

in trap; 'smaragds,' rough beryls, in crystals five to seven inches in length, from Tammela, Kimito, &c., also met with, more rarely, in pale-green and blue transparent crystals (precious beryl), at Tammela; tourmaline of *excessive* brilliancy in albite, at Imbelax—an excellent group of crystals; a large group of hornblendic minerals, conspicuous among which is pargasite, occurring in semi-transparent leek-green nodules, set like plums in a pudding of calcareous spar, associated with jet-black 'plums' of hornblende, crystals of sphene of vivid brightness, containing titanium, shining scales of yellow glimmer, diopside, graphite, and garnets of almost every kind. One specimen exhibits pargasite in association with four of these minerals. The plums of pargasite have a worn rolled-up appearance, and are in many instances full of air-cavities. This interesting mineral with its associates occurs most abundantly at Pargas. In this district of Finland, minerals belonging to the pyroxene group, such as sahlite, coccolite, diopside, bronzite, malackolite, and funkite are met with. The garnet family is well represented. Almandines, the aristocracy of the tribe, occur at Åbo, Imbelax, and three other places; the richly-coloured Romanzowites occur at Pargas and Kimito; chondrodites, red, black, and transparent-yellow, are contributed by Lojo and Pargas; iwaarite ( $\text{Ca}_3 \text{Si} + \text{Fe}_2 \text{Si}$ ) +  $\text{Ca Ti} + 2 \text{Ca Si}$ ) by Kuusams; and jewreinowite, scarcely less rare, having the formula  $3 (\text{Ca}, \text{Na}, \text{K}) \text{Si} + \text{Al}, \text{Fe}) \text{Si}$ , from Manzälä. Rocks of the felspathic group are plentifully distributed throughout Finland; white and flesh-coloured albites too are common, with their ordinarily imbedded minerals. White albite, it may be remembered, is the mineral associated with felspar in Pompey's pillar.

In section five we meet with some rare altered forms of iolite, chief of which is gigantolite, in large crystals of a dark shining steel-grey in gneissoid granite, at Tammela, and pyragyllite, a dull-brown mineral, infusible before the blow-pipe.

In the last group, comprising the minerals the exact composition of which is undetermined, we may mention thermophyllite, a silicate of magnesia, occurring in small silvery-white crystals in a steatite-like base, which is probably the same mineral in an amorphous state; sundvikite, probably an altered anorthite; and a curious black copper from Pielisjärwi.

### III.—DESCRIPTIONS OF SOME NEW EOCENE SPECIES OF CYPRÆA AND MARGINELLA.

By FRED. E. EDWARDS, F.G.S.

(PLATE XIV.)

SINCE the publication by the Palæontographical Society of the third part of my monograph of the '*Eocene Mollusca*,' containing descriptions of the several Eocene species of *Cypræa* then known, I have obtained from the beds in the New Forest, forming parts of the Bracklesham Bay series, several additional species; and Mr. Wetherell has also been so fortu-

nate as to obtain another remarkably fine species from the cutting lately made near Highgate for the Highgate and Edgeware Railway. I now forward descriptions of these new *Cypræa* for publication in 'THE GEOLOGICAL MAGAZINE;' and I avail myself of the same opportunity to correct an error committed by me in the same part of my monograph, in referring to *Marginella pusilla*, a species described by me from High Cliff, a small *Marginella* from Headon Hill, which I now propose to separate under the specific name *æstuarina*.

