- FIGS. 3, 4, 5.—Crystalline grains of olivine replaced by chlorite, and inclosing (No. 5) magnetite crystals. From Upper Trap-band, Rathjordan.
- FIGS. 6, 7, 8.—Cells in amygdaloid, filled with green chlorite (or epidote) and calcite. In No. 7 the green mineral has an excentric arrangement. The calcite is colourless, with a peculiar banded structure, and iridescent to pearly lustre. Cahermarry.
- FIG. 9.—Portion of glass base—magnified about 200 diameters—showing tubes, cells, and belonites, and inclosing crystals of magnetite. From Upper Trap-band, Rathjordan.
- FIG. 10.—Twin crystals of hornblende, brownish colour, inclosing magnetite grains. Lower Trap-band, Roxborough.
- FIG. 11.—Pseudomorphous crystal after hornblende, the substance of the mineral replaced by chlorite or epidote, and calcite. Roxborough.
- FIGS. 12-18.—Forms of augite crystals, or pseudomorphs, mineral sometimes replaced by chlorite and calcite, as in Figs. 12, 13, 14, 15, and 16; from Ballybrood. Fig. 17 represents a crystal of augite from Upper Trap-band, Ballytrasna. Nos. 13 and 15 are twin crystals.

The figures have been sketched by the hand direct from the microscope by the author.

IV.—NOTES ON THE GENUS *ROSTELLARIA* (OR *APORRHAI*?) OF THE GAULT.

By J. STARKIE GARDNER, F.G.S.

HAVING read Mr. Price's note and description of *Rostellaria maxima* in last month's Number (p. 97, Pl. VI.), I venture to express my regret that so doubtful a species should be published with the apparent authority of the GEOLOGICAL MAGAZINE to confirm it; especially as Mr. Wiltshire (than whom there is no one better acquainted with English Cretaceous Mollusca) is of opinion that it is only a giant form of *Rostellaria carinata*. The description given by Mr. Price would equally apply to the ordinary form of *R. carinata* which occurs in the same bed, and, save in size, exactly resembles it. The most distinctive portion of the shell, the wing, is unfortunately not preserved. The examples of *Rostellaria carinata* found in this bed, I may remark, always differ slightly in form, being broader and more obtuse (they are also usually more crushed and imperfect) than those from the lower beds. I am fully convinced that, if size alone is sufficient ground to justify the formation of new species, we shall speedily find the present confusion of names in the Gault fauna more hopelessly involved and more impossible to unravel than ever. What, for instance, would be the result of the adoption of such a basis of nomenclature for the *Cephalopoda* from the same formation?

But, even if the species be allowed to remain, I cannot see how the publication of an isolated form can add materially to our knowledge, since no monograph of Cretaceous *Rostellaria* has been published, and many of the comparatively common species are still imperfectly or improperly described.

While considering the subject of *Rostellaria*, I should particularly like to obtain the opinion of workers in recent and fossil conchology as to the advisability of adopting Da Costa's name of *Aporrhais* for the group, and whether it might not even be made to include *Pteroceras Fittoni* of the Lower Greensand, and *Pteroceras bicarinata* or *retusa* of the Gault. I subjoin an abbreviated translation of Pictet and Campiche's description of each genus:

1.—*Rostellaria*, Lamarck.

Shell pointed, prolonged, turriculated, the mouth terminated anteriorly by a thin rostrated canal; the lip forms a but little developed wing, which has on its margin small pointed teeth. The posterior angle of the mouth generally presents a canal contiguous to the spire. In all recent species there is a want of ornamentation; the surface is smooth or reticulated, but does not present prominent costæ, analogous to those which are so frequent on *Chenopus* and *Pteroceras*.

2.—*Aporrhais*, Da Costa. (*Chenopus*, Philippi.)

In the small number of species which are known the shell is turriculated spire, long or median, with a considerably expanded wing, more or less divided, and a variable anterior canal.

A comparison of the shells, which may easily be made at the British Museum, confirms the foregoing descriptions. It will be observed that all the species of the genus *Aporrhais* are strongly ornamented, and the difference in aspect will strike the most casual observer. Their separation has, I believe, been made on account of differences in structure of the animals themselves.

A careful and unbiassed examination will, I feel convinced, lead to the conclusion that all the Gault *Rostellariæ* should be named *Aporrhais*, for they undoubtedly bear considerably more resemblance to *Aporrhais pes-pelicanæ* and *A. occidentalis*, than they do to any of the *Rostellariæ*. Indeed, they are even more like *Pteroceras* than *Rostellaria*, and can often only be distinguished from the former by the length of their spire.

