One very interesting point we may note with regard to the class Aves—namely, that while birds still possessed the teeth which they had inherited from their reptilian ancestors, two very remarkable and distinct types of the class had already made their appearance, and that these two types have persisted on, even to the present day, dividing the class into *Ratitæ* and *Carinatæ*. The characters of the ancient toothed birds indicate undoubtedly a great antiquity for the class, which was probably evolved from the Reptilia in Triassic times, or even earlier.

Although the majority of entries in Mr. Lydekker's Catalogue relate to the *Carinatæ*, the *Ratitæ* are also well represented in the collection, and there is a sufficient number of remarkable extinct forms and figured types to impart to this volume a high scientific interest.

In conclusion, we must express our thanks to Mr. Lydekker for this last contribution to the very useful series of Catalogues which he has prepared for the Trustees of the British Museum, which cannot fail to prove of great service to biological science.

IRON CARBONYL FROM WATER GAS.

AT the meeting of the Chemical Society on Thursday last, November 5, a communication was made by Sir Henry Roscoe, M.P., in the joint names of himself and Mr. Scudder, concerning a new and highly interesting mode of formation of iron carbonyl, $Fe(CO)_4$, the volatile compound of iron and carbon monoxide independently obtained a few months ago by M. Berthelot and by Messrs. Mond and Quincke. During the course of experiments upon the application of water-gas, which contains about 40 per cent. of carbon monoxide and an approximately equal quantity of hydrogen, to the purposes of illumination, it was noticed that the magnesia combs placed over the flame of the burning water-gas rapidly became coated with oxide of iron, which materially lessened the illuminating power. Steatite burners were likewise found to become stained with oxide of iron. The deposit, when allowed to accumulate, took a coralloid tuberous form quite different from accumulations of particles mechanically carried in a stream of gas This led to the supposition that the iron had existed in the water-gas in a volatile form, and was deposited as the result of the decomposition of the volatile compound at the high temperature of the flame. Further experiments were subsequently made with water-gas which had been compressed to eight atmospheres in iron cylinders. After standing for a week in such a cylinder, the gas, which usually burns with a blue non-luminous flame, was found to burn with an intensely yellow flame, and the illuminating power when the magnesia comb was placed over the flame was considerably reduced, owing to the deposition upon the comb of large quantities of oxide of iron. The experiment was repeated before the Fellows of the Society present, and upon depressing the lid of a porcelain crucible upon the flame a black stain was immediately produced, due to the deposition of particles of metallic iron or oxide. Moreover, upon heating the glass tube through which the gas was passing upon its way to the burner, a black mirror of metallic iron was rapidly formed. A thick deposit was also formed upon a plug of cotton-wool inserted in the tube between the heated portion and the burner. A similar tube was exhibited, through which, while heated, one cubic foot of water-gas had been allowed to pass from a cylinder in which it had been stored two weeks; the deposit was strikingly large, both in the portion which had been heated and upon the cotton-wool. After allowing a similar cylinder containing compressed water-gas to stand for five weeks, the flame was found to be smoky, from the large amount of iron liberated during the combustion. The smokiness, and, indeed, the whole luminosity, disappeared upon heating the tube, the gas burning with its ordinary blue flame; a thick mirror was at once deposited, and a large amount of iron retained by the cotton-wool. Thirty litres of gas from this cylinder, burnt during the space of half an hour, gave thirty-two milligrams of metallic iron in the form of a mirror, and forty milligrams were deposited upon the cotton-wool. Upon passing the gas through a U-tube surrounded by ice, a few drops of a turbid liquid were obtained, consisting mainly of iron carbonyl, possessing the properties ascribed to it at the meeting of the British Association at Cardiff by Mr. Mond. The turbidity entirely disappeared upon the addition of hydrochloric acid. From the above experiments it is evident that iron carbonyl is produced in the cold by the action of the carbon monoxide contained in the water-gas upon the iron of the containing cylinder, for the greater the length of time during which it has been stored, the greater is the amount of the compound present It is interesting to learn that the same deposit of metallic iron or oxide is found upon steatite burners from which ordinary coal-gas is burnt, pointing to the existence of iron carbonyl in our common illuminating gas. This conclusion is strengthened by the fact recorded by Dr. Thorne, that coal-gas which has been compressed in iron cylinders and allowed to stand some time is rendered unfit for use for lantern projection, owing to the deep stain of iron formed upon the lime cylinders. It is also interesting, in view of the fact that iron carbonyl is capable of formation in the cold, to note that the nickel compound, $Ni(CO)_4$, described by Messrs. Mond, Langer, and Quincke last year (*vide* NATURE, vol. xlii. p. 370), is also readily formed in the cold, provided the metallic nickel has been previously heated in a current of hydrogen. A. E. TUTTON.