1. *CYPRÆA CAVATA* (F. E. Edwards); Plate XIV. fig. 1 a—d.  
*C. testâ globosâ, antice attenuatâ, lævi: spirâ prominulâ, sulco obscuro circumdatâ; aperturâ angustâ, obliquâ, elongatâ, leviter arcuatâ, ad utramque extremitatem emarginatâ; labro compresso, incrassato, regulariter dentato, extûs marginato, antice depresso, cavato; labio plicato-dentato, antice in callum fastigiosum ad basin tendentem lateraliter expanso, postice in callum producto; plicâ anticâ magnâ, proeminenti.*

Shell globose, attenuated in front, smooth: spire apparent but of almost concealed by the enamel, and circumscribed by an obscured furrow, due to the suture. The mouth is narrow, oblique in the middle, curved, and produced at each end into a short, moderately wide canal slightly notched: the outer lip, which is somewhat flattened on the front surface and thickened externally, presents on the inner edge a series of teeth of which the anterior four or five are longer than the others; towards the anterior extremity it is flattened and a little hollowed out. The inner lip bears a row of pliciform teeth, regular and transverse—except the front one, which slants upwards, extending across the whole width of the inner lip—and is prominent, rounded, and bifurcate at the point where the anterior canal commences, the left-hand margin of which is formed by the prolongation of the right furcation. The front part of the inner lip, like that of the outer lip, is flattened and hollowed, and is enlarged laterally, so as to form a ridge-like callus extending to the base. The posterior extremity is produced into a bluntly-rounded prominence, which forms the left wall of the posterior canal. The roundly hollow depressions towards the front of the lips, and from which the specific name is taken, form a spoon-like trough resembling that found in *C. oviformis* (Sow.) and *C. Bartonensis* (Edw.).

In the young state (fig. 1 a, b) this *Cypræa* much resembles an *Orula*. The surface is covered with numerous wavy shallow furrows, finely decussated by the lines of growth; the aperture is very effuse in front, and the posterior canal scarcely curved.

The *C. cavata* approaches so closely to *C. angustoma* (Desh.) that, at first sight, it might be taken to be a local variety of that species; but on closer examination differences appear sufficiently marked to render a separation necessary. In the present species the shell is more globose and less attenuated in front than in the French shell; the aperture is less curved, the anterior and posterior canals are

wider, and the callus at each extremity is thicker and more prominent than in *C. angustoma*. A *Cypræa* is found in the lower Oligocene formation at Latdorf (*C. sphaerica*, Phil.), to which our English shell also presents a close resemblance; but in the German species the shell is more attenuated in front, and does not present the spoon-shaped depression which characterises *C. cavata*; it is besides much smaller.

Size: In the figured specimen, in the direction of the axis, 1 in. 11-12ths; diameter, 1 in. and 5-12ths; but a specimen from Hunting Bridge has attained a length of 2 in. and 1-12th.

Localities: Hunting Bridge and Bramshaw in the New Forest (Mus. Edw.).

2. *CYPRÆA ALATA* (F. E. Edwards); Plate XIV. fig. 4 a, b.  
*C. testâ ovato globosâ, antice attenuatâ, lævi: spirâ omnino obtectâ; aperturâ latiusculâ, arcuatâ, antice paulo effusâ, ad basin emarginatâ; labro regulariter arcuato, in medio compresso, postice producto, edentulo? labio dentato-plicato.*

Shell oviform, ventricose, smooth, presenting on the posterior portion of the lower surface a few sharp, irregular, transverse elevated lines, a character generally indicative of an immature state: the spire is entirely concealed. The aperture is moderately wide, curved, a little effuse in front, and broadly but not deeply notched at the base. The outer lip is regularly curved, somewhat flattened on the inner surface, and prolonged and much bent at the posterior extremity, where it forms, as it were, a wing-like enlargement, from which the specific name is taken. The specimen under description does not present any trace of teeth on the outer lip; but it may be an immature specimen, and I hesitate therefore to rely on its edentulous condition as a specific character. The inner lip presents a series of irregular pliciform teeth, which become almost obsolete towards the posterior extremity.

In general character and appearance this *Cypræa* presents a resemblance to *C. Levesquei* (Desh.); but, judging from the figure given by Deshayes, it is more globose than that shell, and not so much attenuated in front: the aperture, also, is more curved and wider, and the outer lip is altogether edentulous.

