

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

The holotype is from the Campanian Stage and the species also occurs in the Maastrichtian and Senonian Stages of the Cretaceous System of the U.S.S.R.

FIGURED SPECIMEN: Bh. A., 689'; P. C. Slide No. 19₂.

GLOBOTRUNCANA GAGNEBINI Tilev 1951

Pl. XI Fig. 1

DESCRIPTION

The test is low trochospiral, and plano-convex. The equatorial periphery is oval and lobate. The axial periphery is angular-truncate, with two closely spaced keels of equal strength, which increase rapidly in size. They are crescent-shaped and strongly overlapping in spiral view. In axial view they are angular truncate, sloping at high angles towards umbilical side with strong shoulders. They are sub-rectangular and curved in umbilical view. The sutures are elevated, thickened and strongly curved backwards and sparingly beaded in spiral view; radial, straight and depressed in umbilical view, with very strong periumbilical extension of the keel but with the adumbilical one not so strongly developed. The wall is smooth on the spiral side except for a few nodes. On the umbilical side it is strongly nodose, and becomes smoother in later chambers. The umbilicus is narrow and deep.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

Tilev (1951) described this species from the Maastrichtian of Turkey (fide Olsson 1960). Bronnimann and Brown (1956) report it, under the name of *G. schewesae* from the Maastrichtian of

Texas and Alabama. Bolli (1957) found it only in the Maestrichtian of Trinidad, and Sigal (1952), under the name of G. lamellosa, found it in the Maestrichtian of Algeria. Similar distribution was found by Olsson (1960) in New Jersey and Delaware.

FIGURED SPECIMEN: Bh. A., 521'; P.C. Slide No. 19g.

GLOBOTRUNCANA GANSSERI Bolli 1951

Pl. IX Fig. 6

DESCRIPTION

The test is low trochospiral and plano-convex umbilico-convex. The chambers are inflated in the early whorls and flat in the last. The equatorial periphery is subelliptical, gently lobate. The axial periphery is squared with one prominent keel. There are four and a half chambers in the last whorl which increase very rapidly in size, the last chamber is much bigger than the second last. The chambers are petaloid, strongly overlapping in spiral view; subrectangular and strongly elongated vertically in axial view, sloping at about 90° towards the umbilicus. They are rounded in umbilical view. The sutures are curved backwards, thickened, elevated and beaded in spiral view; and radial and depressed in umbilical view. The wall is smooth dorsally and ventrally nodose. It is smoother in the final chambers. The umbilicus is narrow and deep.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

Said and Kenawy (1956) report the presence of this species in the Maestrichtian of the Sinai. Bergeren (1962) found it in the Middle - Upper Maestrichtian of Denmark. Bandy (1967) gives

its general range as Maestrichtian. Edgell (1957) reports it from the Maestrichtian of Northwestern Australia.

FIGURED SPECIMEN: Bh. A., 310'; P. C. Slide No. 19h₂

GLOBALOTRUNCANA GLOBIGERINOIDES Brotzen 1956

Pl. XII Fig. 3

DESCRIPTION

The test is trochospiral, concave-convex and umbilico-convex. The equatorial periphery is subelliptical and notched. The axial periphery is rounded with a single, weak keel. There are four and a half chambers to the last whorl, which increase very rapidly in size and are strongly inflated dorsally and ventrally. The concavity of the dorsal side is brought about by the last whorl being much more strongly inflated than the previous one (nepionic stage) so that the centre of the test is depressed. The chambers are petaloid, non-overlapping in spiral view, inflated in axial view. The sutures are almost radial, thin and strongly depressed on both sides; on the umbilical side no extensions of the keel are developed. The wall is sparingly sculptured with nodes and becomes smooth in the later stages. The umbilicus is rather small.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

Schijfama (1946) reports it as rare in the Lower Hervian (Campanian) and common to abundant in the Upper Hervian (Limburg). Hamilton (1953) reports it from mid-Pacific seamounts in the Campanian and Maestrichtian. Ksiązkiewicz (1956) found it in Poland in the Turonian, Coniacian, and doubtfully in younger

strata. Edgell (1957) found it in Australia, in beds of Campanian age. Belford (1960) reports it from the Campanian of Australia.

FIGURED SPECIMEN: Bh. A., 786'; P. C. Slide No. 19db.

