

## SUARITINAE NEW SUBFAMILY AND *GALEANITES GARCENSE* NEW GENUS AND NEW SPECIES OF THE UPPER JURASSIC PERISPINCTACEAE AMMONITES

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### ABSTRACT

Suaritinae new subfamily and *Galeanites garcense* new genus and new species represent a group of the Superfamily Perispinctaceae (Ammonoidea, Cephalopoda) with pairs of ribs joined in ventrolateral tubercles. They are known from the Upper Jurassic (upper Tithonian) of Mexico, Cuba and Argentina.

Key words: Ammonites, Perispinctaceae, Upper Jurassic, Mexico.

### RESUMEN

Suaritinae nueva subfamilia y *Galeanites garcense* nuevo género y nueva especie representan un grupo de la Superfamilia Perispinctaceae (Ammonoidea, Cephalopoda) con pares de costillas unidas en tubérculos ventrolaterales; son conocidos en el Jurásico Superior (Titoniano superior) de México, Cuba y Argentina.

Palabras clave: Amonites, Perispinctaceae, Jurásico Superior, México.

### INTRODUCTION

The paleontologic data presented in this paper is the preliminary result of a cooperative project carried out between the University of Texas at Dallas and the Instituto Politécnico Nacional of Mexico, on the Jurassic-Cretaceous boundary in the northeast of Mexico and California. This study is part of a major project on the ammonites of the Jurassic-Cretaceous boundary. This research is financially supported by the Consejo Nacional de Ciencia y Tecnología (CONACYT 411300-5-2228PT).

According to the ammonite record, the La Casita Formation represents the Kimmeridgian and Tithonian stages in the northeast of Mexico; it consists of thin-bedded limestones, marls and shales. One of the most fossiliferous portions of this formation is found at its upper contact, where ancyloceratid, perispinctid and haploceratid ammonites characterize the upper Tithonian, in some localities of northeastern and north-central Mexico (Cantú-Chapa, 1968; Imlay, 1980; Verma and Westermann, 1973).

### RELATIONSHIPS OF THE PERISPINCTACEAE FROM THE JURASSIC-CRETACEOUS BOUNDARY

Arkell and collaborators (1957) divided the family Berriasellidae Spath, 1922 into three subfamilies of the Tithonian-Neocomian: Berriasellinae Spath, 1922, Himalayitinae Spath, 1922, and Neocomitinae Spath, 1924.

Le Hégarat (1971) studied only two families of the upper Tithonian and Berriasian: Perispinctidae Steinmann, 1890, and Berriasellidae. Depending on the type of ribs, the same author

subdivided the last one into two groups: simple, bifurcate or fasciculate, and with or without tubercles.

Donovan and collaborators (1981) only recognized the families Himalayitidae and Neocomitidae of the Jurassic-Cretaceous boundary, based on the latitudinal and climatic distribution concepts, or supposed sexual dimorphism. The last one prevailed over other proposals of priority principle, and it was divided into the subfamilies Berriasellinae and Neocomitinae.

Recently, the Family Neocomitidae was defined as forms: "...compressed and flat-sides with tabulate or grooved venter..." (Wright *et al.*, 1996). It is divided in three subfamilies, after two different criteria:

- (1) Site of ribs branching on the sides: ribs are simple at umbilical margin and bifurcating on outer part of sides (subfamily Berriasellinae); or ribs are divided from the umbilical margin and again on outer part of sides (subfamily Neocomitinae); or
- (2) suture line (subfamily Endemoceratinae Schindewolf, 1966).

In those systematic proposals nothing was mentioned about looped ribs. In the current state of knowledge, Perispinctaceae ammonites from the upper Tithonian, with particular ribbing as the one here described, are only found in the American continent (Mexico, Cuba and Argentina).