This remarkably fine Cowry forms part of Mr. Wetherell's valuable collection.

Size: In the direction of the axis to the end of the outer lip, 2 in.; diameter, 1 in. and 4-12ths.

Locality: Highgate, where it was obtained from the cutting for the Highgate and Edgeware Railway (Mus. Weth.).

3. *CYPRÆA ORTHOCHEILA* (F. E. Edwards); Plate XIV. fig. 2 a, b.  
*C. testâ ovatâ, ventricosâ, antice attenuatâ, lævi: spirâ obtectâ; aperturâ elongata, latiusculâ, rectâ, ad basin paulo effusâ, postice subcanaliculatâ; marginibus regulariter dentatis, denti-*

*bus numerosis, sub pliciformibus; labro extûs sub-marginato, postice producto, fortiter arcuato.*

Shell egg-shaped, ventricose, attenuated in front, smooth: spire concealed. The aperture is elongate, straight, moderately wide, slightly effuse at the base, and obscurely channelled behind. Each margin presents a row of numerous regular, narrowish, rather fold-like teeth, nearly equal; the anterior teeth being somewhat more lengthened than the others. The outer lip is thickened, flattened on the inner surface, and the posterior extremity produced, and rather suddenly and strongly curved.

The only specimen of this *Cypræa* I possess is in an imperfect state; but the remarkably straight and suddenly curved outer lip is a character which entitles it to specific distinction, and justifies the present description.

It presents some resemblance to *C. inflata* (Lam.); but the peculiar condition of the aperture and the outer lip, and the absence of the small elevated callus found at the posterior extremity of the inner lip of the shell in that species, sufficiently distinguish the present species.

Size: In the direction of the axis,  $1\frac{1}{2}$  in.; diameter, 1 in. and 1-12th.

Locality: Brook in the New Forest (Mus. Edw.).

4. *CYPRÆA ATTENUATA* (F. E. Edwards); Plate XIV. fig. 3 a, b.  
*C. testâ globosâ, antice valde attenuatâ, lævi: spirâ omnino obtectâ; apertura angustâ, elongatâ, flexuosâ, ad utramque extremitatem emarginatâ; labro incrassato, marginato, antice compresso, intûs regulariter dentato; labio plicato-dentato, antice in callum fastigiosum ad basin tendentem elevato, postice in callum transversum producto.*

Shell globose, somewhat produced and much attenuated in front, smooth; spire altogether hidden by the enamel. The aperture is flexuose, narrow, equally wide along the whole length except towards the base, where it is somewhat contracted by the ridge forming the termination of the inner lip. At each extremity it presents a short canal rather broadly but not deeply emarginate. The outer lip is much thickened and spread out, forming a raised margin, broad in the middle and at the posterior extremity, but narrowing towards the front. It is much flattened on the anterior inner surface, and the inner edge presents a series of regular pliciform teeth, which gradually decrease in size as they approach the posterior extremity. The inner lip is furnished with a row of teeth, prominent in front, small and obscure on the middle and posterior extremity. In front the lip expands into a narrow, ridge-like prominence, extending to the base, and at the posterior extremity it rises into a sharpish, transverse ridge, which forms the left wall of the posterior canal.

Size: In the direction of the axis, 8-12ths of an inch; diameter, 5-12ths.

Locality : Bramshaw (Mus. Edw.).

5. *CYPRÆA TUMESCENS* (F. E. Edwards) ; Plate XIV. fig. 5 a—c.  
*C. testa ovato-globosâ, antice rostratâ, lævi : spirâ obtectâ ; aper-  
 turâ elongatâ, angustâ, antice late non profunde emarginatâ,  
 postice sub-canaliculatâ ; labro leviter arcuato, compresso, pos-  
 tice producto, regulariter dentato ; dentibus numerosis, plicifor-  
 mibus ; labio* ?

