within my personal knowledge that makes additional difficulty in accounting for the formation of ground-ice. The main pipe that supplies the pumping engine of the Detroit Waterworks is two feet in diameter, and is 20 feet under the surface of the river, at the distance of 100 feet from the shore. In the winter of 1868 ground-ice adhered to the wire covering over the mouth of the pipe, placed to prevent the entrance of fish into the pipe. The whole wire was so covered with ice as to prevent the action of the pumps by impeding the entrance of water. It is very difficult to account for the ice at that depth, while the water flowed freely above and below the pipe. The cold could not be transmitted from the shore along the iron pipe, for the pipe was not covered with ice. It seems that the condition of rapid flow through narrow or constricted places, like the interstices between stones, or the wire-guard, are necessary to produce congelation; but why it should be produced in such difficult circumstances I am not able to say. The Corporation of Detroit had the matter considered by those they thought competent to give an opinion, without any result, but that of having men to break the ice off the pipe-mouth daily, or whenever the temperature was low. The circumstances of this pipe are more difficult to account for than the ordinary ground-ice at the more moderate depths, because 20 feet of clear water and 100 feet from the shore are the difficult parts of the problem."

Here, then, is a riddle for some of our physicists to solve; for it must be admitted that the mode of formation of ground-ice is still, to say the least, imperfectly understood.—J.G.

NOTICES OF MEMOIRS.

I.—Monthly Notices of Papers and Proceedings of the Royal Society of Tasmania for March, April, and May, 1875. 8vo. pp. 29 and viii. (Hobart Town.)

ONLY one paper calls for attention on our part, viz. that by the Rev. J. E. Tenison Woods, "On some Tertiary Fossils from Table Cape" (pp. 13–26). The beds from which the fossils were obtained are correlated with portions of two horizons in the Cape Otway Series, Victoria—an Upper or Polyzoal Limestone, with *Hemipatagus Forbesii*, Woods and Duncan, and *Cellepora Gambierensis*, Busk; and a Lower, or Brown Clays and Sandstones, distinguished by the presence of *Pecten laticostatus*, Quoy. From the Tasmanian representatives of these beds, twenty-seven species of Mollusca are enumerated, of which eleven are new to science. The Polyzoa are not numerous, being chiefly the remains of the characteristic *Cellepora Gambierensis*, Busk. The Echinodermata are confined to the almost equally characteristic *Hemipatagus Forbesii*; whilst of the Corals three of the forms belong to already-described species, and two others are probably new. Four species of Foraminifera are mentioned. The presence of a portion of the great South Australian Tertiary formation leads Mr. Woods to the conclusion that Tasmania has shared in the general upheaval of the south coast

of Australia. The occurrence of these beds in a longitude east of similar ones in Australia, "proves one more link to the union of these beds with the great Tertiary formation of New Zealand." In the nomenclature of Professor P. Martin Duncan the Table Cape beds will be Lower Cainozoic. Mr. Woods describes the new species of Mollusca in detail. R. E., Jun.

II.—On a New Crinoid from the Cretaceous Formation of the West. By George Bird Grinnell. American Journal of Science and Arts, No. 67, vol. xii. (July, 1876), pp. 81–3, pl. 4.

UNTIL the discovery of the unique fossil, described in the above paper, by Professor O. C. Marsh, Crinoids from the American Cretaceous were unknown. The new form, to which the name of *Uintacrinus socialis* has been given, belongs to the *Astylidæ*, or free Crinoids, and is allied to the genus *Marsupites*, Miller. It differs from the latter in the form and arrangement of its plates, and in having apparently ten arms; it may be the type of a new group. The individuals are found associated together in considerable numbers, hence the specific name. *U. socialis* was first discovered by Professor Marsh in the Cretaceous of the Uinta Mountains, associated with the scales of a *Beryx* and *Ostrea conjesta*, Conrad. Specimens have since been discovered in the Kansas Cretaceous beds, associated with Odontornithes, Pterodactyles, and Mosasauroid reptiles. Mr. Grinnell gives a detailed specific description.

R. E., Jun.

III.—Cotteswold Naturalists' Field Club.

DURING the past two years the Members of this Club have been as active as ever, and the results of their researches—almost entirely geological and archæological—form a large and well-illustrated series of papers. The Addresses of the President, Sir William Guise, contain an epitome of the work done, and the records of those pleasant field meetings for which this Club has always been celebrated.

Excursions have been made to Newent, Bath, Radstock, Farringdon in Berkshire, Chepstow, Symonds Yat (Ross and Monmouth), Pendock, Portskewet, Caldicot Castle, and Caerwent. And it is needless to say that under the able guidance of Dr. Wright, the Rev. W. S. Symonds, Messrs. Etheridge, C. Moore, Lucy, McMurtrie, and others, the many points of geological interest met with on these several excursions have not been neglected.

The printed papers include one on a Bed of Fuller's Earth at Whiteshill, near Stroud; and another on the Angular Gravel of the Cotteswolds, by Mr. Witchell. This Angular Gravel, which occurs on the slopes of the Oolitic escarpments, was at one time considered to be the remains of sea-beaches—a view now happily abandoned. It consists of Oolitic detritus, and is evidently the result of subaerial denudation. Mr. Witchell considers that the formation probably commenced before the river-gravel was laid down; and that perhaps the period to be assigned to its commencement is that of the

recurrent period of cold, during the latter part of the Glacial epoch. And it continued, in his opinion, to be formed while the slopes remained exposed, and ceased only as vegetable matter began to cover up the surface.

The Rev. W. S. Symonds contributes some notes on the Geology and Archæology of Malvern, having reference more especially to the Permian and Triassic rocks. He observes that the pebble-beds towards the base of the 'water-stones' contain pebbles of a quartz-rock, exactly similar to those of the famous Budleigh Salterton Beds.

Other papers there are on the Ancient Wall of Gloucester, on Sherston Magna, on the Ancient Camps of Gloucestershire, and on Offa's Dyke, but these do not come within the province of the geologist. H. B. W.

REVIEWS.

I.—Field Geology. By W. Henry Penning, F.G.S. With a Section on Palæontology. By A. J. Jukes-Browne, B.A., F.G.S. 8vo. pp. 227. (London: Baillière, Tindall, & Cox.)

AMONG the many species of Geologists whom the progress of Science has developed, the Field Geologist is perhaps the most peculiar in his life history and method of work. There is, it is true, a kind of gradation between all classes of workers, but the man who devotes his time to the mapping out of various strata exposed at the surface has very generally been enveloped in a sort of mystery. Many of those whose opportunities of going into the field are confined to a month or six weeks in the year are at a loss to understand the evidence by which the geological lines are drawn upon our maps with such apparent precision, and if in their examination of fresh cuttings they find a boundary-line has been drawn five or ten chains too far in one direction, or a small fault has been altogether omitted in another, they are confirmed in their opinion that mapping is to a great extent conjecture, and that the lines depend very much upon the fertility of the imagination. But the Field Geologist is no more a sudden and special creation than the Lithologist, the Mineralogist, or the Palæontologist. In each branch of inquiry development can only result from experience, and although many Geologists possess a wide range of knowledge that embraces every branch of the science, the Field Geologist is more generally restricted to his special work. And yet, with this restriction, they may include among their number some of the most eminent of Geologists. William Smith, Conybeare, Sedgwick, Murchison, and De la Beche,—each gained his reputation from hard work in the field.

But the work of the Field Geologist of the past is to some extent different to that of the present generation. The honoured leaders, so far as our country is concerned, have drawn in all the main outlines, and the work that they left to be done is but the filling in of the details. The lines sketched in by William Smith, sometimes