Ornamentation consists of ribs that are joined in pairs in a ventrolateral tubercle (*Wichmanniceras* Leanza, 1945; *Suarites* Cantú, 1967, 1976a; and *Corongoceras filicostatum* Imlay, 1942). In the last two, ribs are bifurcating at a lateral tubercle. These genera were assigned to the subfamily Himalayitinae Spath, 1925 (Cantú-Chapa, 1967), or the family Palaeohoplitidae Roman, 1938 (Imlay, 1942; Leanza, 1945).

Ribs bifurcated at the umbilical margin and joined in a ventrolateral tubercle are called looped (Arkell *et al.*, 1957); such ribbing is also present in a group of Tithonian ammonites

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from southern Spain, whose descriptions appeared simultaneously with different genera names: *Beaticoceras* Geysant, 1979; and *Cordubiceras* Oloriz and Tavera, 1979. They are assigned to the family Aspidoceratidae due to their suture line.

Looped ribbing is also present in some species of the genus *Himalayites* Uhlig, 1904, from the upper Tithonian of Argentina and Spain (Leanza, 1945; Tavera, 1985). In these species, a pair of single ribs born from the umbilical shoulder is joined in a lateral tubercle. Certain species of *Himalayites* from Madagascar and Algeria lack such ribbing (Collignon, 1960; Pomel, 1889).

#### SYSTEMATIC PALEONTOLOGY

Order Ammonoidea Hyatt, 1889

Suborder Ammonitina Hyatt, 1889

Superfamily Perisphinctaceae Steinmann, 1890

Family Neocomitidae Salfeld, 1921

Subfamily Suaritinae new subfamily

Type genus: *Suarites* Cantú, 1967

**Diagnosis**—Discoidal, evolute; sides and venter flattened or slightly convex; ribs regularly or irregularly joined in pairs in a ventrolateral tubercle, either simple or bifurcated from lateral tubercle; some species with smooth siphonal band, or crossed by weak ribs. Constrictions present on inner whorls of some taxa.

**Genera included**—The subfamily Suaritinae includes the following genera: *Suarites* Cantú, 1967; *Wichmanniceras* Leanza, 1945; and *Galeanites* new genus from Mexico. *Corongoceras filicostatum* Imlay (1942), from Cuba is a form appertaining to this subfamily. Age: upper Tithonian.

**Discussion**—The subfamily Suaritinae is differentiated from the other Perisphinctaceae subfamilies of the upper Tithonian because their genera are the only ones to have ribs regularly or irregularly joined in pairs in a ventrolateral tubercle. This type of looped ribbing has not been mentioned in the genera of the subfamilies Berriasellinae, Neocomitinae, Argentiniceratinae (Nikolov, 1979), Paraulacosphinctinae (Tavera, 1985), Pseudosubplanitinae (Nikolov and Sapunov, 1977), and Richterellinae (Sapunov, 1977), of the upper Tithonian-Berriasian (cf. Arkell *et al.*, 1957; Donovan *et al.*, 1981; Le Hégarat, 1971; Wright *et al.*, 1996).

As previously indicated, certain species of *Himalayites* from the Mediterranean area and Argentina have looped ribs that are born at the umbilical margin and joined in pairs in a lateral tubercle (Leanza, 1945; Tavera, 1985); that sort of ornamentation is not present in the genera of the subfamily Suaritinae.

#### Genus *Galeanites* new genus

**Type species**—*Galeanites garcense* new genus and new spe-

cies; **original designation**. La Casita Formation (upper Tithonian); Galeana, Nuevo León, northeastern Mexico (Figure 1).

**Derivation of the name**—The name alludes to its occurrence in Galeana, northeastern Mexico.

**Diagnosis**—Evolute, whorls increasing rapidly in size; flexuous ribs, some joined in pairs in a ventrolateral tubercle.

**Description**—Evolute form, external whorl much higher than wide, umbilicus deep, sides lightly flattened, venter fairly narrow, truncated. Ornamentation consists of flexuous ribs that are inclined slightly forward; some ribs joined in pairs in a radial ventrolateral tubercle; remaining ribs simple end in ventral tubercle. Constrictions and lateral tubercles may be present.