Shell smooth, ovate, tumid, much and rather suddenly attenuated, so as to form, as it were, in front a conspicuous beak, broadly but not deeply notched at the base ; spire concealed. The aperture is narrow, produced posteriorly into an obscure moderately-wide canal. The outer lip is slightly but regularly curved, flattened on the face, produced at the posterior extremity, where it is suddenly bent so as to form the posterior canal, and presenting on the edge a row of rather numerous, nearly regular, pliciform teeth, which extend over about a half of the flattened surface of the lip, and of which those towards the front are the smallest. The inflected posterior extremity is thicker than is usually the case, and the lip itself terminates in front in a strong oblique fold, which forms the right wall of the anterior canal. The interior of the specimen figured is, unfortunately, so much crushed that the condition of the inner lip cannot be satisfactorily made out ; but the lip presents at the anterior extremity three oblique folds, of which the front one forms the left wall of the anterior canal ; and this character is also found in another specimen (fig. 5 c), a fragment showing the condition of the outer lip and the anterior canal.

The present *Cypræa* presents a close analogy with *C. globularis* (Edw.) ; but in that species the shell is more globose, and less produced anteriorly. The aperture is more effuse, the outer lip not so much produced at the posterior extremity, and the inner lip is without the anterior folds found in this species. The nearly regular ovate form, and the condition of the teeth on the outer lip, of the shell in *C. Bowerbankii* (Sow.), distinguish *C. tumescens* from that species.

Size : In the direction of the axis, a little more than 1 in. and 7-12ths ; diameter, 1 in. and 1-12th.

Locality : Brook, Bramshaw (Mus. Edw.).

6. *CYPRÆA CANCELLATA* (F. E. Edwards) ; Plate XIV. fig. 6 a—c.  
*C. testâ oblongo-ovatâ, sub-cylindræâ, lineis elevatis trans-  
 versis striisque longitudinalibus sese decussantibus ornatâ ; aper-  
 turâ elongatâ, angustâ, leviter arcuatâ, antice vix emarginatâ ;  
 labro extûs submarginato, intûs regulariter dentato ; labio antice  
 plicato.*

Shell oblong-ovate, attenuated towards the base, but so slightly as to present a somewhat cylindrical character. The surface is ornamented with numerous elevated transverse and longitudinal raised lines, decussating each other, and giving to the shell the appearance of being covered with net-work. The transverse lines are prominent,

regular, moderately distant over the middle and posterior parts, but more closely set towards the base; and they extend from the columella over the whole surface to the edge of the outer lip. The longitudinal lines are more numerous and more slender than the transverse lines. The aperture is elongate, narrow, slightly curved, widely but not deeply notched at the base, and prolonged posteriorly into a wide, short canal. The outer lip presents a series of teeth formed by the ends of the transverse lines; and the inner lip is furnished towards the front with four or five pliciform teeth, distinct from and more prominent than the teeth formed by the ends of the transverse lines.

The specimen figured is, I believe, unique, and is unfortunately somewhat crushed: the foregoing description, therefore, must be received provisionally. In the ornamentation the shell closely resembles *C. elegans* (Defr.), except that it does not present the fine lines which most frequently intervene between the prominent transverse lines on the French shells; and it is apparently more cylindrical and not so much attenuated in front: the aperture also is more regularly curved, and the pliciform teeth on the inner lip are distinct in character and less numerous than those on the inner lip of the shell *C. elegans*. In form the present shell more closely resembles *C. sulcosa* (Lam.), but it appears to be wider at the base, and the ornamentation is quite distinct. A more perfect specimen may lead to the conclusion that the English shell is merely a variety of *C. elegans*.

Size: In the direction of the axis, rather more than 6-12ths of an inch; diameter, 4-12ths.

Locality: Bramshaw (Mus. Edw.).

7. *MARGINELLA ÆSTUARINA* (F. E. Edwards); Plate XIV. fig. 7 a—c.

