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ON THE FRASNIAN BRACHIOPOD GENUS *FITZROYELLA* VEEVERS FROM POLAND

Abstract. — *Fitzroyella alata* n.sp. from the Frasnian of the Holy Cross Mountains (Góry Świętokrzyskie) is described. A cardinal process, previously unknown for the genus, has been observed in the new species and considered as characteristic of the genus *Fitzroyella*. Special attention is paid to the external morphology of *F. alata* n.sp. A new term "marginal pseudospines", a feature characteristic of uncinuloids, is proposed.

INTRODUCTION

The present author's collection of brachiopods from the Holy Cross Mountains (Góry Świętokrzyskie), includes a number of uncinulids belonging to the genus *Fitzroyella* Veevers, 1959, so far unknown in Poland. The specimens were found, for the first time in Poland, in 1966 by Dr. A. Radwański, in the Upper Devonian deposits of two localities: Kowala and Kielce. According to the data from literature, *Fitzroyella* Veevers occurs only in the Frasnian and probably on the Givetian--Frasnian boundary, hence it is a characteristic form and could be of importance for these stages. For this reason, among others, the present author interested herself in the *Fitzroyella* specimens, enriching in 1968 her small collection by some new exemplars from Kowala.

The external appearance of the studied shells differs somewhat from these described members of *Fitzroyella* from Australia, England and Germany. All specimens from the Holy Cross Mountains belong to one species, *Fitzroyella alata* n.sp., and occur, as the other representatives of the genus, in the Frasnian. Although their shell dimensions are small, not exceeding 8 mm in length, they are, however, so characteristic that they can be easily recognized in the field. This increases the value of this species as an index fossil.

All the material of *Fitzroyella alata* n.sp. is deposited at the Palaeozoological Institute, Polish Academy of Sciences in Warsaw, for which the abbreviation Z. Pal. is used.

An acknowledgment is made to Dr. A. Radwański, Department of Geology, Warsaw University, for providing the present author with the first interesting material of *Fitzroyella* Veevers, to Dr. N. H. Fischer, Department of National Development, Canberra, Australia, for his kindness in lending the topotypic specimens of *Fitzroyella primula* Veevers, type species of the genus. The photographs were taken by Miss M. Czarnocka, the ink-drawings by Mrs. K. Budzyńska, both from the Palaeozoological Institute, Polish Academy of Sciences, Warszawa.

MATERIAL

Up to now, the specimens of *F. alata* n.sp. have come from two localities, the Kadzielnia quarry in Kielce and the outcrop in Kowala, about 20 km S of Kielce (Szulczewski, 1968, Fig. 1). The Upper Devonian of the Kielce facies is characterized mainly by biostromal limestone. Recently, these deposits have been partly studied by Pajchlowa & Stasińska (1965) in the Kadzielnia quarry and by Szulczewski (1968) in Kowala. The most numerous specimens have been found in Kowala, where they occur in the biostromal limestone built of massive stromatoporoids preserved in their original growth position. In the Upper Devonian profile, given by Szulczewski, *F. alata* n.sp. can be placed in his set C (Szulczewski, 1968, Fig. 7) in association with rare *Spinatrypa* cf. *tubaecostata* (Paeck.) and *Devonoproductus* sp.

In the Kadzielnia quarry, *Fitzroyella alata* n.sp. occurs also in the biostromal limestone being found on the east wall of the quarry, together with rare shells of *Spinatrypa* sp. and single, incomplete shells of *Adolfia* sp.

The state of preservation of the exterior of the shells in *F. alata* n.sp. is, in general, good. It is somewhat surprising how these small specimens could have preserved their so characteristic fragile alate hinge line, although not in its full length. The specimens are also not deformed, probably due to their small size and comparatively very thick shell. In contrast, the interior of the shells is badly recrystallized. On serial sections it was possible to observe the traces of a few structural details of the shell interior.

DESCRIPTION

Family **Uncinulidae** Rżonsnitzkaja, 1959

One of the characteristics of the family are the marginal "spines". These are not, of course, homologous to the true spines. They are not

hollow structures, their origin being different (Westbroek, 1967). Hence, using for them the term "spines" can only lead to confusion. It seems only right to differentiate the uncinuloid marginal "spines" from the true spines by designating them marginal pseudospines. The term denticulation, used in the Treatise (Schmidt & McLaren, 1965, p. H563) for these structures in some uncinuloids, e.g. *Fitzroyella* Veevers, is not satisfactory as the denticulation appears to be a quite distinct structural element in, among others, its external appearance and functionality. Within the family Uncinulidae, the discussed marginal pseudospines are in a category by themselves and slightly vary in appearance. In general, they are comparatively long and narrow, in some cases very long, as in e.g. *Uncinulus* Bayle (Westbroek, 1967, Fig. 45), externally resembling spines in their true meaning. In addition, the marginal pseudospines can be considered, from the point of view of their development and functionality, as some counterparts of the internal "spinelike extensions or denticulations" in the Permian, e.g. genus *Chonesteges* Muir-Woood & Cooper (Muir-Wood & Cooper, 1960, Pls. 20, 21). These elements have also recently been observed by Sarytcheva (*in press*) in the Permian genus *Urushtenia* Lich. Sarytcheva proposes for them (in her Terminological Vocabulary for Productida, *in press*) a new Russian term "*szipy*" = thorn, to distinguish them from the spines sensu stricto.

Subfamily **Uncinulinae** Ržonsnitzkaja, 1959

The subfamily is characterized by the presence of a well developed cardinal process. This structural element had not been observed in the type species of *Fitzroyella* by Veevers (1959), probably due to the bad state of preservation of the Australian specimens. Hence, the subfamily assignment of the genus *Fitzroyella* suggested by Schmidt and McLaren (1965, p. H563), although at present proved right, was till now not sufficiently justified. So there seems no doubt but that the above genus is a true member of the subfamily Uncinulinae Ržons. The evidence of this can be seen both, in the morphology (character of geniculation, marginal pseudospines) and the internal structure (cardinal process typically uncinuloid).

Genus *Fitzroyella* Veevers, 1959

Type species: Fitzroyella primula Veevers, 1959, p. 106, Pl. 16, Figs. 1-4; Frasnian, Sadler Formation, Fitzroy Basin, Australia.

Species assigned: Fitzroyella primula Veevers, 1959, Australia; *F. angularis* (Phillips, 1841), England; *F. ibergensis* (Kayser, 1881), Germany; *F. praeibergensis* (Paeckelmann, 1913), Germany; *F. alata* n.sp., Poland.

Stratigraphic and geographic range: The Frasnian and ?Givetian-Frasnian boundary. Europe: England — Devonshire, ?Barton, Newton Bushel; Germany: Harz Mountains, Grund, Iberg, Dorper Kalk; Poland: Holy Cross Mountains, Kadzielnia quarry, Kowala; Australia: Fitzroy Basin.

