

A NEW SPECIES OF FUSULINIDÆ FROM THE MEITIEN LIMESTONE*

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INTRODUCTION

The specimens described in this paper were collected by Mr. Y. Y. Lee from the Meitien Limestone, Meitien, Ichang South Hunan. According to Mr. Lee this limestone occurs in isolated outcrops overlying the Lungtan coal series and underlying the Thin Bedded limestone of Lower Triassic age. In association with the forms described here I have not found any other Fusulinidæ but a small specimen of *Cribrostomum* and several *Tetrataxis*.

I am indebted to Mr. Y. Y. Lee for placing his material under my disposal.

DESCRIPTION OF SPECIES

Genus GALLOWAINA (Gen. nov.)

Test small, sub-cylindrical, whorls regularly and compactly coiled, numerous, generally 7 or 8 in number; spirotheca exceedingly thin, composed of the tectum and diaphanotheca in which the alveolar structure is indistinct; antethecæ regularly and intensely fluted up to more than $2/3$ of the height, the lower parts of the opposite folds of the adjacent antethecæ come into contact so as to divide the chamber into round chamberlets; buccal aperture narrow; chomata absent; axial filling present but slight; initial chamber spheroidal, small not exceeding 0.22 mm. in diameter.

Genotype: GALLOWAINA MEITIENENSIS Chen.

Remarks. This genus bears some superficial similarities to *Palæofusulina prisca* Deprat and *Fusulina pseudoprisca* Colani; the latter two may be identical. The fundamental distinction lies in the structure of the spirotheca. In *Palæofusulina prisca* the alveolar structure of the keriotheca is clearly displayed in some figures in Deprat's work.¹ According to Colani this character

* Received for publication in December, 1933.

1. Mém. Serv. Géol. Indochine, Vol. 1, fasc. 3.

is indiscernible in her specimens, and it is really not observable in the figures given by her.² In *Gallowaiina* the alveolar structure is indiscernible or, perhaps, not present. The further difference is that the antethecæ of *Palæofusulina* are strongly fluted for the entire height so that the two lateral sides of the compressed folds are nearly parallel from the floor to the roof of the chambers, but the antethecæ in our present form are plicated only to form broad folds in the lower 2/3 of the surface, and moreover the axial filling is distinctly developed in *Gallowaiina* but entirely lacking in *Palæofusulina*.

Gallowaiina meitienensis Chen (gen. et sp. nov.)

Pl. I, Figs. 1-10.

Test generally sub-cylindrical, gently incurved. One side of the test is usually feebly depressed and the opposite side slightly vaulted. The axial length and median width of a typical form are measured 5.32 mm. and 1.48 mm. respectively; the axial ratio is 1:3.6. Whorls all fusiform, compactly and quite regularly coiled, the height of the whorl increasing very slowly, so much so that the increase in the two successive whorls can hardly be observed. The test is usually axially filled by calcareous masses which become more conspicuous in the inner whorls. Number of whorls 6-7.

Result of some measurements is as follows:—

	Whorls							Specimen
	I	II	III	IV	V	VI	VII	
Widths in mm.	0.22	0.32	0.48	0.65	0.90	1.16	1.48	3606
	0.23	0.34	0.47	0.54	0.76	0.96		3607
	0.30	0.44	0.59	0.81	1.05			3610
	0.35	0.50	0.64	0.82	1.02	1.18		3615

Spirotheca exceedingly thin, consisting of two layers, an outer dark layer, the tectum, and an inner lighter layer of which the alveolar structure is

2. Mém. Serv. Géol. Indochine, Vol. XI. fasc. 1.

indiscernible or entirely wanting. The spirotheca is exceedingly thin, being only 0.02 mm. thick in the outer whorls.

Antethecæ particularly thin, extremely regularly fluted from pole to pole for the lower two thirds of the surface; parallel-sided folds are crowded in the chambers only leaving a very narrow median area for the buccal aperture. The polar parts of the antethecæ in the outer three whorls are twisted into a complicated network which is free from the calcareous deposits. The number of antethecæ in the successive whorls as approximately counted are: 25, 28, 35, 45 from the second to the fifth volutions.

