the 'mutation' had not been noticed in France at that date, and there is evidence that in some localities the failure to produce the characteristic perfume was not generally apparent until after 1916.

DURING the years that followed, it was believed that this failure to produce the 'musk' smell might be ascribed to some adverse condition of cultivation, and it was not known how world-wide was the phenomenon until Sir Arthur Hill, director of the Royal Botanic Gardens, Kew, in his presidential address before Section K (Botany) of the British Association in 1930 at Bristol, stated that, as a result of exhaustive inquiries in Great Britain and in western North America, it had been established that plants of musk with the old-fashioned and distinct fragrance were no longer to be found, even in their native habitat. Correspondence with New Zealand shows that the same thing has happened in all the stations where the plant was previously known to have been scented. Periodically reports reach Kew that the old scented musk has been rediscovered; unfortunately, the statements cannot be substantiated, and seeds submitted produce scentless plants or fail to germinate. Many ingenious suggestions have been made to account for the disappearance of the odour of *Mimulus moschatus* Dougl., but, so far, no conclusive theory has been offered.

Cancer Research

THE eleventh annual report of the British Empire Cancer Campaign, presented at the annual general meeting on July 9, contains summaries of a great variety of researches of different kinds, carried on in a number of laboratories and hospitals. Two of them are of particularly general interest. At the Middlesex Hospital, Prof. J. McIntosh has shown that tumours produced in fowls by the action of tar may be filtrable, that is, they may be transmitted from bird to bird by an ultramicroscopic agent which has many of the characters of a virus. In this way, the artificial tumours resemble those which spontaneously occur in birds, and filtrability seems to be a general property of bird tumours, irrespective of their mode of origin. The common-sense interpretation of this is that the virus-like agent arises in the tumour and does not come into the body from outside. At the Cancer Hospital, Prof. E. L. Kennaway, Dr. J. W. Cook and their colleagues have carried their brilliant work on carcinogenic chemicals a good deal further. Having at last identified at least one of the effective substances in tar, they have studied allied compounds and derivatives and have established what may be called a carcinogenic constitution, so that the probable action of any substance may to some extent be predicted from its structural formula. All this helps to rationalise the overwhelming hygienic case against tar and soot as causes of external cancers: it seems possible also that it may explain the origin of some internal cases, for some of the active substances are related to the sterols, bile acids and œstrin, which are normal components of the body. Conversely, as Prof. E. C. Dodds has shown, some substances which produce tumours are also effective in causing œstrus and sex changes in the plumage of birds.

A New Radioactive Element beyond Uranium

THE Czechoslovak newspapers reported on July 5 that an element of higher atomic weight than uranium has been discovered in Joachimsthal pitchblende by Dr. O. Koblic. The element has been assigned the atomic number 93 and its atomic weight has been found to be 240 from an analysis of the silver salt, $Ag(93)O_4$. The new element would be a congener of manganese and of rhenium, which was discovered in 1925. It should thus form an acid analogous to $HReO_4$ and also salts similar to the permanganates and perrhenates. Acting upon the supposition that the sodium salt of $H(93)O_4$ would be very soluble, Dr. Koblic concentrated the mother liquor from the alkali treatment of pitchblende in the extraction of uranium and radium compounds, and the acidified filtrate was precipitated first with silver nitrate and finally with thallium nitrate. This gave the expected $Tl(93)O_4$ as a red crystalline precipitate. It was re-converted into the more soluble yellow silver salt, 115 milligrams of which were obtained. The discoverer has suggested the name "Bohemium" for the new element, which he considers is probably the parent element of protactinium and the disintegration products of the actinium series. It is estimated that crude pitchblende contains about one per cent of the new element. It will be recalled that Prof. E. Fermi, of Rome, who is investigating the products of neutron bombardment of various elements, recently reported the discovery of an element of atomic weight exceeding that of uranium (see NATURE, June 16, p. 898).

Low Temperature Exhibition in the Science Museum

THE Science Museum—the National Museum of Science and Industry at South Kensington—has made for itself an enviable reputation by the special temporary exhibitions held in the past few years to illustrate the progress which has been made in various branches of science and technical industry. The most recent exhibition, which comes to an end on August 31, shows the public the principles and applications of refrigeration. In the original scheme, it was intended to include a few exhibits to show the progress which has been made in very low temperature work from the days when Faraday demonstrated that certain gases could be liquefied. It was soon realised, however, that the subject was too big and too important to be included merely as a branch of the present exhibition, and it was decided to devote to it an independent exhibition. As the result of a meeting arranged by Col. E. E. B. Mackintosh, director of the Science Museum, of scientific workers, industrialists and representatives of Government institutions interested, to consider the proposal, a small committee has been appointed to decide upon suitable exhibits. The exhibition will commence in March 1935 and will be on view for two months. The arrangements will be in charge of Mr. T. C. Crawhall, the officer of the Museum who was responsible for arranging the present refrigeration exhibition.