Diagnosis (slightly emended). — Small, costate, geniculate, some species being alate, anterolateral margins of adults pseudospinose, cardinal process of uncinuloid type.

Remarks. — The type species of the genus, *F. primula* Veevers, is up to now not well known internally. Unfortunately, this applies also to some other species of the genus from e.g. Germany and England. For this reason probably, the validity of this genus was questioned by Schmidt and McLaren (1965, p. H563). However, as is shown by the present observations, it is a valid taxon, highly distinctive in a few major features of the external morphology. These features are common, with only some unimportant deviations, to all the species included by Veevers (1959) and the present author in the genus *Fitzroyella* Veevers.

One of the features characteristic of *Fitzroyella* is the pattern of the surface ornamentation. This is, in the case of the above genus, in agreement with Cooper's opinion (1959, p. 10) that the "ornamentation and folding patterns are clearly generic in character". The strongly costate shell occurs in all the known species of *Fitzroyella*. In addition, two high median costae border and accentuate the very shallow median ventral, sinus-like depression and dorsal, fold-like elevation (Veevers, 1959, Pl. 16, Figs. 1—3; this paper, Pl. I).

Another property is the diminutive size of the genus (a constant feature). The adult specimens of all known species of *Fitzroyella* Veevers do not exceed 15 mm in length and probably never reached larger dimensions. *F. ibergensis* (Kayser) is, in all probability, one of the largest known species of the genus, its maximum length measuring 14 mm (Kayser, 1881, p. 332). Further features which merit some mention here are: the outline and shape of the shell, always pentagonal to subquadrate, with well marked anterolateral angles, an exception — the roundly outlined *F. ibergensis* (Kayser, 1881, Pl. 19, Figs. 2—3). The shell of the genus is always widest at the hinge line, nearly biconvex, with both beaks, especially the dorsal one, well marked.

The great external similarity of *Fitzroyella* Veevers to the Lower Devonian *Obturamentella* Amsden, a member of the subfamily Hebetoechiinae Havl. (Schmidt & McLaren, 1965, Fig. 439.7) should be mentioned. Some external distinction between these two genera lies in, among others, the more pentagonal shell, more deep ventral sulcus and dorsal elevation, and simple radial costae in *Obturamentella*. There is also some external similarity between *Fitzroyella* and the Upper Devonian genus *Sinotectirostrum* Sartenaer (Schmidt & McLaren, 1965, p. H562, Fig. 432),

a member of the family Trigonirhynchiidae McLaren, 1965. The later genus appears to be larger, the radial costae are thinner and more numerous and it has not a cardinal process.

Fitzroyella alata n.sp.
(Pls. I—III; Text-figs. 1—5)

Holotype: Pl. I, Fig. 6; Z. Pal. Bp. XI/2. Paratypes: Pl. I, Figs. 3,7; Z. Pal. Bp. XI/3—4.

Type horizon and locality: Biostromal limestone, Lower Frasnian, Kowala, Kielce facies, Holy Cross Mountains.

Derivation of the name: Lat. *alatus* = winged.

Diagnosis. — Small, alate to different degree, geniculate, anterolateral commissure pseudospinose, weakly undulate in adults, sinus and fold shallow and wide.

Material. — About 130 specimens with both valves closed, no separate valve, externally well preserved, interior recrystallized. All specimens come from the outcrop in Kowala and from the Kadzielnia quarry in Kielce.

Measurements (in mm):

Cat. No. Z. Pal. Bp. XI	Length	Width at the hinge line	Maximum shell width	Thickness
2 (holotype)	6.7	8.1	7.5	3.1
9	4.9	7.9	5.3	3.0
11	4.6	7.5	5.2	2.9
12	4.8	5.1	5.2	3.0

Description. — Shell small, none among those at hand, being above 8 mm long, subtransverse-transverse to pentagonal in outline; weakly biconvex, medially slightly depressed; hinge line moderately curved, in different degrees alate; shell geniculate, anterolateral margins moderately undulating; shell surface distinctly costate.

Pedicle valve weakly convex to almost flat; umbo well developed, only slightly incurved, beak pointed with an apical and roundly outlined pedicle foramen; deltidial plates correspondingly small, sometimes inconspicuously elongated and thickened, allegedly somewhat labiate; area marked, of moderate length, weakly concave; median sulcus very shallow, starting from the umbo.

Brachial valve as convex as the opposite valve, much less deep; umbo well marked, beak distinct, incurving, covered by the beak of the opposite valve; median fold shallow.

Ornamentation

The costae are strong (in relation to the general shell size) with backs narrowly rounded to ?acute, 17—24 on each valve. This number comprises 3—6 median costae with 2 primaries, which start early in the process of growth, and 6—8 lateral ones, appearing, almost simultaneously, slightly later. The costae are usually simple, except for the median ones (including the primary ones), dividing with time. Intercalation can also occur. The primary costae are normally the highest and

