

analysis of precipitation in relation to wind direction. Southerly and south-easterly winds have the highest relative frequency, while south-south-westerly and west-north-westerly winds are the wettest; easterly winds are the driest. The mean annual temperature at Trondhjem for the 30½ years is 4.8° C. (=41° F.). The average for January and February is about -2½° C. (=27½° F.), and for July, the warmest month, 13.8° C. (=57° F.). There is a good range of variability, -26.1° C. (= -15° F.), having been recorded in February, 1899, and +35° C. (=95° F.) in July, 1901, the latter a remarkable value for the latitude.

(3) "Oversigt over Luftens Temperatur og Nedbøren i Norge (1918)." This paper contains mean temperature and rainfall tables for the year 1918 for Norway. January is shown to have been abnormally cold, especially in the North, where Karasjok was 8.8° C. and Alten 7.2° C. on the average below normal. June, except in the North, and September, were also cool, but temperatures for other months and also for the whole year, were generally above normal. The rainfall at Florø amounted to 2617 mm. (=103 in.) during the year, 481 mm. in excess of normal. Karasjok, however, with a total of only 224 mm. (=9 in.) was 161 mm. below the normal.

(4) "Om betyningen av, at der i Skandinavien opprettes aerologiske stationer," by Th. Hesselberg. In this paper the director of the Norwegian Meteorological

Institute gives a brief survey of the present position and importance of aerological research, and urges the need for the establishment of aerological research stations in Scandinavia to take part in international investigations. He advocates a departure, however, from the present custom of observing on certain fixed days in the year, and proposes to make ascents only during the prevalence of interesting types of pressure distribution. Such an arrangement is certainly desirable, but likely to be difficult in practice.

(5) "Aarsberetning (1919-1920)." Much of the information contained in this annual report relates to purely administrative work. There is an account of the opening of a geophysical observatory on Spitsbergen and of the destruction caused by a severe storm. There is also a note on a comparison which was made at the end of 1919 between spectro-heliograph observations at Meudon (near Paris), and simultaneous magnetic observations at Haldde (N. Norway), and it appears that a connection was traced between calcium flocculi and the electric radiation occurring in aurora borealis and magnetic storms. Although the general cause of these phenomena remains unknown, the writer of the report expresses the view that terrestrial magnetic storms are a far more delicate test of solar activity than any solar phenomenon which can be studied by direct observation of the sun.

J. W.

The Preservation of our Fauna.¹

By T. A. COWARD.

THE preservation of a fauna or flora is a national and international duty. The main arguments for protection are: (a) economic—the argument of the commercial mind and of the Board of Agriculture; (b) æsthetic—mainly used in support of bird protection; (c) humanitarian—the argument against cruelty and the wastage of life; and (d) scientific—the desire to preserve all species or forms rather than individuals from extinction. The last, though the most difficult position to demonstrate logically, is the one which should carry most weight with the biologist.

Man is a competing animal, and in that aspect is justified in interfering with natural laws so far as is necessary for his welfare. But all such influence should be ordered by scientific and unprejudiced investigation of the inter-relation of animal life. Legislation and personal influence are the best methods of retarding or stopping the destruction of the fauna, but either without the other fails in its purpose. Public opinion, the aggregate of personal influences, is the creator and upholder of legislation. Protective measures have in the past frequently been framed for selfish ends, not for the sake of the object to be protected, hence the confusion in the legislation of to-day.

Normally, without the influence of man, a natural numerical ratio of individuals and species is maintained, for convenience termed the balance; famine or other causes adjust this balance in time of over-

¹ Abstract of the presidential address delivered to the Manchester Literary and Philosophical Society on October 4.

under-population. Man by cultivation and domestication has so dislocated natural conditions that such balance is impossible. But there is, especially in civilised lands, an artificial "natural balance," in which man is one of the competing factors. This balance is constantly overthrown by man or his competitors; it should be readjusted whenever possible in so far as readjustment is in accordance with advance. Unwise or over-cultivation, as exemplified during the food shortage, caused certain unexpected results; the temporary cessation of checks to the natural increase of certain species, as shown during the absence of many men during the war, produces a surprising alteration in the status of many forms.

Man, by his very abundance, encourages the increase of such forms as depend upon him; many of these are inimical to his welfare and therefore must be combated. In his attitude towards the larger animals, especially where he treats them as legitimate objects for the increase of wealth or for the enjoyment of sport, he may easily destroy the very creatures he wishes to exploit. The artificial introduction of animals alien to any country is always dangerous, and has in the past been the cause of the crowding out or destruction of native forms; in the interests of a fauna this practice should be stopped. The unintentional introduction of many "pests" is almost entirely due to commerce; these hangers-on of civilisation should, so far as is possible, be controlled, as their presence is alike a danger to the human race and to other creatures.

Researches on Food.

THE Report of the Food Investigation Board for 1920¹ records a considerable amount of research work of scientific interest and immediate practical value. The Engineering Committee of the Board has

¹ Report of the Food Investigation Board for 1920. (H.M.S.O., 1921.) 15

shown that of the two channels of heat loss through an insulator, the solid itself and the air enclosed in the spaces of the solid, the latter is far the more important. The specific conductivity of any particular substance, e.g. cork, depends much more upon the form and size of its air spaces than upon the specific con-

ductivity of the material considered as a continuous solid. It has also been demonstrated that the chief source of escape of heat from the surface of a wall is by convection currents. The Meat Committee has devoted particular attention to the conditions under which "black spot," caused by the fungus *Cladosporium herbarum*, develops in cold stores. Its prevalence on meat coming from the southern hemisphere during 1918-19 was correlated with the unusually prolonged period of cold storage due to war conditions. Apart from its unsightly appearance, no harmful effect could be traced to the growth. The Fruit and Vegetables Committee has carried out a great deal of research. Amongst other results we may mention the observation that only those fruits which lack the complete systems of ferments causing post-mortem changes in flavour and colour (strawberries, raspberries, black currants, red currants, and gooseberries) can be kept in a satisfactory condition for jam-making when frozen in contact with air.

