The wild whooper swan which arrives in Britain in autumn from Iceland settles at times on the sea, but is never happy on the salt water, although its relative, the smaller Bewick's swan, passes most of the winter season on the brackish lochs and estuaries of the Hebrides. Ducks appear to drink frequently, but wild geese at their winter haunts must be able to go some time without water, for some of the sea-girt isles where they live have no fresh water upon them.

The grey or hooded crow is detested by game preservers because of its habit of stealing eggs. Especially when the grey crows have young in the nest they hunt far and wide for the eggs, not only of grouse but also of much larger birds, and I have known them suck a nest of a grey lag goose's eggs in a single day. It is possible that this egg stealing is partly to provide the young birds in the nest with as much liquid food as possible, and one can understand why young hooded crows should be able to exist without water. But the twite, which feeds its young on seeds, the siskin, the linnet and other passerine birds—how is it possible that the broods of these birds should live without water during their time in the nest? The passerine birds which feed their young on hard and dry seeds do so by regurgitation. They swallow the seeds, and later present them to their young moistened, and impregnated with their digestive saliva. Those which feed their young on insects and other juicy living food feed them directly, without regurgitation.

Dr. Glover Allen, in his book "Birds and their Attributes" referring to the drinking habits of North American birds, writes:

"In the far north water may be unobtainable throughout winter, but it may be possible for northern birds to subsist on snow. I have known pine siskins to eat snow and once watched a flock of Cedar Waxwings engaged in catching snowflakes during a storm, flying up and snapping at them as if they were insects. Here is a subject on which more information might easily be secured."

Elsewhere Dr. Allen remarks:

"A final word as to the drinking habits of birds, which have not perhaps been sufficiently studied. We have all noticed that hens and sparrows sip from a pan, raising their head between each sip as if to let the drop trickle down their throats. The quite different manner in which pigeons thrust in their bills and pump in the water like a horse cannot have escaped the attention of most. We do not know much as to the amount of water birds need and how often they drink. It is said that prospectors in desert country are often able to locate springs by watching the flights of doves or pigeons which must drink daily and fly in from the surrounding country regularly for the purpose.

"Most sea birds are known to drink salt water in preference to fresh; indeed captive gulls may die without it. Land birds, however, need fresh water. No doubt some species must go long periods without drinking, as in case of certain birds that incubate continuously, for example, the female Hornbill that is walled up in her nest cavity and fed by her mate."

In "Jungle Side", a natural history account of Ceylon, by John Still, are some interesting remarks on the drinking habits of birds. The author writes:

". . . the lovely paradise fly-catcher who nests in some garden in the nor'-east monsoon can be found passing the sou'-west as a visitor to a water-hole. Others are permanent forest dwellers, like the wonderful long-tailed robin whose song is the sweetest in all Ceylon, and another rather rare little bird who often owns a water-hole to himself, the three-toed kingfisher, whose gay habit it is to have rosy plumage where most of his tribe have blue."

Observations by trained watchers on the drinking habits of birds are, however, very meagre, and the whole fascinating subject would certainly repay more close observations.

Joachim Barrande and his Palæontological Work

By JAN KOLIHA, Curator of the Barrandeum, National Museum, Prague

A LITTLE more than fifty years ago, on October 5, 1883, the death occurred of Joachim Barrande, who was one of the greatest palæontologists of the second half of the nineteenth century. Barrande was born on August 10, 1799, on the estate of his family at Sangues (Dept. Haute Loire). He studied at the Paris Polytechnic School. Besides lectures of a purely technical nature on bridge- and road-construction, he attended those on geology, zoology and botany. His teachers were G. Cuvier, A. Brongniart, de Jussieu, C. Prévost, de Blainville, G. St. Hilaire, Serres, Audouin and others.

Soon after Barrande left the Polytechnic, he was called to the French Court, to act as tutor in natural science and mathematics to the hereditary Prince Henri, Count Chambord, grandson of Charles X. When the Bourbon family was expelled from France, after the revolution of July 1830, Barrande also went into exile with them. After a short stay in Edinburgh, the royal family came to Bohemia, first of all living at Buštěhrad Castle (west of Prague) and then at the Castle, Prague (that is, Hradčany, the old royal castle of the Czech kings). From this time onwards, Barrande remained permanently in Prague.

In 1833 Barrande gave up his position as a tutor, and devoted himself to engineering. He was entrusted with the surveying of a projected line, which was a continuation of the horse route, from Křivoklát, along the River Berounka, to the coal basin of Radnice and then on to Plzeň.