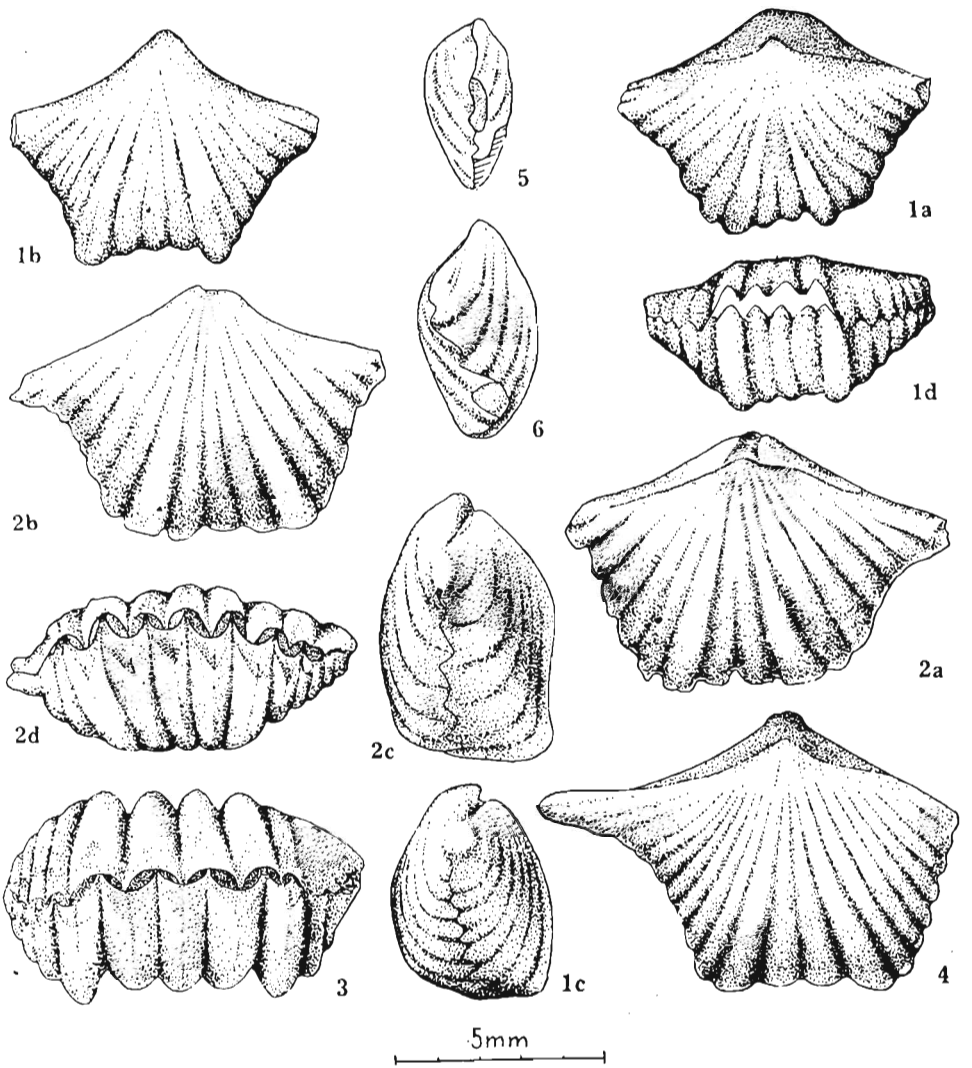

Fig. 1. — *Fitzroyella alata* n.sp. *1*, *2* two post-brefic shells (Z. Pal. Bp. XI/12, 13) in *a* dorsal, *b* ventral, *c* lateral, *d* anterolateral commissure views; 3 anterior view of post-brefic shell, Kadzielnia quarry at Kielce (Bp. XI/14); *4* dorsal view of post-brefic shell (Bp. XI/15), left alate hinge line extension preserved; *5*, *6* two brefic shells (Bp. XI/16, 17) to show the shell convexity.

the thickest on the shell surface, distinctly bordering both, the weak ventral sinus and the dorsal elevation (Fig. 1). The separating furrows are always deep, acute, and, as a rule, two to three times narrower than the costae, having an appearance of longitudinal slits. The all costae are thicker and higher at the border of geniculation and the separating furrows comparatively deeper. At the anterolateral commissure the costae are widened, flattened, hence their height being, of course, very reduced (Fig. 2*b*; Pl. I, Figs. 11, 12). The general appearance of the radial costae remains constant, although their size slightly varies. These small changes usually concern their thickness, upon which the final number of costae is, to some extent, connected. This is common within brachiopods, especially thick-costate.

The anterolateral commissure is of uncinuloid type. It is zigzag to moderately undulate, this depending upon the individual age (Pl. I, Figs. 11—12), and pseudospinose. The commissure can, in its general

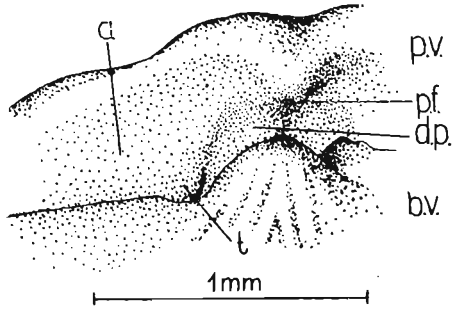

Fig. 2. — *Fitzroyella alata* n.sp., Kowala (Z. Pal. Bp. XI/40), umbonal part of adult specimen: *p.v.* pedicle valve, *p.f.* pedicle foramen, *d.p.* deltidial plate, *b.v.* brachial valve, *t.* tooth.

appearance, correspond to the type B, one of the four types of the anterolateral commissure differentiated by Westbroek (1967) within uncinuloids. In our species, however, the undulation are slightly more accentuated and pseudospines comparatively slender, similarly as in *Uncinulus maledictus maledictus* (Barrande), as figured by Westbroek (1967, Pl. 12, Fig. 2).

Interior. Traces of dental plates, small teeth, hinge plate observed on serial sections show that they are very analogous to those of the type species *F. primula* Veevers. The cardinal process is in *F. alata* n.sp. of "uncinulus" type, comparatively large (myophore being indistinct), bordered by the dental sockets of moderate depth, dental ridges almost parallel to the hinge line (Fig. 3).

Growth stages

The specimens of the studied collection belong to the two final, ontogenetic growth stages, i.e. 1) young (= brefic) and 2) adult (post-brefic).

Young shells are not numerous, making up only about 10 per cent of the total number of specimens. They do not differ greatly in size from the adults, being, as a rule, about two-thirds that of the latter. Adult specimens are more differentiated than is the case in other members of uncinuloids.

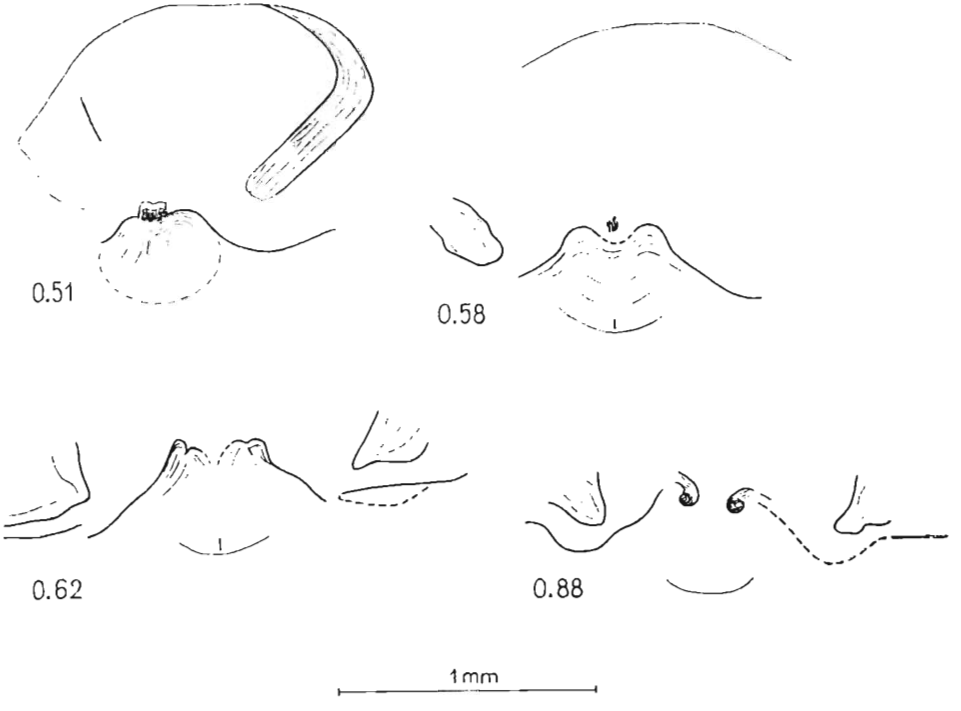

Fig. 3. — *Fitzroyella alata* n.sp., Kowala (Z. Pal. Bp. XI/39): cross sections.

