

the dipper, which breed in holes, are not gorgeously coloured, while others, such as the pheasants and the humming-birds, are gorgeously coloured, but do not breed in holes, is evidence, as far as it goes, that the gorgeous colour of the bird is not the effect of its breeding in a hole, though the white colour of the egg probably is. It must be admitted, however, that the latter cases are not parallel. Whilst the hen kingfishers and bee-eaters are as gorgeous as their mates, the hen pheasants and the hen humming-birds are plainly, not to say shabbily, dressed. If birds be as vain as the advocates of sexual selection deem them, it must be a source of deep mortification to a hen humming-bird to have to pass through life as a foil to her rainbow-hued mate. Whilst the kingfisher relies for the safety of its eggs upon the concealed situation of its nest, the humming-bird depends upon the unobtrusiveness of the plumage of the sitting hen.

A very large number of birds, such as the grouse, the merlin, most gulls and terns, and all sandpipers and plovers rely for the safety of their eggs upon the similarity of their colour to the ground on which they are placed. It may be an open question whether these birds select a site for their breeding-ground to match the colour of the eggs, or whether they have gradually changed the colour of their eggs to match the ground on which they breed; but, in the absence of any evidence to the contrary, it is perhaps fair to assume, as in the previously mentioned cases, that the position of the nest is the cause, and the colour of the egg the effect.

Many birds make their nests in lofty trees, or on the ledges of precipitous cliffs. Of these, the eagles, vultures, and crows are conspicuous examples. They are, for the most part, too powerful to be afraid of the marauding magpie, and only fear the attacks of beasts of prey, amongst which they doubtless classify the human race. They rely for the safety of their eggs on the inaccessible positions of the nest. Many of them also belong to a still larger group of birds who rely for the safety of their eggs upon their own ability, either singly, in pairs, or in colonies, to defend them against all aggressors. Few colonies of birds are more interesting than those of herons, cormorants, and their respective allies. These birds lay white or nearly white eggs. Nature, with her customary thrift, has lavished no colour upon them because, apparently, it would have been wasted effort to do so; but the eggs of the guillemot are a remarkable exception to this rule. Few eggs are more gorgeously coloured, and no eggs exhibit such a variety of colour. It is impossible to suppose that protective selection can have produced colours so conspicuous on the white ledges of the chalk cliffs; and sexual selection must have been equally powerless. It would be too ludicrous a suggestion to suppose that a cock guillemot fell in love with a plain-coloured hen because he remembered that last season she laid a gay-coloured egg. It cannot be accident that causes the guillemot's eggs to be so handsome and so varied. In the case of birds breeding in holes secure from the prying eyes of the marauding magpie, no colour is wasted where it is not wanted.

The more deeply Nature is studied, the more certain seems to be the conclusion that all her endless variety is the result of evolution. It seems also to be more and more certain that natural selection is not the cause of evolution, but only its guide. Variation is the cause of evolution, but the cause of variation is unknown. It seems to be a mistake to call variation spontaneous, fortuitous, or accidental, than which expressions no adjectives less accurate or more misleading could be found. The Athenian philosophers displayed a less unscientific attitude of mind towards the Unknown when they built an altar in its honour.

SCIENTIFIC SERIALS

American Journal of Science, December 1886.—On the crystallisation of native copper, by Edward S. Dana. This elaborate memoir, which is illustrated with four plates figuring fifty-four varieties of native copper crystalline forms, is based chiefly on the fine collection of over sixty specimens from Lake Superior, belonging to Mr. Clarence S. Bement, of Philadelphia, supplemented by reference to the cabinets of Yale College Museum and Prof. G. J. Brush. The planes here determined are disposed in the three groups of tetrahedrons, trisoctahedrons, and hexoctahedrons, and include several new to the species. The paper also comprises an historical summary from the studies of Häuy and Mohs (1822) to the recent contributions of W. G.

