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THE CARBONIFEROUS BRACHIOPODS *PODTSHEREMIA PRIMA* FROM THE U.S.S.R., AND *PODTSHEREMIA AUSTRALIS* FROM EASTERN AUSTRALIA

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ABSTRACT

This report redescribes the Russian brachiopod *Podtsheremia prima* Kalashnikov based on topotype material sent to the author by Dr. N. V. Kalashnikov. *Podtsheremia australis* n. sp. a new Carboniferous spiriferid brachiopod from eastern Australia is also described. *Podtsheremia? thomasi* Roberts and *Podtsheremia? humilicostata* Roberts are confirmed as belonging to the genus *Podtsheremia*.

INTRODUCTION

The genus *Podtsheremia* Kalashnikov 1966 was first used in relation to Australian brachiopods by Roberts in 1971 (p. 216-217) for two species of spiriferids from the Bonaparte Gulf Basin in Northwestern Australia (*P.? humilicostata* Roberts and *P.? thomasi* Roberts). It is difficult to use the genus with confidence, because of the poor quality of reproduction of photographs in the Russian literature, and the lack of detail in the descriptions.

While studying Carboniferous spiriferids of eastern Australia the author encountered *Podtsheremia sp.* (Roberts, 1975) from the Chichester Fm. (Crane & Hunt, in press) in New South Wales. To ascertain the exact relationships with *Podtsheremia*, it was necessary to examine topotypes of *Podtsheremia prima*. Dr. Kalashnikov graciously sent me eight topotype specimens of *P. prima* from the Podcherem River in the Ural Mts. The descriptions of the external features of *P. prima* and the accompanying photographs should clarify the interpretation of the genus.

Podtsheremia sp. (Roberts, 1975) has been assigned to the genus and has been named *Podtsheremia australis* n. sp. *P.? humilicostata* Roberts, and *P.? thomasi* Roberts from the Bonaparte Gulf Basin are confirmed as belonging to the genus *Podtsheremia*.

Family: *Spiriferidae* King, 1846

Genus: *Podtsheremia* Kalashnikov, 1966

Type Species: *Podtsheremia prima* Kalashnikov, 1966 from the Tuls horizon, (Visean), Kirpich-Kyrta, Podcherem River, Northern Urals, U.S.S.R., by original designation of Kalashnikov, 1966. (Fig.2; numbers 1-4).

Diagnosis: (from Kalashnikov, 1966, pp. 50-51, translated by Mrs. G. A. Cooper).

Shells of medium size. Hinge line shorter than the greatest width. Ears rounded. Sinus triplicate — with a median rib. Ribs flatly convex, numerous. On the flanks they branch and form fascicles of 2 or 3 ribs. Microsculpture is in the form of fine longitudinal stria (difficult to distinguish) and fine concentric lines of growth. Delthyrial plates appear a few millimetres from the tip of the beak. A delthyrial plate is preserved for about half of the delthyrium. The shell is thin, apical filling is absent. In the dorsal valve are a wide cardinal process, high crural plates and a short septal ridge. (Roberts, 1971, p. 216-217).

Description of *Podtsheremia prima* based on examination of topotype material.

Records of The Australian Museum, Vol. 32 No. 19, 589-596, Figures 1-3.

Shell biconvex, hinge line nearly greatest width, cardinal extremities rounded; ornament of 40-50 rounded costae, most of which increase by bifurcation and trifurcation, near the cardinal extremities costae remain simple, fasciculation not obvious. Pedicle valve umbo curved slightly over hinge line, interarea moderately high, concave, with triangular delthyrial opening. Sinus broad, shallow, containing up to 30 costae at the commissure, all of which increase by bifurcation and trifurcation; a median costa is surrounded by costae on either side which split into six; the next 4 or 5 costae all bifurcate; in some specimens the floor of the sinus becomes elevated forming a median hump towards the commissure; the sinus-fold area also may become elongated, forming a 'tongue' at the margin, (Fig. 2;).

Internal features have not been observed in the Russian material.

Thin ventral adminicula are the only internal features observed in the Russian material.

Age: Visean

Material: 8 partially decorticated specimens.