The morphological differences appear late in ontogeny and concern, above all, the outline and shape of the shell (Fig. 1). As a result, the two types of shell related to the growth stage, characteristic of uncinuloids occur: 1) the brefic shell of "rhynchonella" type with anterolateral margins very zigzag like, e.g. members of Rudwick's subgroup AI (Rudwick, 1964, Fig. 7H), and 2) post-brefic shell of combined "uncinuloid-spiriferoid" appearance, the anterior half of the shell being of "uncinulus" type, the posterior partly of "spirifer" type — a feature highly characteristic of the species *F. alata* n.sp. In both stages the shell grows with almost equal intensity, but in different directions. In the brefic stage, the growth being radial, the specimen reaches its maximum size for the species. The shell remains more pentagonal, moderately biconvex, the greatest convexity in the posterior half of the shell, surface costae very distinct (Fig. 1 $^{5-6}$). In the post-brefic stage, the growth being vertical and partly lateral, the specimen attains its maxi-

mum thickness (depth) for the species in the anterior half of the shell. The vertical zone in its final growth is comparatively large, constituting, on an average, about one-third of the whole shell length (Fig. 1 $^{1-4}$). In addition, the shell outline becomes more subquadrate, marginal pseudospines and alae develop. The thickness of valves increases, but slowly.

Geniculation

By the end of the brefic stage, both valve margins in *F. alata* n.sp. are thickened, markedly zigzag, the costae often acutely rounded and sometimes serrated anteriorly (Fig. 4*A*). In the early post-brefic stage, the "paries geniculatus" (Westbroek's term, 1967) is developed. Its growing walls are, in general, thinner than the brefic shell, especially thin being the border of geniculation. On the internal moulds of adult specimens, in the points corresponding to the elevated distal ends of the costae, traces of small oval grooves are present (Fig. 5*A*). These suggest traces of foramina for the marginal mantle setae of the brefic shell of living *Fitzroyella alata* n.sp. They remind one, to some degree, of the foramina of e.g. the Permian *Uncinellina jabiensis* (Waagen), interpreted by Rudwick as — "the points of emergence of setae which could provided effective protection of the crest of zigzag slit" (Rudwick, 1964, p. 154, Pl. 12, Fig. 10). These grooves are followed by slits running anteriorly along the midline of the flattened costae on paries The slits, about midlength, suddenly widen in a triangle and deepen anteriorly, this being a trace of the opposite pseudospine (Fig. 5). The mentioned grooves and slits are also well visible through the transparent shell of complete specimens, being filled in by a lighter shell substance.

Geniculation in *F. ibergensis* (Kayser, 1881, Pl. 12, Fig. 2 b-c), *F. praeibergensis* (Paeckelmann, 1913, Pl. 6, Fig. 4c), *F. primula* (Veevers, 1959, Pl. 16, Figs. 3—4) is smaller, corresponding to the not advanced post-brefic stage of *F. alata* n.sp. This does not seem to be a regular feature, but due to the scarce material, it is difficult to clarify this point. *F. alata*, represented by a number of shells, shows the subsequent phases in geniculation, including that noted in the above species. Shells of *F. angularis* (Phillips), figured by Phillips (1841, Pl. 35. Fig. 162c) and Maurer (1885, Pl. 8, Fig. 22b) are not geniculated, being of the "rhynchonella" type. No doubt, they correspond to the brefic stage of *F. alata* n.sp. Probably, the post-brefic shells of *F. angularis* are lacking, just have not been found as yet.

Marginal pseudospines

Some specimens of *F. alata* n.sp. show at the commissure partly preserved arcuate bands of the (?secondary) shell layer. They extend from the underside of the valve margins, somewhat narrowing laterally,