CAPE GUARDAFUI AND THE NEIGHBOURING SEA.[1]

THIS work consists of monthly charts which illustrate the sea surface temperature, the wind, ocean currents, sea disturbance, and weather in the immediate vicinity of Cape Guardafui, extending down the Somali coast so as to include Ras Hafún, and covering the sea to 53° E. Some years ago the Admiralty issued a "Notice to Mariners," indicating the precautions necessary in rounding Cape Guardafui from the southward, in consequence of the Committee of Lloyd's having drawn attention, through the Board of Trade, to the large number of wrecks which had taken place in the neighbourhood. It was pointed out that the wrecks occurred chiefly during the period of the south-west monsoon, which blows from April to September, when the weather on the African coast is stormy and accompanied by a heavy sea; the currents are strong, and the land is generally obscured by a thick haze. The principal recommendation adopted by the Admiralty was the necessity for every precaution in verifying the vessel's position by soundings; and with this precaution it is asserted that the vessel's safety is assured, as the water rapidly deepens northward of the parallel of the cape. Ignorant of the exact position, many seamen have mistaken the high land at the back of Ras Jard Hafún, ten miles south of Cape Guardafui, for the latter, which, being lower and lighter in colour, is often invisible at any considerable distance. Believing the cape to be passed, ships have been steered into the comparatively low bay between the two headlands, and have struck on the sandy beach before any warning has

[1] "Meteorological Charts of the Portion of the Indian Ocean adjacent to Cape Guardafui and Ras Hafún." (London: Published by the authority of the Meteorological Council, 1891.)

been given. An idea was mooted that a change in the sea temperature could be trusted to indicate the position of the ship in latitude, and some experienced captains in the mercantile marine advocated warmly this test, holding that a sea temperature of 80° F. was never found at this season south of Cape Guardafui. The attention of the Meteorological Office was called to these statements, and it was evident that an investigation into the facts would be of great service to the mariner. A preliminary inquiry threw doubt on the view in question, though it was apparent that the temperature was, generally speaking, lower to the south of Cape Guardafui than to the north. The charts now published are the outcome of the inquiry. So far as the practical bearing of the investigation on navigation is concerned, the result, in brief, is that in every month of the year a sea surface temperature above 80° may be found to the southward of Cape Guardafui; and that, although in the months of June, July, and August, when the south-west monsoon is at its height, this occurrence is rarer than at other seasons, the thermometer would prove a very dangerous guide for the purpose suggested.

The primary object of the discussion undertaken by the Meteorological Office was to show the difference of sea surface temperature near Cape Guardafui in comparison with that over the sea to the southward during the south-west monsoon months, from April to September, but more especially in the months of June, July, and August, when the monsoon is most pronounced. In spite of this being the period of the northern summer, the surface water is coldest at this season, and from June to September are the only months during the year that temperatures below 70° are experienced within the area dealt with. It is clear that during the full strength of the south-west monsoon the cold water of the southern hemisphere is driven north of the equator; but on the other hand, although low temperatures are experienced, readings of 80° and above are met with in these months at a considerable distance to the southward of Cape Guardafui; and for a vessel, making a passage from the southward, to reason that she had passed Cape Guardafui because the thermometer indicated a temperature of 80° would be altogether misleading. The temperatures are without doubt more uniformly high in the vicinity of Cape Guardafui than further to the southward during the months of June to September, and this justifies to a very great extent the opinion formed by many leading captains of the merchant service that a safe course might be shaped by the thermometer; but this view is now proved to be erroneous. The sea surface temperature reaches its highest point in the district discussed during the months of March, April, and May, when nearly the whole area is above 80°.