GLOBOTRUNCANA sp. aff. G. IMBRICATA Mornod 1950

Pl. XI Fig. 2

DESCRIPTION

The test is moderately high trochospiral, almost planoconvex to unequally biconvex and spiro-convex. The equatorial periphery is strongly lobate; the axial periphery is angular-truncate, and has two strong keels starting on each chamber very close together and getting further apart towards the frontal side of the chamber. In each new chamber the two keels start level with the umbilical keel of the previous chamber and repeat the same pattern, while the spiral keel (of the previous chambers) swings upwards and continues into the suture, so that the chambers are imbricated. There are five and a half chambers in the last whorl, which are crescent-shaped and increase quite rapidly in size. The last chamber is sometimes very high and narrow. In axial view the chambers are sub-rectangular and slope at low to very low angles towards the umbilicus. In umbilical view they are subrectangular, short and slightly wedged to slightly elongated in the direction of growth and with curved sides. The sutures are elevated, beaded, and curved backwards on the spiral side. They are depressed, radial and straight on the umbilical side. The adumbilical and peri-umbilical portions of the keel are not developed. The wall is

nodose, becoming smoother in the later chambers on both sides. The umbilicus is exceptionally small and shallow, a feature that recalls Abatomphalus.

COMPARISON

The Zululand specimens are very close to Mornod's description, but their ventral surface is bedded, a characteristic which is mentioned by Takayanagi (1965) but not by Mornod. The range does not correspond.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

G. imbricata was reported by Mornod from the Turonian of Montsalvens. Takayanagi (1965) reported it from the Turonian - Coniacian of California.

FIGURED SPECIMEN: Bh. A., 310'; P. C. Slide No. 190₁

GLOBOTRUNCANA LINNEIANA (d'Orbigny) 1839

Pl. XI Fig. 4

DESCRIPTION

The test is quite big, subcircular in outline. It is low trochospiral with both the spiral and umbilical sides depressed and almost flat. The equatorial periphery is lobate, and the axial periphery squared with two well developed keels set well apart. The sculpture of the keels is very light and consists of small nodes, which become smaller and further apart in later chambers. There are six chambers in the last whorl, which increase slowly in size, with the last chamber smaller than the second last and displaced towards the umbilicus. The chambers are petaloid and strongly

overlapping in spiral view, square in axial view, and subrectangular in umbilical view. The sutures are elevated and sculptured with nodes, especially in the early chambers, and curved backwards on the spiral side, and are elevated on the umbilical side, with the ad-umbilical and periumbilical portions of the keel more or less strongly developed. The wall is smooth. The umbilicus is quite wide.

COMPARISON

G. linneiana has been proved by Takayanagi (1965: pages 217-218) to be synonymous with G. lapparenti. This opinion is followed here.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

Bronnimann and Brown (1956) attribute to G. linneiana a range of Turonian to Campanian. Barr (1962) reports it on the Isle of Wight, in rocks ranging from Coniacian to Campanian. Pessagno (1962) reports it from strata probably of Lower Maestrichtian age in Puerto Rico. Cushman and Goudkoff (1944) report it from the Upper Cretaceous of California under the name of G. canaliculata. Under the same name Bandy (1951) found it in the Navarro-Taylor-Austin of California. Takayanagi (1965) found it in the Lower Coniacian to the Santonian in California.

FIGURED SPECIMEN: Bh. A., P. C. Slide No. 19d.

LOBOTRUNCANA MARGINATA (Reuss) 1845

Pl. XII Fig. 1

DESCRIPTION

The test is moderately high trochospiral and equally but not strongly biconvex. The equatorial periphery is subcircular and

lobate. The axial periphery is truncated with two well developed and well separated keels. There are five chambers in the last whorl, which increase slowly in size, the last chamber is smaller than the second last. The chambers are crescent-shaped and overlap in spiral view. In axial view they are angular truncate and slope towards the umbilicus at a low angle in the early stages, than at a quite high angle, with the development of umbilical shoulders. In umbilical view they are subrectangular and taper towards the umbilicus. The umbilical keel is so strong in the early stages that the chambers appear concave. The sutures are strongly curved backwards, very strongly elevated and rope-like in spiral view; and radial and depressed in umbilical view. Only the periumbilical extensions of the keel are developed. The wall is smooth. The umbilicus is small.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

Schijfsma (1946) noted the presence of this species (under the generic name of Rosalinella) in the Campanian of Southern Limburg. Edgell (1957) found it in Santonian and Campanian beds in north-west Australia. Belford (1960) found it in similar position in W. Australia. Barr (1962) reports it from the Senonian of the Isle of Wight (England). Takayanagi (1965) found it restricted to the Turonian in California and Bandy (1967) gives its general distribution as Turonian - Lower Maestrichtian.