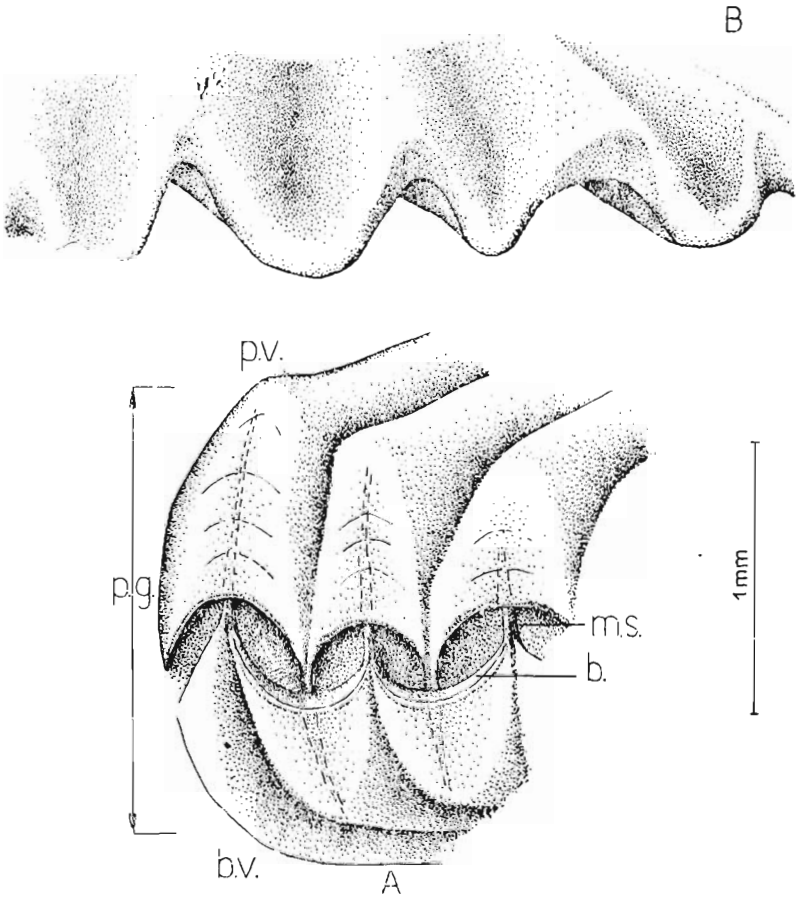

Fig. 4

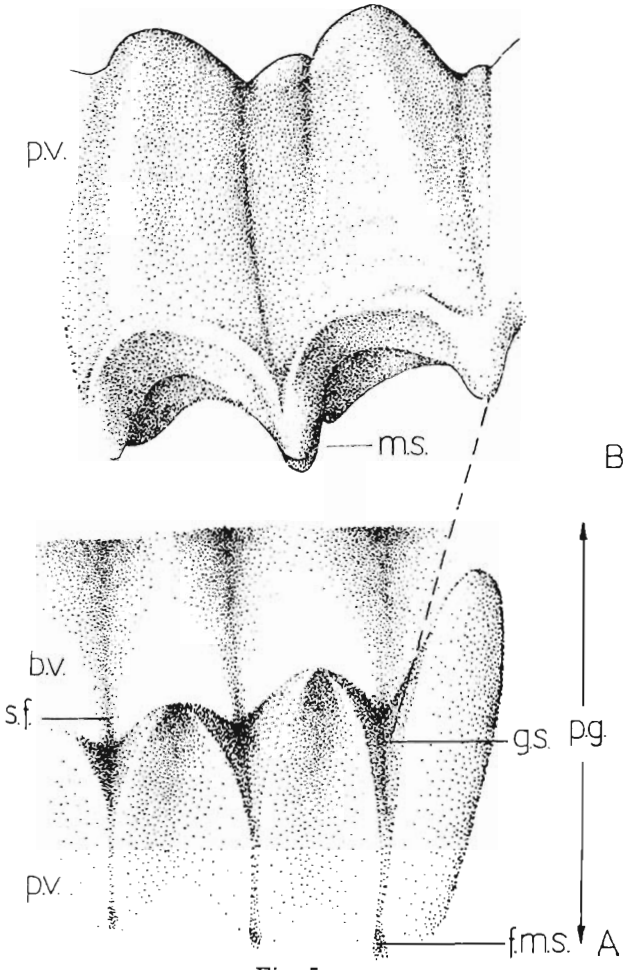

Fig. 5

towards the surface furrows. The concentric lines, with time, remind one of the lines on the posterior region of the shell. Such bands run internally along each side of the anterior ends of the furrows, elongate directly onto the internal surface of the backs of the opposite surface costae (Fig. 5*A*). These elongations are the growing marginal pseudospines and lie in the continuation of the surface furrows which are marked on the upper side of pseudospines. On the internal walls of paries geniculatus, in the places corresponding to the surface furrows, low, ridge-like thickenings arise from the bottom of walls. These are considered as the remnants of earlier developed marginal pseudospines, thickened and removed with growth from the ends of paries. The height and thickness of these ridges almost correspond to the depth and width of the surface furrows. Pseudospines are, in general, thin, with the upper surface sometimes extending anteriorly, the underside of their distal end slightly retracted. In anterior viev, the pseudospines are like triangles of a slightly varying length, narrowing anteriorly, in side view like a plate or ridge. The approximate outline and, to some extent, the shape and thickness of pseudospines can be detected on the internal moulds, their traces usually present in the anterior half of the paries geniculatus (Fig. 5*B*). The pseudospines also in *F. alata* n.sp. are differentiated in length and thickness, depending on which part of the margin they are placed. The longest are the pseudospines on the anterolateral angles of the shell and the stouter, often those laterally to these angles. In addition, they vary in appearance within a population, this depending on the individual age and the secretory activity of the animal.

In the diagnosis of *F. primula* Veevers the anterior commissure is noted only as being deeply serrated (Veevers, 1959, p. 106) and in the genus *Fitzroyella* Veevers — as denticulate (Schmidt & McLaren, 1965, p. H563). At present, pseudospines are also stated in *F. primula* on the basis of topotypic shells. It is quite possible that they occur also in the remaining species of *Fitzroyella*. Marginal pseudospines in this genus are not an unusual feature, their presence supporting the view that

Fig. 4. — *Fitzroyella alata* n.sp., Kowala: *A* right lateral view showing undulating valve margins and fragments of pseudospines (Z. Pal. Bp. XI/19), *p.v.* pedicle valve, *b.v.* brachial valve, *p.g.* paries geniculatus, *b.* band of secondary shell layer, *m.s.* marginal pseudospines, approx. × 48; *B* ventral margin of the brefic shell (Bp. XI/20).

Fig. 5. — *Fitzroyella alata* n.sp., Kowala: *A* lateral view of paries geniculatus, ventral valve exfoliated, brachial valve with preserved shell (Z. Pal. Bp. XI/21), *p.v.* pedicle valve, *b.v.* brachial valve, *p.g.* paries geniculatus, *f.m.s.* probable foramen for mantle seta, *g.s.* groove for the marginal pseudospine, *f.* separating furrow like a slit, *B* anterior view of paries geniculatus of pedicle valve (Bp. XI/22), *m.s.* fragment of marginal pseudospine?

they always accompany geniculation in uncinuloids (Westbroek, 1967). In addition, their development is closely related to the disappearing of zigzag growth lines on the paries, replacing the zigzag crest from the point of view of functionality, serving as further protection of the shell.

Hinge line extensions

The most significant "novum" for *F. alata* n.sp. is found in the hinge line of post-brefic shell; this is always, although to different degrees, alate. The alae are not preserved in full length in fossil state, usually being broken. As shown, the alae start to grow in late individual age, usually in the post-brefic stage, paralelly to the developing *paries geniculatus*. They grow intensively for quite a long period, thus can attain a considerable length, over one-half of the whole width and length of the shell. One of the specimens, about 7 mm long, is nearly two times larger (about 14 mm) at the hinge line. This is, however, not the maximum attained, judging from the broked distal alate ends. In addition, the alae extend laterally not in a straight line but, in almost every case, are slightly outcurved dorsally. This seems to be not an accidental feature. The under margins of alae are weakly undulated and provided with small pseudospines. The alae of *F. alata* n.sp. are very much like those of *Cyrtospirifer* Nalivkin, *Eleuterokomma* Crickmay, *Mucrospirifer* Grabau. As far as can be judged from the literature, they do not occur or only very sporadically within rhynchonelloids. They occur in e.g. *Austrirhynchia* Ager, 1959, but with this difference that in the mentioned genus the lateral growth refers to the antero-lateral angles, forming "unusual" wings, and not to the posterolateral ones as in *F. alata* n.sp.

The other species of *Fitzroyella* are not alate, however, their hinge angles are always pointed. The illustrated specimen of *F. primula* (Veevers, 1959, Pl. 16, Fig. 8) shows the right hinge angle slightly auriculate. But this may be due to some deformation, the specimen being slightly asymmetrical. In conclusion, it can be said that in all *Fitzroyella* species an alate tendency existed, this alate feature, however, being developed in *F. alata* n.sp. only. This new element can be considered as an additional response to the environmental requirements. The alae could act as a support, holding the shell in the life position. These animals were permanently attached by the pedicle. The pedicle could be short (judging from the shell outline) as also comparatively thick (as showed by the pedicle foramen and deltidial plates slightly ?labiate). The required balance in the living *Fitzroyella alata* n.sp. could have been helped by the alae, these forming, in addition, a weak arc, thus increasing the area of leaning.

Comparison

The very small shell size and especially the alate hinge angles are the two main specific features which give to *Fitzroyella alata* n.sp. its very individual character and distinguish it from the other members of the genus. Additionally, in comparison with *F. primula* Veevers, *F. alata* n.sp. possesses a more elevated and thicker dorsal beak and the two comparatively larger costae, bordering the median sulcus, and fold are more accentuated. *F. praeibergensis* (Paeck.), extremely very close to *F. alata* n.sp., has a smaller ventral beak and ventral area, also the umbonal angle being more acute. *F. ibergensis* (Kayser) is more roundly outlined, *F. angularis* (Phillips) has a deeper ventral sulcus and more elevated dorsal beak. However, these additional differences are very small.