Under the Oils and Fats Committee Dr. and Mrs. Robinson have continued their investigation of the synthesis of isomeric oleic acids. A synthesis of oleic acid is being attempted, and the ground has been cleared by the preparation of quantities of the starting materials. The preparation of suberic acid from ricinoleic acid has been improved, and the diethyl ester of this acid has been reduced with the production of octomethylene glycol and a small yield of hydroxyoctoic acid. Miss Gilchrist has continued an investigation of the constitution of the synthetic fats derived from mannitol and methylglucoside. In connection with the Canned Foods Committee, the work of Dr. Savage, recently published in the *Journal of Hygiene*, on the effects of putrefying meat upon the health of animals fed with it deserves mention. Very little obvious effect upon health was produced.

University and Educational Intelligence.

BRISTOL.—There was a large attendance in the council room at the University on Friday, December 2, when Dr. Lloyd Morgan was presented with his portrait, a gift from friends, colleagues, and students both past and present. The portrait was executed by Mr. Anning-Bell, A.R.A.

CAMBRIDGE.—The event of scientific importance in the term just completed was the opening of the Molteno Institute for Parasitology by Viscount Buxton. This is a research institute equipped and presented by Mr. and Mrs. P. H. Molteno, where Prof. Nuttall (unfortunately too unwell to attend the opening ceremony), his assistants, research students, and trained investigators from all parts will attack the many problems connected with the life-history of parasites and their reactions on their hosts. In addition to the regular facilities for experimental research, there is a good museum included in the institute.

MANCHESTER.—Prof. H. B. Dixon has intimated to the Council and Senate that it is his intention to retire from the Sir Samuel Hall chair of chemistry at the end of the present session. Prof. Dixon was appointed in 1886 to the chair rendered vacant by the resignation of Sir Henry Roscoe, and he has maintained ably the reputation of the chemistry department of the college now known as Manchester University. His special line of research has been the investigation of the rate of explosion in gases. It was his knowledge and experience of this branch of investigation which led to his appointment in 1891 to the Royal Commission charged to report on the explosion of coal-dust in

mines, and also to the post of Deputy Inspector of High Explosives for the Manchester Area during the recent war. The scientific importance of his researches was recognised by the Royal Society in its invitation to deliver the Bakerian lecture in 1893 and by the award of a Royal medal in 1912. His whole-hearted devotion to the Owens College, and later to the University, led him to take a prominent part on its academic boards, where the many-sidedness of his attainments were of invaluable assistance, particularly at the time of the establishment of an independent university in Manchester. Prof. Dixon intends to continue his researches in the chemical department of the University, where the elaborate equipment necessary for his investigations has been built up.

THE Salters' Institute of Industrial Chemistry has awarded forty-seven grants in aid to chemical assistants occupied in factory or other laboratories in or near London to facilitate their further studies.

APPLICATIONS are invited for the Gull studentship in pathology and allied subjects at Guy's Hospital Medical School. The studentship, value 250*l.* yearly, tenable for three years, is open to candidates under thirty years of age who have studied at the Medical School of Guy's Hospital. The latest date for the receipt of applications, which should be addressed to the Dean of the School, is Tuesday next, December 20.

THE Grocers' Company, with the view of encouraging original research in sanitary science, is offering three scholarships, each of the value of 300*l.*, plus an allowance for expenses, tenable for one year, but renewable for a second or third year under certain conditions. The election will take place in May next, and applications must be sent before April 1 to the Clerk of the Grocers' Company, Grocers' Hall, E.C.2, upon a form obtainable from the Clerk.

THE Institution of Naval Architects announces that the following scholarships will be open for competition in 1922:—Naval Architecture: Elgar (130*l.* per annum), Cammell Laird (150*l.* per annum), and Armstrong (150*l.* per annum). Marine Engineering: Parsons (150*l.* per annum) and John Brown (150*l.* per annum). The scholarships are open to British apprentices or students, and are tenable (subject to the regulations governing each scholarship) for three years at particular educational establishments. Full particulars may be obtained from the Secretary, Institution of Naval Architects, 5 Adelphi Terrace, London, W.C.2.

THE tenth annual Conference of Educational Associations will be held at University College, Gower Street, W.C.1, on December 28-January 7. A preliminary programme has been issued, and the following are among the papers which will be presented:—Education as a Mission, by Principal L. P. Jacks, at the inaugural meeting (to be held at Bedford College for Women, Regent's Park) presided over by the president of the conference, Lord Gorell, on December 28; Secondary Education through Handwork, by Mr. B. S. Gott, on December 31; Mental Tests and Mentality, by Prof. T. H. Pear, on January 2; The Effects of Competition on Plant Life, by Dr. Winifred Brenchley, and The Soil and Plant Growth, by Dr. E. J. Russell, on January 3; and Needs of the Modern University, by Prof. H. Laski, on January 4. The papers to be read to the Geographical Association have already been announced in NATURE of December 8, p. 483. On December 31 "Education as a Science" will be the subject of a joint conference at University College; Dr. J. C. Maxwell Garnett and Prof. J. Strong will take part in the discussion.