*Marginella pusilla* (Edw.), Eocene Mollusca (Gasteropoda), p. 143, t. 18, f. 6, in parte.

*M. testâ minimâ, ovali: spirâ brevissimâ, sulco obscuro circumdatâ; apice obtuso: aperturâ elongatâ postice angustâ, antice effusâ; ad basin latiusculo non profunde emarginatâ; labro submarginato, intus crenulato; labio quinques vel sexies plicato; plicis duabus anticis proeminentibus, obliquis; cæteris transversis, fere obsoletis.*

Shell minute, oval; spire very slightly elevated, and circumscribed by a shallow sulcus almost obliterated by the enamel; apex obtuse. The aperture elongated, narrow behind, effuse and rather widely but not deeply notched in front: outer lip thickened along the outer margin, and very finely crenulated within. The inner lip presents two thick, prominent, oblique folds in front, and three or four transverse folds, almost obsolete, behind.

Since the publication by the Palæontographical Society of the third part of my monograph of the Eocene Mollusca, in which I referred the present species to *Marginella pusilla*, a High Cliff species, I have obtained several additional specimens as well from Headon Hill as from other synchronous deposits, and a more rigid comparison has induced me to separate the Headon Hill shells from the High Cliff species. The *M. æstuarina* is, in fact, distinguishable from

*M. pusilla* by the shorter spire, the more depressed apex, and the condition of the folds on the columella. It is besides a broader and smaller shell.

Size: Axis, 3-24ths of an inch; diameter, 2-24ths.

Localities: Headon Hill, Lyndhurst, and Roydon in the New Forest (Mus. Edw.).

#### EXPLANATION OF PLATE XIV.

- Fig. 1. *Cypræa cavata* (F. E. Edw.).  
 a. Back view of immature shell from Hunting Bridge.  
 b. Front view of do. do.  
 c. Back view of adult shell from Bramshaw.  
 d. Front view of do. do.  
 2. *Cypræa orthocheila* (F. E. Edw.).  
 a. Back view of adult shell from Brook.  
 b. Front view of do. do.  
 3. *Cypræa attenuata* (F. E. Edw.).  
 a. Back view of adult shell from Bramshaw.  
 b. Front view of do. do.  
 4. *Cypræa alata* (F. E. Edw.).  
 a. Back view of adult (?) shell from Highgate.  
 b. Front view of do. do.  
 5. *Cypræa tumescens* (F. E. Edw.).  
 a. Back view of adult shell from Brook.  
 b. Front view of do. do.  
 c. Fragment showing the condition of the outer lip and the anterior canal.  
 6. *Cypræa cancellata* (F. E. Edw.).  
 a. Enlarged view of portion of the whorl, showing the cancellation.  
 b. Back view of adult shell from Bramshaw.  
 c. Front view of do. do.  
 7. *Marginella æstuarina* (F. E. Edw.).  
 a. Shell natural size, from Roydon.  
 b. Enlarged back view.  
 c. Enlarged front view.

#### IV.—ON CERTAIN TRACKS IN THE MANX SLATES.\*

By THOMAS GRINDLEY, Esq.

IN 1862 Mr. John E. Taylor (of Norwich), while surveying a newly-opened slate quarry at Dalby, on the western side of the Isle of Man, discovered three impressions of an oval form about nine inches long, and described them † as resembling the tracks of *Protichnites*, figured in Owen's Palæontology‡; the quarrymen told him that they were of frequent occurrence.

In 1863 Mr. Grindley noticed similar markings in great abundance upon a series of beautifully rippled slates of Cambrian age at Laxey, on the eastern side of the island.

The outline of the markings is an irregular oval. Their dimensions vary considerably in different examples, the average size being

\* This communication was received some time since, but from want of space we have been unwillingly compelled to postpone it, and even now cannot give it in full.—EDW.

† Geologist, vol. v. 1862, p. 322.

‡ 2nd edition, 1861, p. 183.