Podtsheremia australis sp. nov.

Podtsheremia sp. Roberts, 1975 p. 50.

Diagnosis: Shell biconvex, subtrigonal, hingeline less than greatest width, cardinal extremities rounded, ornament of 30-50 rounded costae, all of which increase by bifurcation or trifurcation. Micro-ornament of fine radial lirae and concentric growth lines. Pedicle valve slightly more convex than brachial valve, umbo slightly curved over hinge line; hinge denticulate; interarea moderately high, concave. Sinus wide, shallow, containing a simple median costa and bordering costae which split into five or six costae either side of the median (Figs 1, 3). Similar pattern on fold. Delthyrial cavity unthickened, thin ventral adminicula, no teeth preserved, muscle field shallowly impressed, costation pattern visible on internal surfaces. Brachial valve interior possesses small sockets which flank a striated cardinal process.

Type specimen: F.59831, The Australian Museum, Sydney. (Fig. 3. no. 4).

Type locality: 90-6 (Roberts, 1975) from the Chichester Fm., N.S.W. also at 88-3, 103-2.

Age: Early Carboniferous (Visean).

Range: *Delepinea aspinosa* Zone to *Rhipidomella fortimuscula* Zone.

Fig. 3: nos. 1-7

Material: numerous specimens of molds and casts of both external and internal features.

REMARKS: The obvious differences between *P. prima* and *P. australis* are the size of the shell and the coarseness of costation. Both of these characters vary considerably at the specific level. Differences in the internal structures are difficult to ascertain, since we can not examine these features on the topotype material and must rely on the translations of Kalashnikov's descriptions. Kalashnikov mentions delicate teeth and delthyrial plates appearing a few millimetres from the tip of the beak. No teeth have been observed on the Australian species (due to poor preservation?) and there are no delthyrial plates. It is possible that Kalashnikov is using the term 'delthyrial plates' in reference to the ventral adminicula present in the pedicle valve. Kalashnikov also describes 'a delthyrial plate' preserved for about half the delthyrium. This was not observed in the Australian species.

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The character taken to be of generic importance is the pattern of costation in the sinus and fold. This pattern is consistent among individuals of each species, and is remarkably similar between the Russian and Australian species. Similarity in ornamentation, which should be consistent among members of the same genus, allows the assignation of other species to the genus *Podtsheremia* Kalashnikov to be verified.

Podtsheremia? humilcostata Roberts and *Podtsheremia? thomasi* Roberts both have sinal patterns similar to *P. prima* and *P. australis*. *P. humilcostata* which is more transverse and smaller than *P. australis*, has a different sinal pattern in which the first costa on either side of the median splits into three, not five or six. *P. thomasi* resembles *P. australis* having a nearly identical sinal pattern.

A thorough discussion of the affinities of the genus *Podtsheremia* with overseas genera is given in Roberts (1971) and need not be repeated here. New light has been shed on the relationship of *P. australis* and *Spirifer duplicicostus* Phillips. Roberts (pers. comm.) reports that the type specimen of *S. duplicicostus* Phillips (1836) now housed in the British Museum bears little resemblance to the illustrations but is similar to the Australian species of *Podtsheremia*. On the type specimen the first four or five bundles of costae on each lateral slope are in triplicate, and the remainder in duplicate. There are no simple costae. This pattern on the flanks coincides with that found on *P. australis*, but not with that of *P. prima* which has simple costae towards the cardinal extremities.

Roberts reports that the sinal pattern of *S. duplicicostus* consists of a median costa which trifurcates at about $\frac{1}{2}$ the length of the valve, and five lateral costae which arise by splitting towards the posterior. This is different from the simple median costa usually in members of the genus *Podtsheremia*. Rarely a *P. australis* specimen with a bifurcating median costa has been found.

The sinal costation pattern of *Podtsheremia* is similar to that found in *Neospirifer campbelli* and *Neospirifer semilis* from New South Wales. (Roberts, Hunt & Thompson, 1976). The pattern in these species consists of a median costae surrounded by costae which bifurcate twice to form four costae on either side. The overall appearance of *Podtsheremia* is similar to *Neospirifer*. *Podtsheremia* may be an intermediate form between *Spirifer* and *Neospirifer*.

