Manchester and London will join in these observations.

The new movement initiated by the committee for studying and recording the character of the soot-fall in various industrial centres of the United Kingdom is, therefore, meeting with considerable support; and there is little doubt that the observations and records will prove of decided value to all interested in the progress of smoke abatement.

Dr. W. N. Shaw, F.R.S., director of the Meteorological Office, is chairman of the committee; and its hon. secretary is Dr. J. S. Owens, 47 Victoria Street, S.W., from whom any further particulars regarding the work of the committee can be obtained.

LORD CRAWFORD, F.R.S.

AS announced with regret last week, James Ludovic Lindsay, the twenty-sixth Earl of Crawford, died on January 31. Born at St. Germain-en-Laye on July 28, 1847, he was educated at Eton and Trinity College, Cambridge, and for a short time served as lieutenant in the Grenadier Guards, but his early developed scientific tastes led him to resign the service and devote himself to astronomy and bibliography.

As Lord Lindsay he first became known to readers of NATURE by his organisation of an expedition to observe the total eclipse of the sun near Cadiz on December 21, 1870, and by the establishment, soon afterwards, of his observatory at Dun Echt, Aberdeenshire. Its astronomical equipment was far in advance of any other observatory in Scotland and second only to that of Greenwich in the United Kingdom, for it contained a fine 15-inch equatorial refractor by Grubb with many improvements on former designs, a transit circle of 8-in. aperture by Troughton and Simms, a fine heliometer by Repsold of 4-in. aperture, a 6-in. equatorial refractor by T. Cooke and Sons of York, two reflecting telescopes with silver-on-glass mirrors of 12-in. aperture, both equatorially mounted, a Foucault siderostat by Eichens of Paris, with 16-in. mirror by M. Martin, a 40-ft. photographic lens by Dallmeyer (to be used to photograph the transit of Venus), a 12-in. altazimuth by Troughton and Simms, and a large collection of smaller astronomical and physical apparatus, including the largest electro-magnet then in existence.

Simultaneously with the erection of this observatory (1871–1874) Lord Lindsay was organising an expedition to Mauritius for the purpose of observing the transit of Venus in December, 1874, and there are those who remember the astonishment and interest with which astronomers first read in the Monthly Notices of the Royal Astronomical Society for November, 1873, of the scope and extent of these preparations. The very important results of that expedition are published by him in vols. ii. and iii. of the Dun Echt Observatory Publications. They not only include determinations of the longitudes of Alexandria, Suez, Aden, Seychelles, Reunion and Mauritius, but also an experimental determination of the solar parallax by heliometer observations of the minor planet Juno. This latter series of observations was probably the most important result of all the many costly transit of Venus expeditions, for it proved concl sively that the heliometer method of observing minor planets was capable of determining the solar parallax with a precision and certainty that is unattainable by the historic method of the transit of Venus.

On his return to England Lord Lindsay, in addition to his duties as Member of Parliament for Wigan, continued to perfect the equipment of his observatory, and made researches on the spectra of stars, planets and comets—adding at the same time continually new treasures to his splendid astronomical library.

He also instituted, under the able editorship of Dr. Ralph Copeland (who was in charge of his observatory from 1876 to 1889), the valuable series of Dun Echt circulars, by which early intimation of astronomical discoveries was communicated to astronomers.

On the death, in 1880, of his generous and highly cultured father, the twenty-fifth Earl of Crawford, he succeeded to the earldom. The many responsibilities and occupations which then crowded upon him prevented him from taking much farther part in active astronomical research, and although his interest in it never abated, he thereafter left the work of the observatory almost entirely in the hands of Dr. Copeland.

For some years previous to the retirement of Prof. Piazzi Smyth, in 1888, from the post of Astronomer Royal for Scotland, the question of reorganising the Edinburgh Observatory had been under consideration—and it had even been proposed to hand it over to the University. But this was prevented by Lord Crawford's timely action and noble generosity. He offered the whole of the beautiful instrumental equipment of his observatory and its splendid astronomical library to the nation on the sole condition that the Edinburgh Observatory, thus enriched, should be maintained as a royal observatory. This offer was finally accepted and Dr. Copeland was appointed to the vacant offices of Astronomer Royal for Scotland and professor of astronomy in the University of Edinburgh in January, 1889. The great national observatory on Blackford Hill, which owes its existence to the generous action above described, was formally opened in April, 1896, by Lord Balfour of Burleigh in the presence of Lord Crawford.

Our limits of space render it impossible to do justice to the varied activities of Lord Crawford's life; we have therefore confined attention to the side of his career by which his name will chiefly be remembered in the scientific world, although the narrative conveys but little idea of his mental grasp and breadth of view. He had an inborn genius for mechanics and engineering, a love of science in every form, and a passion for travel; and he inherited from his father the love of all things rare and beautiful, together with the instinct of the antiquarian, the bibliophile and the collector. His generous and sympathetic nature endeared him to all who were his fellow-workers, and more than one man has to thank him for scientific opportunity that would otherwise have been denied him.