During this work, Barrande found a number of beautifully preserved fossils, in Middle Cambrian shales, in the neighbourhood of Skryj and of Tejřovice. By these discoveries he confirmed his view, that strata exist in Bohemia similar to those which Murchison had studied in Wales and Scotland. When the first part of the latter's "Silurian System" appeared in 1839, Barrande decided to investigate systematically all the so-called Transition Strata and their fauna in Bohemia, being certain that the Silurian formation of Bohemia was the same as that in Britain.

Finally, after many years of investigation and collection, Barrande began the publication of his "Système silurien de la Bohème" (1852), a work which even to-day is the only one of its kind in palæontological bibliography. The author published between 1852 and 1881 twenty-two big quarto volumes, partly containing text, partly plates. The treatise contains more than 6,000 pages of descriptions and 1,160 plates of fossils. The first volume, in which he deals with trilobites, forms, together with the supplementary parts, the most important and best account of these extinct crustaceans in general. Barrande also gives a careful description and illustration of the geological conditions in the older Palæozoic rocks of Bohemia. He divides the "Silurian" into eight series, indicated by the letters A to H. He determines the order of succession, the relations of deposit, and the fossiliferous contents of all his stages, based on their palæontological connexion with the British Silurian. In this and in the following volumes of his work, the author describes in turn the other crustaceans besides trilobites, and the fishes, cephalopods, brachiopods and lamellibranchs known up to that time in Bohemia.

It is clear from his palæontological work that Barrande was a convinced believer in the constancy of species (being a pupil of Baron Cuvier), and therefore an opponent of the theory of evolution. It is well known that his objections were among the most weighty of those which were ever expressed against that theory.

While issuing his chief work and several lesser publications, Barrande spent much time in defending his theory of so-called 'colonies', which were supposed to be intercalations of parts of a later geological fauna in strata containing an older geological fauna, the result of migrations. Barrande, from 1861 until 1881, was at war with many well-known geologists, and to the day of his death was never shaken in his opinion of such migrations of faunas. He defended his view by the publication of polemical articles, letters and longer works, which were gathered into five parts and entitled "Défense des Colonies". The chief opponents of Barrande's views were Prof. J. Krejčí, the father of Bohemian geology, V. M. Lipold, the Viennese geologist, and J. E. Marr, the English geologist, who explained these phenomena as due to faulting of the strata.

Barrande also took part victoriously in the dispute concerning the independence of the so-called Taconic System in North America, ending a discussion of many years by proving that the fauna which was discovered by Emmons and Marcou represented his primordial Cambrian fauna.

Meanwhile, great uncertainty prevailed both in the Bohemian National Museum and in the Czech University as to what would be the fate of the huge collections of fossils made by Barrande. Various negotiations took place, letters were written to Barrande, and a promise was obtained that his collections would be installed in the new building of the National Museum. When Barrande's will was opened, it was discovered that the National Museum had become the heir of all his collections, of all his manuscripts, and of his scientific library. By this splendid bequest, the National Museum of Prague has become the owner of one of the greatest collections of older Palæozoic fossils, and as such is the most important goal of all geologists and palæontologists who study the oldest fossiliferous rocks.

Obituary

PROF. SVEN ODÉN

IT was with the deepest regret that we heard of the death of Sven Odén. He had for some time been in failing health, but his friends still clung to the hope that his vigorous vitality might win. Unfortunately this was not to be, and he died on January 16 in his forty-seventh year.

Odén was trained under Svedberg and was soon recognised as an exceptionally able colloid chemist. His first investigation, published in 1910, was on the coagulation of colloidal sulphur, and it brought out the important fact that small variations in the hydrogen ion concentration of the solution greatly influenced the critical concentrations of electrolytes that just brought about coagulation. This group of problems interested him throughout the whole of his life and he constantly reverted to it. In 1911 he began an important series of investigations on the size of the particles in the suspension, determining the mass of the particles lying between successive size limits. This led him to a study of fractional coagulation. All this work he pursued with great ingenuity, using as his materials such varied substances as clays, deep sea deposits, cements and various precipitated substances. Having an unusually wide outlook, he was able to apply his results not only to problems in the pure science of colloids, but also to problems of applied science.

Nothing better illustrates the genius of Odén for attacking a difficult problem than the automatic balance he made for use in sedimentation investigations. By its means he was able for the first time to construct curves showing the mass