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Specimens, including the holotype of *Podtsheremia australis*, will be housed at the Australian Museum, Sydney.

TABLE OF DIMENSIONS

Podtsheremia prima

AM No.	Width (cm)	Length (cm)
F.59838	3.56	3.00
F.59840	3.80	3.18
F.59839	2.57	2.51
F.59836	3.29	2.80
F.59837	4.34	2.72
F.59835	3.36	2.39

Podtsheremia australis

AM No.	Width (cm)	Length (cm)
F.59828	2.10	1.45
F.59829	2.10	1.80
F.59830	2.40	1.70
F.59831	1.86	1.42
F.59832	2.10	1.21
F.59833	3.04	1.43

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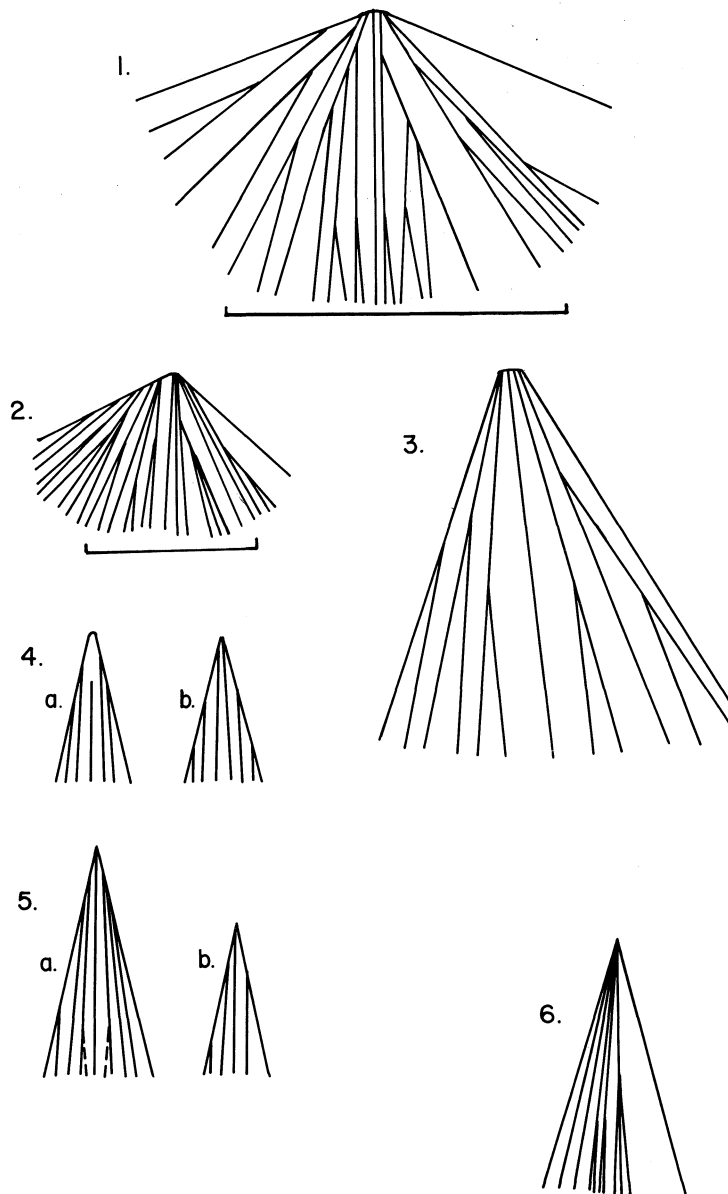


Figure 1. SINAL COSTATION PATTERNS 1. *Podtsheremia prima*, first lateral costa splits into six, median remains simple. X2; 2. *Podtsheremia prima*, first lateral costa splits into five. X1; 3. *Podtsheremia australis*, unsymmetrical sinal pattern, one lateral costa splits into five, the other into six. X4; 4. *Podtsheremia humilicostata*, (a) sinus, first costa splits into three, (b) fold pattern X1.5 (Roberts, 1971); 5. *Podtsheremia thomasi*, (a) sinus, pattern similar to *P. australis* (b) fold pattern X1.5 (Roberts, 1971); 6. *Spirifer duplucicostus*, median trifurcates, first costa splits into six or seven.