REMARKS

It is worth mentioning that in the present collection of *F. alata* n.sp. (about 130 exemplars) there occur specimens which could be considered as representatives of each known species of *Fitzroyella* Veevers. Of course, the alate feature of *F. alata* n.sp. is not taken into consideration in this case. Many specimens of *F. alata* n.sp. are characterized by a narrowly pentagonal shell outline, simple and thick radial costae — thus they appear to be almost analogous to *F. praeibergensis* (Paeck.) and *F. primula* Veevers. The other specimens of *F. alata* n.sp. are close to *F. ibergensis* (Kayser) in their wider shell, slightly thinner costae, only the anterolateral commissure of the German species being more rounded. There are also specimens which in the brefic stage can remind one of *F. angularis* (Phillips). All this is based on the comparison with illustrations but, unfortunately, of single specimens for the species: *F. praeibergensis* (Paeckelmann, 1913, Pl. 6, Fig. 4), *F. ibergensis* (Kayser, 1881, Pl. 12, Fig. 2), *F. angularis* (Phillips, 1841, Pl. 35, Fig. 162). To sum up, it can be said that: 1) there occurs individual variability within *F. alata* n.sp., but it concerns a limited number of external features; 2) the specific differences within the genus *Fitzroyella* Veevers are small, evidence of this being the morpological counterparts for the known species, found in our collection of *F. alata* n.sp.

With reference to the mentioned members of *Fitzroyella* Veevers it would be interesting to ascertain: 1) whether the illustrated specimens of *F. praeibergensis* (Paeck.), *F. ibergensis* (Kayser), *F. angularis* (Phillips) are typical of the above species, i.e. whether they really illustrate constant (?dominating) morphological types characteristic of those mentioned species; 2) which of their features vary; 3) what are the limits of individual variability, which certainly occurs within these

species. It is quite possible that the same variability, as in our species, occurs also in the remaining members of *Fitzroyella*. If this is so, the previous specific features, e.g. shell outline and surface ornamentation, should be restudied and the species, not well known, revized, the revision based on a greater number of specimens.

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GERTRUDA BIERNAT

FITZROYELLA VEEVERS (BRACHIOPODA) Z FRANU GÓR ŚWIĘTOKRZYSKICH

Streszczenie

Rodzaj *Fitzroyella* Veevers, przedstawiciel rodziny Uncinulidae Rżons., odznacza się bardzo charakterystyczną morfologią zewnętrzną. Zespół kilku cech zewnętrznych, mianowicie: ornamentacja powierzchni muszli składająca się z grubych żeber, małe rozmiary muszli oraz w dużym stopniu jej kształt i zarys — stałe w obrębie rodzaju, nadają tej jednostce taksonomicznej specyficzny charakter. Ponadto, rodzaj ten ma, jak dotychczas, zasięg stratygraficzny ograniczony do franu (ewentualnie granicy żywet-fran) oraz duże rozprzestrzenienie geograficzne (Anglia, Niemcy, Polska i Australia). Powyższe dane stawiają *Fitzroyella* w rzędzie ważnych stratygraficznie brachiopodów.

Rodzaj *Fitzroyella* był dotychczas w Polsce nie znany. Obecnie reprezentowany jest przez jeden gatunek — *Fitzroyella alata* n. sp. Okazy jego pochodzą z dolnego franu facji kieleckiej w Górach Świętokrzyskiej, gdzie występują w biostromalnych wapieniach dwóch odsłonięć: w Kowali i w kamieniołomie Kadzielnia w Kielcach.

Fitzroyella alata n.sp. różni się od innych przedstawicieli rodzaju przede wszystkim swym spiriferowo-uncinulusowym wyglądem, który polega na tym, że brzeg zawiasowy jest „*alate*" — typu spiriferowego, część przednia muszli jest genikulowana — typu uncinulusowego. Ponadto, brzegi przedniobocznie muszli dorosłej są zaopatrzone w „kolce marginalne". Dla tych elementów strukturalnych został wprowadzony nowy termin: „marginalne pseudokolce", w celu odróżnienia ich od kolców *sensu stricto*. Cecha ta, nie obserwowana dotychczas u *Fitzroyella*, została obecnie stwierdzona również u okazów typowego gatunku — *Fitzroyella primula* Veevers z Australii, wypożyczonych z Muzeum Instytutu Geologicznego w Canberra. Cechę tę uważa się obecnie za charakterystyczną dla całego rodzaju *Fitzroyella*.

Posiadane okazy *F. alata* n.sp. pozwoliły na przeprowadzenie obserwacji dwóch stadiów wzrostowych: breficznego i post-breficznego, bardzo odmiennych, podobnie jak u większości uncinulidów. Dodatkowo, w stadium post-breficznym, pojawia się u *F. alata* n.sp. ważna cecha gatunkowa, mianowicie lateralny wzrost brzegów zawiasowych muszli, wyciągniętych skrzydełkowato. Jedną z cech wewnętrznych, stwierdzonych u *F. alata* n.sp., jest wyrostek zawiasowy typu uncinulusowego. Cechy tej dotychczas nie obserwowano u *F. primula* Veevers — typowego gatunku rodzaju, wskutek prawdopodobnie braku okazów z dobrze zachowanymi wnętrzami. Inne cechy wewnętrzne *F. alata* n.sp.: zęby, płytki zębowe, płytki zawiasowe i krura — są analogiczne do tychże elementów u *F. primula* Veevers.

Należy stwierdzić, że *F. alata* n.sp. — przez swe małe rozmiary, mniejsze niż przeciętne u innych gatunków rodzaju, a przede wszystkim brzeg zawiasowy typu „alate" — jest bardzo charakterystyczna i może być łatwo rozpoznana w terenie. Ponadto, jej ograniczony zasięg stratygraficzny, niemal analogiczny do zasięgu innych przedstawicieli *Fitzroyella*, podnosi znaczenie opisanego gatunku, jako przewodniego dla dolnego franu.

ГЕРТРУДА БЕРНАТ

БРАХИОПОДА *FITZROYELLA* VEEVERS ИЗ ФРАНСКОГО ЯРУСА ПОЛЬШИ

Резюме

Род *Fitzroyella* Veevers является представителем семейства Uncinulidae Rżons.; он отличается очень характерной внешней морфологией. Такие внешние признаки, как скульптура поверхности раковины, образованная толстыми ребрами, ее малые размеры, а также, в значительной степени, ее форма и очертания, являющиеся постоянными для рода, придают этой таксономической единице особый характер. Кроме того, этот род в своем распространении ограничен франским ярусом (или, быть может, границей живета и франа) и имеет широкое географическое распространение (Англия, Германия, Польша и Австралия). Это свидетельствует о том, что род *Fitzroyella* принадлежит к брахиоподам, имеющим большое стратиграфическое значение.