I have ventured to subjoin a list of the species from the Gault in my collection. I shall be happy to place them at the disposal of and to assist any practical palæontologist who desires to give a really exhaustive account of this most interesting group, which seems to have reached its maximum development at this period of the Cretaceous epoch. The species are best preserved and most abundant at Folkestone. It must be understood that the following is a hurried list, and merely provisional. The subject wants most careful treatment and illustration from perfect specimens existing in different cabinets. If it serves to provoke discussion and call attention to the group, my object will have been attained.

1. *Aporrhais* (Pict.) *carinata*, Sow.
2. *Aporrhais Orbignyana*, Pict. et Roux (qy. *A. obtusa*, Pict.) *R. costata* of Michelin, but described under a false assimilation with a different species found at Gosau. Very abundant.
3. *Aporrhais Parkinsoni*, Sow. Much confusion has arisen from different species having been figured by Mantell, Sowerby, and D'Orbigny under the same name. According to strict precedent, the species figured by Parkinson, and known to English geologists as *R. Parkinsoni*, has the priority, and should be retained instead of *R. Reussii*, *R. buccinoides*, etc.
4. *Aporrhais calcarata*, D'Orb. (and qy. *A. Muleti*, d'Orb.). A small species, also common at Blackdown.
5. *Aporrhais carinella*, D'Orb. A smooth species, figured by D'Orbigny in Pal. Fr., but imperfect in his figure.
6. *Aporrhais*, a distinct elongated species, the *elongata* of Sowerby, Geol. Trans., 2nd ser., vol. iv., pl. xi., fig. 17, appears to be a *Scalaria*. I should propose to retain the specific name *elongata* for this species.

7. *Aporrhais cingulata*, S. P. Woodward. Strongly and regularly transversely ribbed, without tubercles or longitudinal costæ. S. P. Woodward claimed this as a new species, but Pictet and Roux had already figured a very similar but imperfect specimen from the Gault under this name.
8. *Aporrhais*, spec. nov. A small pupæform species, with two keels on the body-whorl, and one keel on each of the remaining whorls, and marked with longitudinal ribs wide apart. Anterior rostrated canal longer than the rest of the test, and large-winged prolongations from the lip.
9. *Rostellaria*, or possibly *Fusus*. Smooth but very finely transversely striated. All the specimens have the body-whorl imperfect, but have the prolonged rostrated canal.
10. *Pteroceras retusa*, Sow. *Pteroceras bicarinata*, D'Orb. An abundant and well-marked species.
- R. marginata*, Sow., Geol. Trans., 2nd ser., vol. iv., pl. xi., fig. 18, is evidently *R. carinata*. Both Pictet and Campiche and Pictet and Roux refer to it, but figure a different species, with the ornamentation of a Gault *Scalardia*. The rest of the species figured by D'Orbigny and other foreign writers do not occur, as far as I can ascertain, in the Gault of Folkestone.

V.—ON SOME POINTS CONNECTED WITH LATE GLACIAL ACTION AND RAISED SEA-BEDS.

By the Rev. O. FISHER, M.A., F.G.S.

MY thanks are due to Mr. Tiddeman for his reply to the letter from me, which appeared in your February Number. I may perhaps be allowed to add a few words more upon the subjects under discussion.

There is an error in my former letter, which gives a wrong impression of my views upon the subject of the Trail. I originally used that word in 1866, to designate the disturbed ground commonly found below the subsoil or warp. I am made to say that it is "none other than the river gravels." I certainly intended to write that "it is newer than the river gravels."

Mr. Tiddeman is nearly correct in saying that I use the word in question to designate the "till" of a particular period. More exactly I use it to designate a particular accumulation of disturbed ground, which certainly exists; and I think it will be best to reserve the name for that deposit. It expresses no theory about the causes which produced it, but only implies that it has been dragged along, which has evidently been the case. It is true that I myself regard it as the *moraine profonde* of a particular period, to wit, of the last covering of ice upon this country. I do not mean to imply, however, that this was of the age of the ice-sheet of Lancashire, but simply wish to inquire whether it may not have been contemporaneous with the laminated clay of the Settle Cave; not understanding Mr. Tiddeman as fixing the age of that clay. In it I think I recognize an instance of ice-action subsequent to the cave-and-river period, and fitting to my theory. My protest against the expression, "*The glacial period*," was a general one, as too indefinite; and I have no intention of claiming the great ice-sheet (about which I am not well informed) as synchronous with the Trail. For I suppose that the marine glacial clay of Hollingworth, near Manchester, is one of the deposits, newer than the ice-sheet, to which Mr. Tiddeman refers.