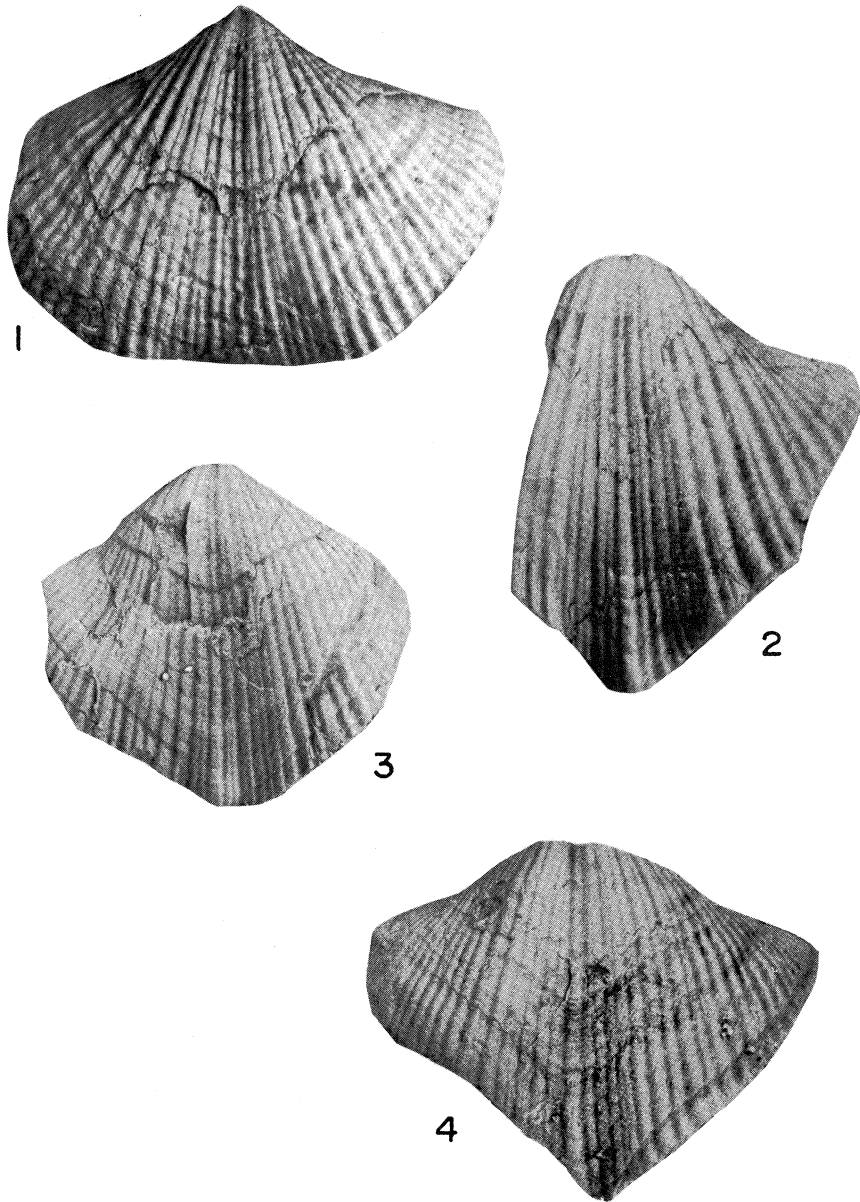


Figure 2. *PODTSHEREMIA PRIMA* Kalashnikov 1. *Podtsheremia prima*, exterior pedicle valve. X2. AM F.59838; 2. *P. prima*, exterior pedicle valve, note sinal costation pattern and 'tongue' at sinal margin. X2. AM F.59840; 3. *P. prima*, exterior pedicle valve, X2. AM F.59839; 4. *P. prima*, exterior pedicle valve, X2. AM F.59836.