FIGURED SPECIMEN: Bh. A., 712'; P. C. Slide No. 19w₁

GLOBOTRUNCANA ROSETTA (Carsey) 1926

Pl. XI Fig. 3

DESCRIPTION

The test is low trochospiral, flat or nearly flat dorsally and ventrally strongly inflated. The chambers are ventrally rounded at first and then become strongly protruding and pointed. The equatorial periphery is oval and slightly notched. The axial periphery is rounded at first, then becomes angular, with two closely spaced keels that are equally strong and initially strongly sculptured, but later become smooth. There are five to six chambers to the last whorl which increase rapidly in size. They are slightly inflated at first and then become dorsally flattened, crescent-shaped and quite strongly overlapping in spiral view. In axial view they are rounded at first and then become sub-rectangular and slope towards the umbilical side at high angles. In umbilical view the chambers appear sub-rounded at first, later subrectangular. The sutures are strongly curved backwards, heavily beaded and elevated on spiral side; they are depressed and radial near the umbilicus and then curve backwards near the periphery. The adumbilical and periumbilical extensions of the keel are very faint. The wall is sculptured by few blunt spines on the spiral side and becomes smooth in later stages. On the umbilical side it is more heavily sculptured, and not completely smooth even in the last chamber. The umbilicus is rather small and deep.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

This is a very well known and widespread species. Berggren (1926) reports it from the Maestrichtian of Denmark and gives a very good synonymy. Later mention of the species is made by Sala and Samuel (1966), from the Campanian and Maestrichtian of the Western

Carpathians, and also by Bardy (1967) who regards its general range as Campanian - Maestrichtian. Most authors agree on this range.

FIGURED SPECIMEN: Bh. A., 712'; P. C. Slide No. 19j₁

GLOBOTRUNCANA STUARTI STUARTI (de Lapparent) 1918

Pl. XII Fig. 1

DESCRIPTION

The test is high trochospiral, equally biconvex and subcircular in outline. The equatorial periphery is uninterrupted or very gently notched in the early stages, the axial periphery is sharply angled with a strong angle k. The keel is sculptured with more or less prominent spines, and becomes smooth in the last two to three chambers. There are six to seven chambers in the last whorl, which increase slowly in size. The last chamber is often smaller than the second last. The chambers are trapezoidal in spiral view. In umbilical view they are subrectangular and slightly wedge-shaped and slope at low to quite high angles towards the umbilicus, with the formation of sharp shoulders. On spiral side the sutures are slightly curved to straight and they are thickened and elevated; they are radial-curved, thin and depressed on the umbilical side. The adumbilical and periumbilical portions of the keel may be either strongly developed or absent. The wall is smooth or sculptured with very faint nodes on the umbilical side of the very early chambers. The umbilicus is small and deep.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

Said and Kenawy (1956) report G. stuarti stuarti from the

Maestrichtian of Sinai. Nagappa (1959) found it in the Maestrichtian and Upper Senonian of the India - Pakistan - Burma region. Dalbiez (1955) reports it from the Upper, possibly Lower, Maestrichtian in Tunisia. Berggren (1962) reports it from the Maestrichtian of Denmark. Pessagno (1962) found G. stuarti stuarti restricted to the Upper Maestrichtian of Puerto Rico. Olsson (1964) regards it as developing in the Upper Maestrichtian of New Jersey.

FIGURED SPECIMEN: Bh. A., 282'; P. C. Slide No. 19f₁

GLOBOTRUNCANA STUARTI STUARTIFORMIS Dalbiez 1955

Pl. XII Fig. 2

DESCRIPTION

The test is low trochospiral, umbilico-convex with the spiral side very strongly depressed, almost flat. The periphery is subcircular, uninterrupted at first to very gently notched in later stages. The axial periphery is sharply angled with a prominent single keel. The keel is sculptured in the early stages by a few spines. There are five or six chambers in the last whorl, which increase slowly in size and are subtriangular in shape, some with rounded angles, while the last one is often trapezoid in equatorial view. In axial view they slope at very high angles towards the umbilicus, forming sharp umbilical shoulders. In umbilical view they are sub-rectangular and slightly wedged. The sutures are straight, elevated and sculptured by few spines in spiral view, and gently curved backwards and depressed in umbilical view, with periumbilical and adumbilical portions of the keel more or less developed. The wall is smooth dorsally and bears few nodes in the early chambers of the last whorl ventrally. The umbilicus is narrow and deep.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

Dalbiez (1955) described the range of G. s. stuartiformis as Campanian Lower Maestrichtian in Tunisia. Pessagno (1962) recorded it from the Campanian to the Maestrichtian (more Upper) in Puerto Rico. Olason (1964) found the same distribution in New Jersey. For a discussion on the lineage Globotruncana stuarti stuartiformis - stuarti stuarti, see Dalbiez (loc. cit. page 169) and Olason (loc. cit. page 170).