Brown.—On the trap and sandstone in the gorge of the Farmington River at Tariffville, Connecticut, by W. North Rice. The trap and sandstone of this locality are here specially studied with a view to the general elucidation of the history of these formations in the Connecticut Valley. The author's researches confirm the conclusion already arrived at by Prof. W. M. Davis, that some of the sheets of trap intercalated among the sandstones and associated rocks are contemporaneous, and others intrusive.—Comparative studies upon the glaciation of North America, Great Britain, and Ireland, by Prof. H. Carvill Lewis. This is an abstract of a paper by the author, read at the Birmingham meeting of the British Association last September. Its object is to show that the glacial deposits of the British Isles, like those of America, may be best interpreted by considering them with reference to a series of great *terminal moraines*, which both define confluent lobes of ice, and often mark the line separating the glaciated from the non-glaciated areas.—On certain fossiliferous limestones of Columbia County, New York, and their relation to the Hudson River shales and the Taconic system, by J. P. Bishop. The author describes some new fossils recently discovered in a metamorphic limestone occurring in the Chatham and Ghent districts on the western border of the Taconic slates of Columbia county, and tending to throw further light on the age of the Taconic formation. His investigations are still in progress, but from the facts so far determined, he considers that the fossils are of Trenton age, suggesting a synclinal having the Trenton limestone outcropping on both sides, and with the eastern edge pushed over westward.—Crystallised vanadinite from Arizona and New Mexico, by S. L. Penfield. The specimens here described and figured belong partly to the collection of the late Prof. B. Silliman, partly to that of Prof. Geo. J. Brush. Those from Pinal County, Arizona, are specially interesting, being of a deep red colour, and usually showing the very simple combinations already described by L. H. Blake.—The viscosity of steel and its relations to temper, by C. Barus and V. Strouhal. Having during the course of their former researches expressed the belief that the qualities of retaining magnetism exhibited by steel would probably stand in relation to the viscous properties of the metals, the authors here make a first search for such a relation. For several reasons their investigations are limited to torsional viscosity, and a new and very sensitive differential method is partially developed for the study of this property, with incidental reference to the viscosity of iron and glass. The results of the method as applied to steel are further compared with the known behaviour of permanent linear magnets tempered under like conditions.—Some remarks upon the journey of André Michaux to the high mountains of Carolina in December 1788, in a letter addressed to Prof. Asa Gray, by C. S. Sargent. Michaux's chief object was to secure living specimens of *Magnolia cordata*, and the locality explored by him appears to have been the highland region of North and South Carolina about the head waters of the Savannah River. The author has recently visited the same district for the purpose of re-discovering the same plant where Michaux was thought to have found it, but he searched for it in vain, and he concludes that Michaux's *Magnolia cordata*, as known in gardens, must be regarded as a rare and local variety of *M. acuminata*.—Note on the age of the Swedish Paradoxides beds, by S. W. Ford. It is argued on several grounds that these beds, or at any rate those above the division characterised by *Paradoxides kjerulfi*, are of the age of the Menevian group. Even this species should probably be referred to the same group, so that the strata containing it may be regarded as constituting a legitimate portion of the Swedish Paradoxides measures.

Rivista Scientifico-Industriale, November 1886.—On the development of atmospheric electricity which accompanies the condensation of aqueous vapour to rain or snow caused by a lowering of the temperature, by Prof. Luigi Palmieri. Those physicists who still doubt the reality of this phenomenon are recommended to conduct their researches with the Bohnenberger electroscope, as perfected by the author.—On the electric conductivity of vapours and gases, by Prof. Constantino Rovelli. Some experiments are described, fully confirming the important conclusions recently announced by Prof. Luvinì regarding the non-conducting property of aqueous vapour.—On the pairing-season of frogs and toads in the Venetian district, by Dr. Alessandro P. Ninni. This period is shown to be determined by the atmospheric conditions, being advanced or retarded according to the mildness or severity of the weather in spring.