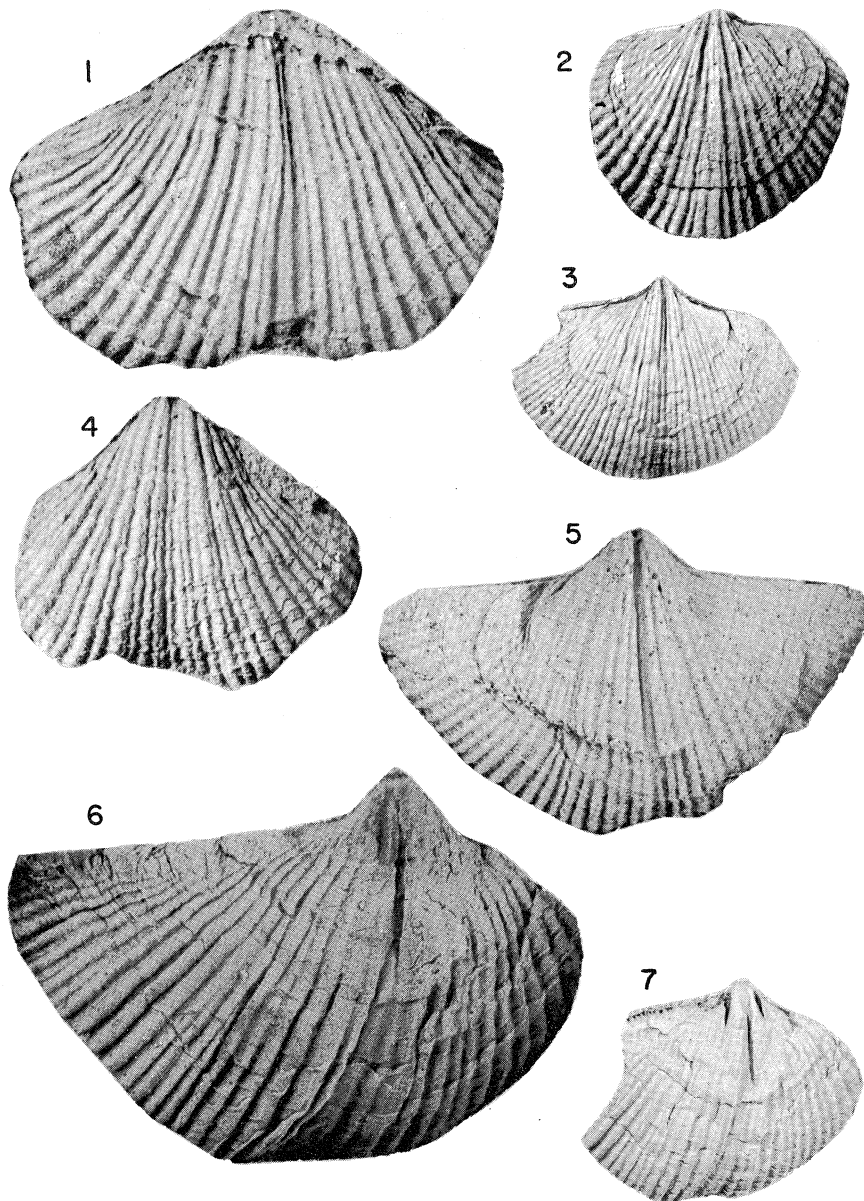


Figure 3. *PODTSHREMIA AUSTRALIS* N.SP. 1. latex cast of pedicle valve exterior, X4, Loc. 90-6, AM F.59828. Paratype; 2. brachial valve interior, X2, Loc. 90-6, AM F.59829. Paratype; 3. pedicle valve interior, X2, Loc. 88-3, AM F.59830. Paratype; 4. latex cast of pedicle valve exterior, X3, Loc. 90-6, AM F.59831. Holotype; 5. latex cast of pedicle valve exterior, X3, Loc. 88-3, AM F.59832; 6. latex cast of pedicle valve exterior, distorted, (4), Loc. 103-2, AM F.59833a; 7. pedicle valve interior, note denticulate hinge line, X2, Loc. 103-2 AM F.59833b.