FIGURED SPECIMEN: Bh. A., 712'; P. C. Slide No. 19f₃

GLOBOTRUNCANA VENTRICOSA White 1929

Pl. XII Fig. 4

DESCRIPTION

The test is low trochospiral, planoconvex umbilico-convex. The equatorial periphery is subcircular and slightly notched. The axial periphery is angularly truncate, with two very strong and widely separated keels. The peripheral band is strongly protruding relative to the ventral surface, and it is set at right angles to the dorsal surface. There are seven chambers to the last whorl, which increase very slowly in size. These are petaloid and more or less overlapping in spiral view. In axial view they are subrectangular, and slope at high angles towards the umbilicus. The wall is slightly concave, forming strong umbilical shoulders. In umbilical view they are almost trapezoid and overlapping. The sutures are thickened and elevated, curved backwards on the spiral side and curved backwards on the umbilical side with the adumbilical and periumbilical extensions of the keel strongly developed. The

umbilicus is small and deep. The wall is smooth.

COMPARISON

Takayanagi (1965) figures a smooth specimen for his ventricosa. Barr's (1962) G. ventricosa is very hispid. Belford's (1960) specimens are the closest of the Zululand ones in having only few blunt spines on the ventral side.

PREVIOUSLY RECORDED STRATIGRAPHIC DISTRIBUTION

White (1929) reports G. ventricosa from strata probably equivalent to Upper Coniacian - Lower Maestrichtian of Mexico. Hamilton (1953) reports it from the Pacific seamounts and attributes to it a range Coniacian - Maestrichtian in Europe. Belford (1960) reports it from the Santonian of Australia. Dalbier (1955) from the Upper Santonian of Tunisia. Barr (1962) from the Actinocamax quadratus zone of the Isle of Wight. Takayanagi (1965) found it in the Upper Coniacian of California but reports its range to reach the Maestrichtian elsewhere. Bandy (1967) regards its general range as Coniacian - Maestrichtian.

FIGURED SPECIMEN: Bh. A., 1415'; P. C. Slide No. 19_{EB1}

GLOBOTRUNCANA sp. G.

Pl. XII Fig. 6

DESCRIPTION

The test is moderately high trochospiral, umbilico-convex and subcircular in outline. The equatorial periphery is gently lobate. The axial periphery is truncate with two clearly separated keels that may be more or less closely spaced, the umbilical one of which being the weakest and sometimes even slightly weaker than the

chambers are added. There are five and a half chambers to the last whorl, which are petaloid and strongly overlapping in spiral view and increase quite rapidly in size. The chamber is usually smaller than the second last. In axial view the chambers slope at low to quite high angles towards the umbilicus and develop umbilical shoulders; in umbilical view they are subrectangular, and taper towards the umbilicus. In spiral view the sutures are gently curved, elevated and thickened except in the last chamber. In umbilical view they are radial-depressed with the adumbilical and periumbilical portions of the keel not very strongly developed. The wall is smooth on the spiral side and bears small nodes on the umbilical side, particularly in the early chambers. The umbilicus is rather narrow.

FIGURED SPECIMEN: Bh. A., 282'; P. C. Slide No. 29_g

GLOBOTRUNCANA sp. M₁

Pl. XII Fig. 7

DESCRIPTION

The test is very high trochospiral, unequally biconvex. The equatorial periphery is lobate and becomes more strongly so in later stages. The axial periphery is angular truncate with two fairly weak, well separated keels. The umbilical keel becomes very faint on the last chamber. There are four chambers in the last whorl, of which the first three are crescent-shaped and overlapping and the last one is very high and narrow and strongly bent downwards in spiral view. The chambers are subrectangular in axial view and slope gently towards the umbilicus; in umbilical view they are subrectangular, and elongated in the direction of growth. The sutures are curved backwards, elevated and beaded on

the spiral side, and radial and depressed on the umbilical side. The wall is sparsely sculptured with nodes. The umbilicus is narrow.

COMPARISON

These specimens present some similarities with the Globotruncana fornicata contusa lineage, especially in the early stages, but the final chamber is very much different. They could represent an evolutionary sideline. It is very similar to Globotruncana fornicata Plummer subsp. Dianaurensis Gandolfi 1955 but it differs from it in the more widely separated keels.

FIGURED SPECIMEN: Bh. A., 292'; P. C. Slide No. 19m.

Family CAUCASINIDAE

Subfamily FURSENKOININAE

Genus FURSENKOINA Loeblich and Tappan 1961

FURSENKOINA Sp. A₁

Pl. XIII Fig. 2

DESCRIPTION

The test is very small, elongated and thin. It is subcircular in cross-section. The initial stage is obscure, later the test is biserial with a tendency to become uniserial in the late stages. The sutures are thin and flush. The aperture is comma-shaped and touches the suture.

FIGURED SPECIMEN: Bh. A., 462'; P. C. Slide No. 26a.

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