Род *Fitzroyella* до сих пор в Польше не был известен. Сейчас он представлен одним видом — *F. alata* n. sp., происходящим из келецкой фации нижнего франа в Свентокшиских Горах, где он встречен в биостромовых известняках в двух обнажениях: в Ковали и в каменоломне Кадзельня в Кельцах.

F. alata n. sp. отличается от других представителей рода главным образом своим спириферово-унцинулусовым видом, заключающимся в том, что кардинальный край раковины является „*alatus*" — типа спириферов, передняя же часть раковины коленчатая — типа унцинулусов. Кроме того, передне-боковые края взрослой раковины имеют маргинальные шипы. Для этих элементов автором введен новый термин — „маргинальные псевдошипы" — для отличения их от шипов *sensu stricto*. Этот признак до сих пор не наблюдавшийся у *Fitzroyella*, в настоящее время констатирован также у особей типичного вида — *F. primula* Veevers из Австралии, присланных автору из Музея Геологического института в Канберра (Canberra). Этот признак характерен для всего рода *Fitzroyella*.

Имеющиеся образцы *F. alata* n. sp. позволили провести наблюдения над

двумя стадиями роста: юной и взрослой, очень различных, как и у большинства унцинулидов. Кроме того, у *F. alata* n. sp. во взрослой стадии появляется важный видовой признак, а именно рост в стороны кардинальных краев раковины, вытянутых крылообразно.

Одним из внутренних признаков, установленных у *F. alata* n. sp., является кардинальный отросток типа унцинулуса. Этот признак до сих пор не наблюдался у *F. primula* Veevers, повидимому из-за недостатка образцов с хорошо сохраненными внутренними частями. Другие внутренние признаки *F. alata* n. sp. — зубы, зубные пластины, замочные пластины и крура — аналогичны таким же элементам у *F. primula* Veevers.

Автор констатирует, что *F. alata* n. sp. характеризуется малыми размерами, меньшими чем средние у других видов рода, и главным образом кардинальным краем типа „*alatus*". Этот вид можно легко определить в поле. Ограниченное стратиграфическое распространение, почти аналогичное распространению других представителей рода, придает этому нижнефранскому виду стратиграфическое значение.

PLATES

Plate I

Fitzroyella alata n.sp.
(Kowala)

Figs. 1-3, 5-6. Specimens in slightly different individual age (Z. Pal. Bp. XI/7,6,4,8,2) in: *a* dorsal, *b* ventral, *c* anterior views. *1* brefic shell, *3* paratype, *6* holotype; × 4.2.

Figs. 4,7. Two adult specimens (Bp. XI/8a, 3) in: *a* dorsal, *b* ventral views, *7* paratype; × 4.2.

Figs. 8, 9. Left lateral views of two adult specimens (Bp. XI/13,9); × 10.

1a

1c

1b

3a

2a

2c

2b

3b

4a

3c

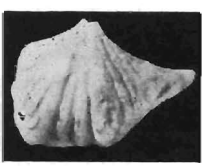
4b

7a

5a

5c

5b

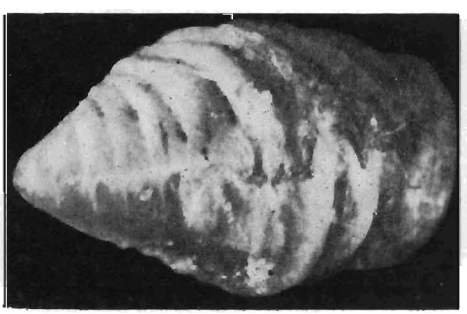


7b

6a

6c

6b



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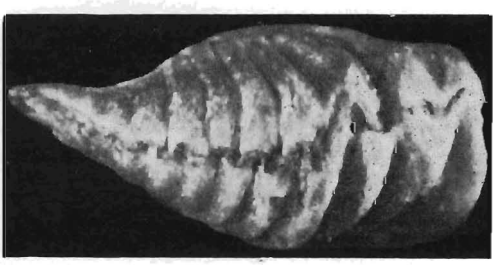

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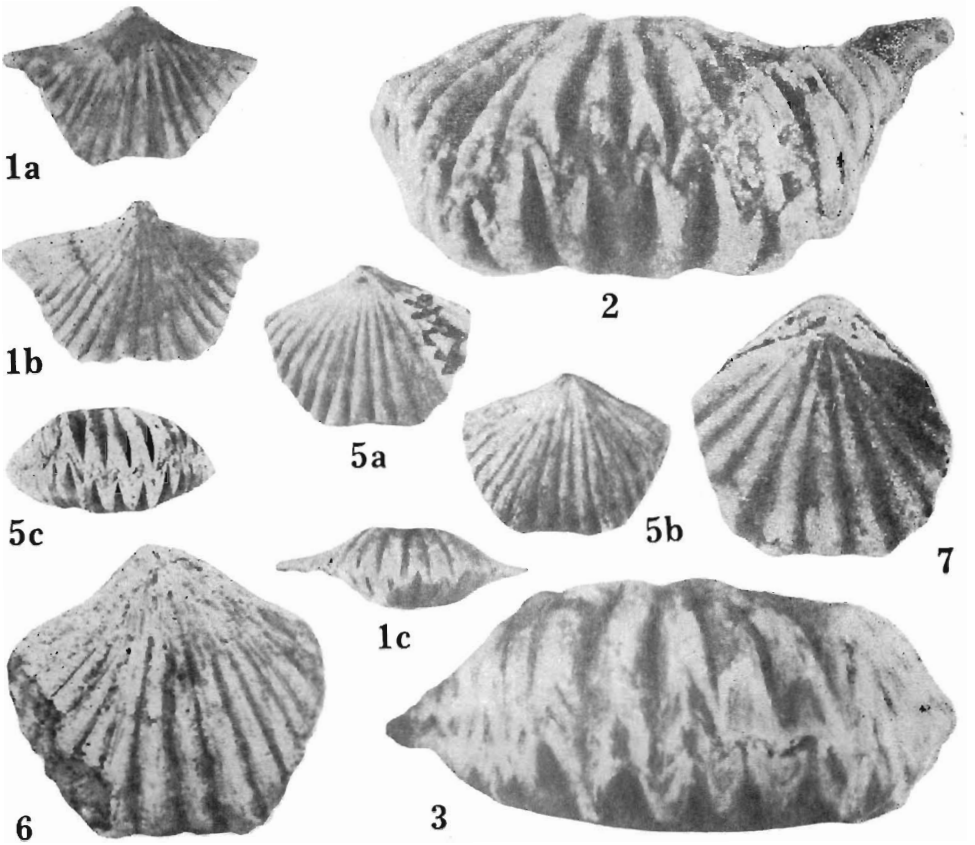
1a
1b
5c
6
5a
1c
2
5b
7
3