THE two laboratories in Great Britain which specialise in low temperature work, namely, the Clarendon Laboratory at Oxford, under Prof. F. A. Lindemann, and the Royal Society Mond Laboratory at Cambridge, under Prof. P. Kapitza, have offered the Museum their advice and assistance, and the Committee, under the chairmanship of Mr. H. T. Tizard, includes other well-known scientific workers and representatives of industrial organisations. The exhibition is primarily intended to show the properties of substances in the following low temperature regions :—solid carbon dioxide, liquid air, liquid hydrogen and liquid helium. As the use of these gases involves the liquefaction of gases obtained from the air, there will be exhibits to illustrate how the liquefaction and separation of these gases is performed in the laboratory and on an industrial scale, while the properties and uses of the gases and liquids will also come within the scope of the exhibition. The scheme is an ambitious one and there is no doubt that, with the support which the Science Museum has already received, it should result in an exhibition of great importance and interest. Col. Mackintosh desires that it should be comprehensive and he will welcome suggestions from anyone who has not so far been approached.

The Radcliffe Observatory

WHEN in the Court of Chancery on July 2 Mr. Justice Bennett approved in principle the application of the Radcliffe Trustees for permission to remove their observatory from Oxford to a site on the high veld near Pretoria, this project, which has been the subject of discussion for several years, reached a further and important stage in its development. Although the judge has reserved his final sanction of the scheme until he is satisfied as to certain details of law and finance, it is not anticipated that these will give rise to any serious difficulty. The Radcliffe Trustees have from the outset wished for some system of close co-operation between the observatory in South Africa and the University of Oxford, and it is intended that the scheme submitted to the judge for his final sanction shall set forth plans for such co-operation in a more concrete form than has hitherto been possible. The present buildings of the Radcliffe Observatory have to be vacated in the summer of next year, when they will be taken over by the Oxford Medical School, but several years must clearly elapse before the new observatory with its 72-inch telescope will be able to commence operations on the site on the hills outside Pretoria most generously presented by the municipality of that city. When it does, it will find waiting for it a vast field of nebulæ and faint stars yet unexplored with the spectroscope.

Heavy Hydrogen

THE intensive research on the new hydrogen isotope, 'heavy hydrogen', of mass 2, and on its oxygen compound, 'heavy water', some aspects of which have been summarised in NATURE (**132**, 536, 1933; **133**, 197, 881, 1934), has given rise to an extensive literature. It was to be expected, therefore, that a monograph on the subject would be written, and two such have recently appeared. In that of Prof. E. Darmois ("Un Nouveau corps simple : le Deuterium ou Hydrogène Lourd", *Actualités Scientifiques et Industrielles*, No. 121. Paris, Hermann et Cie, 1934, pp. 24)—to consider them in alphabetical order of authors—a brief account of the course of discovery, the methods of separation, and the properties of heavy hydrogen and heavy water are reviewed, with useful numerical data. There is a short account of the utilisation of the deuterium (heavy hydrogen) nucleus in atomic disintegration, and of the compounds of deuterium apart from the oxide. The monograph of Prof. H. Mark ("Das Schwere Wasser". Leipzig and Vienna, F. Deuticke, 1934, pp. 32) covers much the same ground, but is rather fuller in some parts than that of Prof. Darmois, and the converse is also true, so that both monographs are necessary in obtaining information on the whole range of the subject up to the date when they were written. Readers of NATURE who desire information on the subject of heavy water will find these monographs very convenient and useful : it is noteworthy that many of the communications listed in the bibliographies have appeared in our columns.

Chlorination of Water Supplies

AT the recent annual meeting of the British Waterworks Association, Prof. P. S. Lelean dealt with the history and present state of the methods of chlorination of water supplies. The process was used in 1897 after an enteric outbreak at Maidstone, and its application on a large scale began in 1900 at Ostend; but the modern process, in which much smaller amounts of chlorine are used, was first put into operation in connexion with the London supplies on the initiative of the late Sir Alexander Houston. The method was extensively used during the War, when perfectly safe drinking water was procured in large amounts from canals and other sources of highly polluted water. In modern practice, bleaching powder has been replaced by chlorine from liquid chlorine. One part of chlorine in ten millions can reduce *Bacillus coli* from 1,000 to 2 per c.c. in ten minutes. The chloramines formed by the action of chlorine on ammoniated water, however, are much more effective than chlorine alone. In the case of Thames water, an addition of 0·1 parts per million of ammonia, filtration, and addition of 0·25 parts per million of chlorine resulted in the absence of *B. coli* from 98 per cent of the samples of 100 c.c. Growth from spores is also considerably retarded. The process causes neither taste nor odour. Prof. Lelean dealt with many aspects of water chlorination in detail, and his lecture emphasised the very great service rendered to public health by the use of scientific methods by the authorities responsible for water supplies: in London, 280 million gallons per day are treated.

Water Supplies in Rural Districts

THE British Electrical Development Association, Inc., has recently issued a report on water supplies and sewage disposal in rural and small urban districts in Great Britain. The report is one which should be