Lord Crawford's health in his later years was far from good. He once wrote: "It has been my lot to live in close communication with two inseparable hangers-on, the one rheumatism, the other asthma. I found relief by going to sea, provided it was towards the Sunny South. The cold damp of a home winter I have not faced for many years." During these voyages he made important collections of birds, fishes, insects and plants (many of them previously unknown to science), which were presented to the National History Department of the British Museum, or, in the case of live specimens, to the Zoological Society. The story of his last cruise in his yacht, the *Valhalla,* among the little-known islands of the Pacific is told by Mr. M. J. Nicoll in his "Three Voyages of a Naturalist."

During the last four years of his life Lord Crawford was almost a prisoner in his house, Cavendish Square, London, where he occupied a suite of rooms that was maintained at nearly uniform temperature. But his mental activity was unabated, and almost to the last he was closely occupied in preparing a catalogue of a vast number of documents he had gathered together relating to the French Revolution—a collection that includes more than 600 original letters of Napoleon the First.

Lord Crawford joined the Royal Astronomical Society in 1871, and became its president in 1878 and 1879. In recognition of his services to astronomy he was elected a fellow of the Royal Society in 1878. He was a trustee of the British Museum, a Knight of the Thistle, a Knight of Grace of St. John of Jerusalem, a Commander of the Legion of Honour of France and of the Rose of Brazil.

ORIGINS OF HELIUM AND NEON.

AT the meeting of the Chemical Society on Thursday last, February 6, two papers were read which have attracted great public attention. One was by Sir William Ramsay, on the presence of helium in an X-ray tube, and the other, on the presence of neon in hydrogen after the passage of the electric discharge through hydrogen at low pressure, was by Prof. Norman Collie and Mr. H. Patterson. An excellent account of the meeting appeared in *The Morning Post* of February 7, and upon it the subjoined revised report is based. Elsewhere in the present issue will be found a communication from Sir J. J. Thomson describing recent experiments of a somewhat similar character made by him, and his interpretation of them.

In the absence of the president of the Chemical Society, Prof. A. Smithells presided at the meeting of the Chemical Society at Burlington House on February 6. Sir William Ramsay, in his paper on the presence of helium in the gas from the interior of an X-ray tube, reminded the fellows that some years ago he and Mr. Cameron had obtained lithium from copper, though people were mildly incredulous. He had also published a statement to the effect that under the influence of radium emanation silicon gave some carbon dioxide, while with thorium a respectable quantity of carbon dioxide was obtained, the inference being that the element tended to break down to carbon, which in the presence of oxygen became carbon dioxide. When the time came for him to have to return the radium that had been lent to him he had looked about for some other substance with which to continue his experiments. Radium gave helium and niton, or radium emanation, and also heat and α rays. Niton was extraordinarily energetic, more so than any other known substance, so that a cubic centimetre of it gave more than three and a half million times the energy of a cubic centimetre of explosive gas. During the decomposition of the emanation α rays were given off and β rays with even greater velocity. The question to determine was whether it was possible to find signs of chemical transformation through the β rays, a difficult one when it was remembered that only 6 per cent. of the energy of emanation appeared in the form of β rays. He had made the attempt, however, with old X-ray bulbs. In the first instance his method had been to break the bulbs, and on analysing the gases contained in the glass by means of the combustion tube, he had found as the only gases helium, neon, and argon. Last November, instead of breaking the bulbs, he had heated them to three hundred degrees, and collected the gases, finding the spectrum of helium and also a small quantity of neon. As a result of these experiments there was no question that the bulbs contained helium. The problem was what was the source of this helium. It might have been derived from the electrons, or from contact with the kathode or anti-kathode, or from the contact of the kathodic rays with the glass. Last summer he had informed the society that on treating water with radium emanation, instead of getting helium, neon was got, the equation suggesting itself that helium (4) plus oxygen (16) equals neon (20). Thus at Bath, when the waters were charged with radium, great quantities of both neon and helium were produced.

Prof. N. J. Collie and Mr. H. Patterson read their paper on the presence of neon in hydrogen after the passage of the electric discharge through hydrogen at low pressures. Prof. Collie directed attention to the fact that he and Mr. Patterson had done the early portion of the work of their joint paper independently and from different points of view, and that it was only in the later stages of the work, when they had learnt that they were getting the same results independently, that they had collaborated. He described his early experiments, which had been undertaken on fluorspar with the hope of decomposing the fluorine by means of the electric discharge. On testing some fluorspar that Sir William Ramsay had received from Iceland last summer he had found that helium was given off. Further investigation showed that the spar gave off carbon monoxide and other gases, and when the problem had been investigated with one of Sir William Ramsay's ingenious pieces of apparatus it had been determined that on treating the spar neon was produced. Further investigation showed that the same result was obtained by using artificial calcium fluoride, and again by using glass wool, and then again by carrying out the discharge in the bare glass tube. What was the origin of the neon? Had air leaked in through the taps of the apparatus? Was it due to impurities in the hydrogen placed in the tube to con-