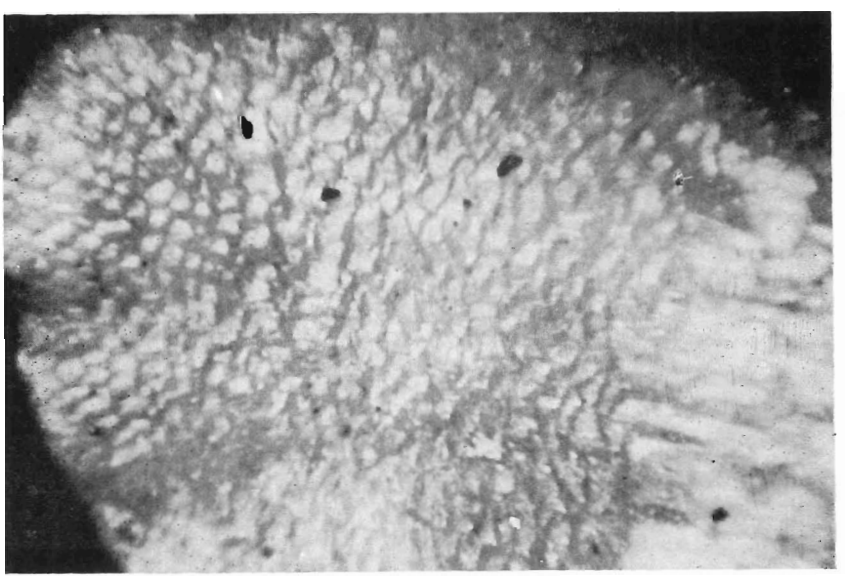
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Plate II

Fitzroyella alata n.sp.
(Kowala)

Fig. 1. Adult specimen (Z. Pal. Bp. XI/11) in: *a* dorsal, *b* ventral, *c* anterior views; × 4.5.

Figs. 2, 3. Anterior view of two adult specimens (Bp. XI/12, 10) × 10.

Fig. 4. Small fragment of left flank of adult shell partly exfoliated, showing a mozaic pattern (Bp. XI/9); × 70.

Fitzroyella primula Veevers
(Fitzroy Basin, Australia)

Fig. 5. Adult specimen (K246) in: *a* dorsal, *b* ventral, *c* anterior views; × 3.

Figs. 6, 7. Two different specimens (K230); *6* in ventral view, × 9; *7* in dorsal view, × 6.

Plate III

Fitzroyella alata n.sp.

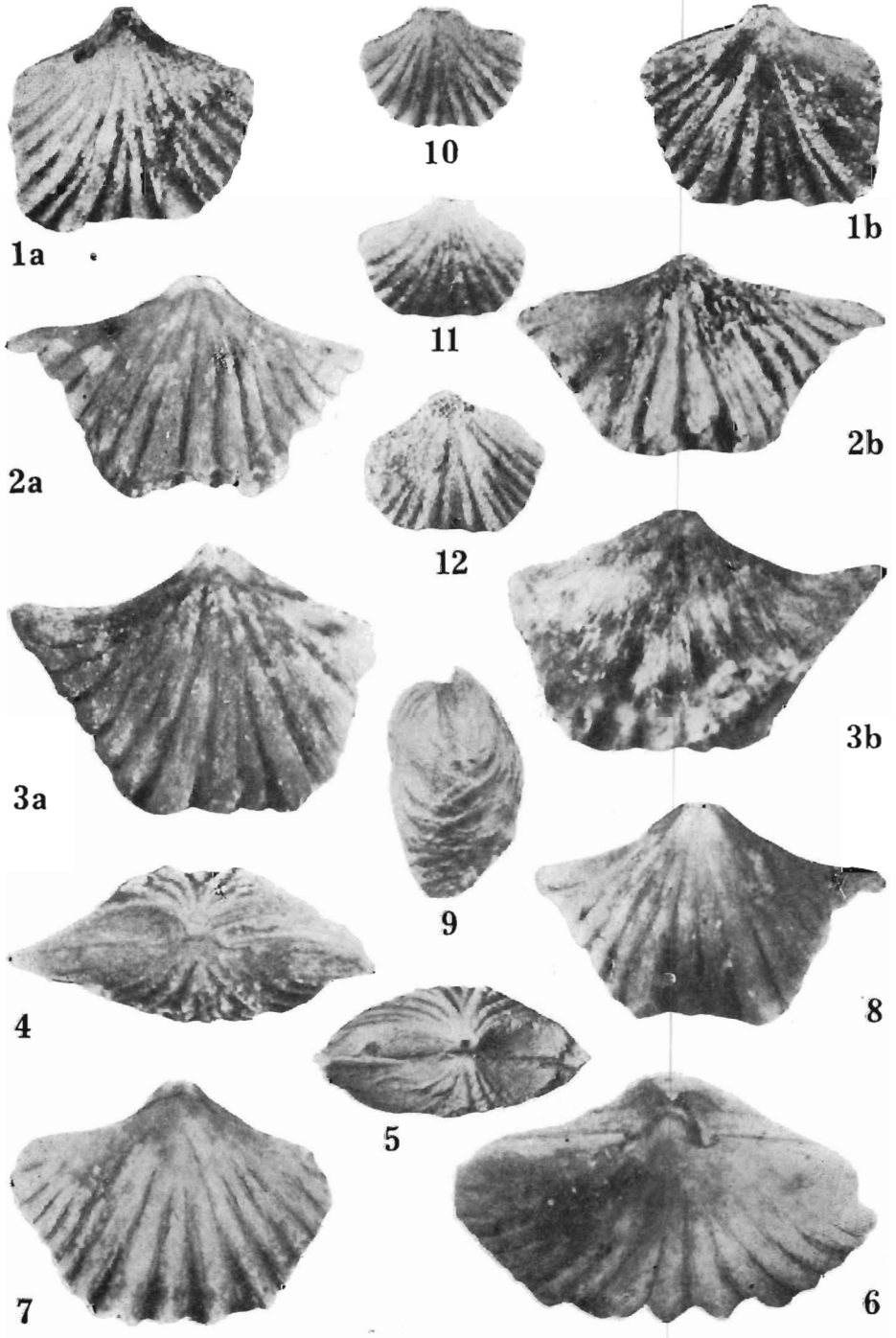
Figs. 1-3. Three different specimens, Kowala (Z. Pal. Bp. XI/6, 11, 7) in: *a* dorsal, *b* ventral views; approx. × 7.

Figs. 4-6. Posterior view of three adult specimens, Kadzielnia quarry in Kielce (Bp. XI/12 e-f), *4, 5* approx. × 7, *6* approx. × 10.

Figs. 7, 8. Two adult specimens, Kowala (Bp. XI/12 a,b): *7* in dorsal, *8* in ventral views; × 7.

Fig. 9. Side view of adult specimen, Kowala (Bp. XI/12c); × 7.

Figs. 10-12. Ventral view of three brefic shells, Kowala (Bp. XI/12 g-i); approx. × 6.5.


1a
10
1b
11
2a
2b
12
3a
3b
9
4
8
5
7
6