The winds and ocean currents, which are plotted in position on the charts, give features of especial interest. The change of monsoon is well shown, and the effect produced by the adjacent land on the direction of the wind, also the variations in the strength of the monsoon, especially the intensified force of the south-west wind, which reaches its maximum in July, when the winds frequently blow with the force of a whole gale. The direction during the south-west monsoon is generally more southerly near the land than over the open sea. The surface current during the south-west monsoon almost invariably sets off the land to the eastward and north-eastward, and it sometimes attains the velocity of 80 to 100 miles in the 24 hours. In the north-east monsoon the conditions are generally much quieter, but the monthly charts show interesting and important differences; and the work, embracing, as it does, the whole twelve months, illustrates very fully the changes which occur, and afford very valuable material both for the man of science and the sailor.

NOTES.

THE President and Council of the Royal Society have recommended Prof. Charles Lapworth and Prof. A. W. Rücker for the Royal Medals this year, and the Queen has signified her approval of the award. The other medallists are Prof. Cannizzaro for the Copley Medal, and Prof. Victor Meyer for the Davy Medal.

THE following is the list of names recommended by the President and Council of the Royal Society for election into the Council for the year 1892, at the anniversary meeting on November 30:—President: Sir William Thomson. Treasurer: John Evans. Secretaries: Prof. Michael Foster, Lord Rayleigh. Foreign Secretary: Sir Archibald Geikie. Other Members of the Council: Captain William de Wiveleslie Abney, William Thomas Blanford, Prof. Alexander Crum Brown, Prof. George Carey Foster, James Whitbread Lee Glaisher, Frederick Ducane Godman, John Hopkinson, Prof. George Downing Liveing, Prof. Joseph Norman Lockyer, Prof. Arthur Milnes Marshall, Philip Henry Pye-Smith, William Chandler Roberts-Austen, Prof. Edward Albert Schäfer, Sir George Gabriel Stokes, Prof. Sydney Howard Vines, General James Thomas Walker.

WE are glad to hear of a splendid gift which has just been formally accepted by the Regents of the Smithsonian Institution. It is a gift of 200,000 dollars, which has been presented to the Institution by Mr. Thomas Hodgkins, of Setauket, Long Island. The donation is accompanied with a condition—which, as the New York *Tribune* remarks, "will not be onerous"—that the donor shall have the option of giving another sum of 100,000 dollars within the year. Mr. Hodgkins has arranged that the interest of 100,000 dollars shall be "permanently devoted to the increase and diffusion of more exact knowledge in regard to the nature and properties of atmospheric air."

THE opening meeting of the seventy-fourth session of the Institution of Civil Engineers was held on Tuesday, and was very fully attended. Awards were made for various original communications submitted during the past session, for various papers printed in the Proceedings without being discussed, and for various papers read at the supplemental meetings of students. Mr. George Berkley, the President, delivered an address, taking as his subject the advance of engineering work in relation to social progress.

THE following, briefly stated, are prize subjects recently proposed by the Dutch Academy of Sciences, at Haarlem:—(1) Molecular theory of internal friction of gases departing from Boyle's law, and if possible, of liquids. (2) Determination of the duration of electric vibrations in various conductors. (3) Try inoculation of *Viscum album* on apple, pear, chestnut, and lime trees, and explain its preference for certain species. (4) Criticism of opinions on structure and mode of growth of the cell-wall, having regard to continuity of the protoplasm of the adjacent cells (in some cases). (5) New experiments on the reproductive power of parts of plants, and the polarity observed in it. (6) Study of the low organisms appearing (usually as filaments) in bottles containing solutions of chemical products, after long standing. (7) Significance of peptones for the circulation of nitrogen in plants. (8) Oxidation of ammoniacal salts in the ground, and transformation into nitrates. Do the microbes found by Winogradsky and Frankland exist in the soil of Holland? (9) Researches on the organism concerned in production of marsh gas, or the conditions in which the gas is formed, if life has only an indirect influence on the phenomenon. Liberation of the gas from manure. (10) Study of the