devoted a good deal of time and thought to dielectric and conductor problems in submarine cables. He contributed many papers to the *Proceedings of the Physical Society*, the *Phil. Mag.* and to the engineering institutions, as well as articles to the electrical press. These covered a variety of subjects including electrical alloys, network problems, submarine cable testing and apparatus for this purpose, coherers, surface tension and thermometry. He was mostly interested in dielectric theory, and an outstanding example of his practical application of his knowledge of physics was the production of the submarine cable connecting Honolulu and San Francisco, in which he achieved the lowest dielectric constant obtained on any submarine cable to that date.

In the improvement of the conductor for long-distance submarine cables, Appleyard invented the 'conductometer', an instrument for the measurement of electrical conductivity, and his paper on the subject before the Institution of Civil Engineers gained him the Telford Premium in 1903. As evidence of his versatility and long interest in technical matters, it may be recorded that seventeen years later the award was made to him a second time, for a paper on the mathematics of catenaries. While

at Silvertown he also devoted considerable thought to the physics and the development of the intricate mechanism involved in the formation of a golf ball core.

During the War of 1914–18, Appleyard worked in the Admiralty and Air Service, where his unique combination of practical engineering knowledge and physics training enabled him to make many contributions to the war effort, for which the O.B.E., as a mark of recognition, was conferred upon him. He introduced improvements in the measurement of height by barometer and the design of instruments used for many different purposes.

Throughout his life, Appleyard showed a marked literary talent which for many years revealed itself in his papers and articles. Towards the end of the War of 1914–18, he produced several valuable confidential reports for Government Departments, and directed for some time the technical history section of the Admiralty. He was a member of the editorial staff of *The Times Engineering Supplement* for some nine years from its establishment in 1905. As one of the abstractors in the early days of *Science Abstracts*, he did useful work, but perhaps he will best be remembered for his delightful biographical works: "Pioneers of Electrical Communications", "A Tribute to Faraday", and others. These, along with his "History of the Institution of Electrical Engineers", will for many years to come remind the members of that body, among whom he counted so many friends, of his engaging character. Mostly perhaps will he be missed in those more intimate circles, the Athenæum, the 25 Club and the Dynamicables, where his grace and charming personality were always a delight to his fellow-members.

P. DUNSHEATH.

WE regret to announce the following deaths:

Sir Sidney Burrard, Bart., K.C.S.I., F.R.S., formerly Surveyor-General of India and superintendent of the Trigonometrical Survey of India, on March 16, aged eighty-two.

Prof. H. G. Denham, dean and professor of chemistry, Canterbury University College, Christchurch, New Zealand, and chairman of the New Zealand Council of Scientific and Industrial Research, aged sixty-two.

Prof. J. Eustice, emeritus professor of engineering at University College, Southampton, on February 24, aged seventy-eight.

Dr. F. G. Parsons, research fellow in anthropology at St. Thomas's Hospital and formerly professor of anatomy, University of London, on March 11.

Mr. H. E. Stilgoe, C.B.E., formerly chief engineer of the Metropolitan Water Board, and a past-president of the Institution of Water Engineers, the Institution of Municipal and County Engineers and the Town Planning Institute, on March 12.

NEWS and VIEWS

Cambridge University Botanic Garden

WHEN Mr. Reginald Cory, a graduate of Trinity College, died in 1934, he bequeathed the residue of his estate to the University Botanic Garden at Cambridge. Mr. Cory, who was himself a great gardener and helped to finance expeditions to China and other countries to collect plants that could be grown in British gardens, was a generous benefactor of the Cambridge Garden during his lifetime. His handsome final bequest has now begun to accrue, and from this time onwards the garden will benefit by £9,000, rising eventually to £13,000, a year. In accordance with the terms of the will, only £1,000 a year of the legacy can be devoted to maintenance, the remainder being available for capital expenditure, including the purchase of land for the extension of the garden. The Cory Fund will be administered by six members of the senate, including the Professor of Botany and the University Treasurer.

The Cambridge Botanic Garden, which is a part of the University Department of Botany, has already a deservedly high reputation, but there are now great possibilities of further enhancement, especially as regards the variety of plants cultivated in it and the general beauty of the Garden. In the past, many important botanical investigations have been carried out there, and in view of the opportunities now available it is anticipated that several branches of botany will be greatly assisted. Of the total area of forty acres, about eighteen have been used as garden allotments for many years. After the War, it may be considered desirable to incorporate these into the Garden proper. An arboretum is a great desideratum, but this may have to be established on a different site as the soil is unsuitable for certain conifers. The Garden at present lacks protection from the north and east, and a good wall against which the more delicate shrubs can be grown is an urgent necessity. Much greater facilities could be usefully provided for growing water-plants as there is a stream contiguous to the Garden. The range of glasshouses could also be advantageously extended, giving additional provision for the cultivation of ferns and bryophytes, and tropical and sub-tropical flowering plants. No doubt all these possibilities will be weighed by the managers of the Cory Fund.

Nature Reserve at Oxford

THE University of Oxford has accepted, as a gift from Mr. and Mrs. H. Spalding, eighteen acres of meadow land on the left bank of the River Cherwell opposite the walk known as Mesopotamia. This land is to be maintained as a nature reserve, to preserve in perpetuity a piece of water meadow, characteristic of the Oxford basin, for the enjoyment of the public, and to afford facilities for observation of the plants and animals inhabiting this type of land. The meadow land includes a small triangular area at its south end which, surrounded by old hedges, might, if suitably planted, develop into a woodland plot tempting to nightingales, which at present are not audible from Mesopotamia. The area is at two levels, that nearer the river being liable to flooding. The blight of suburban extension has already threatened that part farthest from the river with untidy neglected fields and huts, and the preservation of Mr. and Mrs. Spalding's gift will protect Mesopotamia from further spoliation of the river. Administrative control is to be vested in the Curators of the Parks who, in consultation with a committee of naturalists, will manage