Chomata not developed.

Buccal aperture slit-like, very low and narrow, well defined; its height reaching only $1/3$ of that of the chamber and its breadth occupying $1/15$ of the length of the whorl in the sixth volution.

Initial chamber spheroidal to ovoid. The aperture is situated at that side which generally opposes the slightly depressed side of the test. The wall of the initial chamber is generally, if not always, solid, darker and thicker than the spirotheca in the inner volutions. The diameter ranges from 0.15 mm. to 0.20 mm.

HORIZON AND LOCALITY: This new species is found without associated other *Fusulinidæ* in the Meitien Limestone which overlies the Lungtan coal series and underlies the Triassic thin bedded limestone. From the stratigraphical position of the limestone in which this form occurs the age of the present species is probably Middle or Upper Permian.

GALLOWAINA MEITIENENSIS var. **EVOLUTA** Chen (var. nov.)

Pl. I, Figs. 11-14.

An excellent median section and some oblique section have been found in our material. The median section possesses five whorls which evolute comparatively rapidly towards the outer volutions and contain fewer antethecæ in the corresponding whorls as the type species do. The widths of the whorls measured nearly at the end of each volution are represented by the following figures:—

I.	0.13 mm.
II.	0.22 mm.
III.	0.38 mm.
IV.	0.68 mm.
V.	1.13 mm.

Spirotheca thin, composed of the outer dark tectum and the inner lighter keriotheca, not prominently increasing in thickness outward; the thickest point is reached in the fourth volution where it is measured about 0.02 mm. thick. The thickness appears to be slightly decreased in the fifth volution.

Antethecæ thin, slender, consisting of the inflexed part of the tectum and the anterior and posterior layers of keriotheca which extend very far downward if not to the lower margin of the antethecæ. The antethecæ unite into pairs at a short distance from the upper margin when this condition prevails. They are numbered 8, 15, 20, 25, 44 in the five successive volutions.

Chomata are completely absent.

Buccal aperture has not yet been clearly determined in shape and size but probably not much deviating from that in the type form.

Initial chamber minute, spherical, having a diameter of 0.08 mm. The wall of the initial chamber is dark and solid, and thicker than the first part of the spirotheca.

Remarks: This variety is separated from the type form by the outer, or more evolute volutions, less numerous antethecæ in the corresponding whorls and the smaller initial chamber. Although the entire mature test has not been procured, the probable shape can be inferred to be more fusiform than cylindrical from a young fusiform specimen which can be unmistakably assigned to the same variety as the above referred median section does; for the young form also possesses a minute initial chamber nearly of the same size as that of the median section.

HORIZON AND LOCALITY: This form occurs in association with the type species in the same limestone.

**Explanation of
Plate I.**

PLATE I

Figs. 1-10. *Gallowaina meitienensis* Chen (gen. et sp. nov.)

湖南宜章梅田梅田石灰岩

From the Meitien Limestone, Ichang, Southern Hunan.

Fig. 1. Axial section of the typical form, showing the regularity of the folding of the antethecæ.

Fig. 1a, $\times 15$, Fig. 1b, $\times 40$.

Fig. 2. An axial section of a compact form. $\times 15$.

Fig. 3. An axial section, showing the relatively large initial chamber. $\times 15$.

Fig. 4. A para-axial section. $\times 15$.

Figs. 5-7. Sub-median sections. $\times 20$.

Fig. 8. A median section showing the large initial chamber. $\times 15$.

Fig. 9. An oblique section. $\times 20$.

Fig. 10. A somewhat obliquely median section showing the double initial chamber. $\times 20$.

Figs. 11-14. *Gallowaina meitienensis* var. *evoluta* Chen (var. nov.)

From the Meitien Limestone, Ichang, Southern Hunan.

Fig. 11. A para-axial section. $\times 20$.

Fig. 12. An axial section of a young form, showing the fusiform outlines of the whorls and the minute initial chamber. $\times 20$.

Fig. 13. Median section showing the two-layered structure of the spirotheca. Fig. 13, $\times 15$, Fig. 13a, $\times 40$.

Fig. 14. A sub-median section. $\times 20$.