**Discussion**—*Galeanites* resembles some neocomitids because of the rapid growth of the whorl and development of tubercles on both sides of the venter. However, the irregular lateral ribs that end by pairs in a ventrolateral tubercle forming looped ribbing, place this ammonite within the forms of subfamily Suaritinae of the upper Tithonian, such as *Suarites* and *Wichmanniceras*.

*Galeanites* is easily distinguished from *Suarites* because it usually possesses bifurcate principal ribs branching from a lateral tubercle and *Galeanites* does not have lateral tubercles. Also, *Suarites* is the oldest of these genera and characterizes a biostratigraphical zone at the base of the upper Tithonian (Cantú-Chapa, 1967). On the other hand, *Galeanites* occurs with *Salinites*, an assemblage recorded from a higher level (Cantú-Chapa, 1976b).

*Wichmanniceras* from Argentina and Mexico is strongly compressed and evolute, the whorls are increasing gradually in size, and the umbilicus is shallow and fairly wide; the simple ribs are rectiradiate and inconstantly joined in pairs in a ventrolateral tubercle (Leanza, 1945; Cantú-Chapa, 1967); this type of coiling and ornamentation is not observed in *Galeanites*.

Ribbing of *Corongoceras* from Mexico, Argentina, Spain, and Romania (Leanza, 1980; Patruilus and Avram, 1976; Tavera, 1985; Verma and Westermann, 1973) is different from that of *Galeanites*. Only one species described as *Corongoceras filicostatum* Imlay (1942, p. 1448, pl. 5, figs. 1–16), from the upper Tithonian of Cuba, is here assigned to *Galeanites* because of its looped ribbing, but may be distinguished from the Mexican genus by the presence of constrictions and lateral tubercles. There is rather some similarity between *Galeanites* and the fragmented form classified as cf. *Corongoceras filicostatum* (Cantú-Chapa, 1976b, p. 15–16, pl. 1, figs. 3, 3a) from Mazatepec that does not have lateral tubercles. Its systematic positioning is incomplete due to its fragmented form; it could also be considered as *Galeanites*.

This last genus is different of *Himalayites* Spath, 1924, because of the ornamentation. As suggested by Tavera (1985), only certain species of *Himalayites* from the upper Tithonian of

Spain have looped ribs (*linaresi*, *hollandi*, *seideli*, and *kasbensis*); they are joined in pairs in a lateral tubercle, where they are divided in several branches; such ornamentation is also present in *Himalayites concurrens* Leanza (1945, p 46, pl. III, figs. 5 and 6) from the upper Tithonian of Argentina (Leanza, 1945). Pomel (1889) did not mention ribs looped in *H. kasbensis*; as neither indicated by Collignon (1960), when this author described several species of *Himalayites* from Madagascar. In the opinion of the present author, the species of *Himalayites* previously mentioned constitutes a different group because of the particular looped ribbing.

### *Galeanites garcense* new genus and new species

(Figure 1a, b)

**Derivation of the name**—In honor of Ing. Romeo Garza, Petróleos Mexicanos, who collected the specimen in Galeana, Nuevo León, northeastern Mexico (Figure 2).

**Diagnosis**—Diagnosis of the species same as that of the genus.

**Description**—Form discoidal, evolute; outer whorl becoming rapidly expanded, umbilicus deep, moderately wide, wall nearly vertical, shoulder rather rounded, flanks and ventral region almost flat. About 40 fine ribs begin at the umbilical margin; they are high, thin, fairly widely spaced, flexuous and inclined forward on the upper part of the flanks; only two ribs branch from the internal third of the flank where they alternate irregularly with the principal fine ribs. Some ribs are joined in pairs in a ventrolateral tubercle alternating with simple ribs. The ventral ribs endings are tubercular, radial and forming two rows of these structures. Suture line not observed.

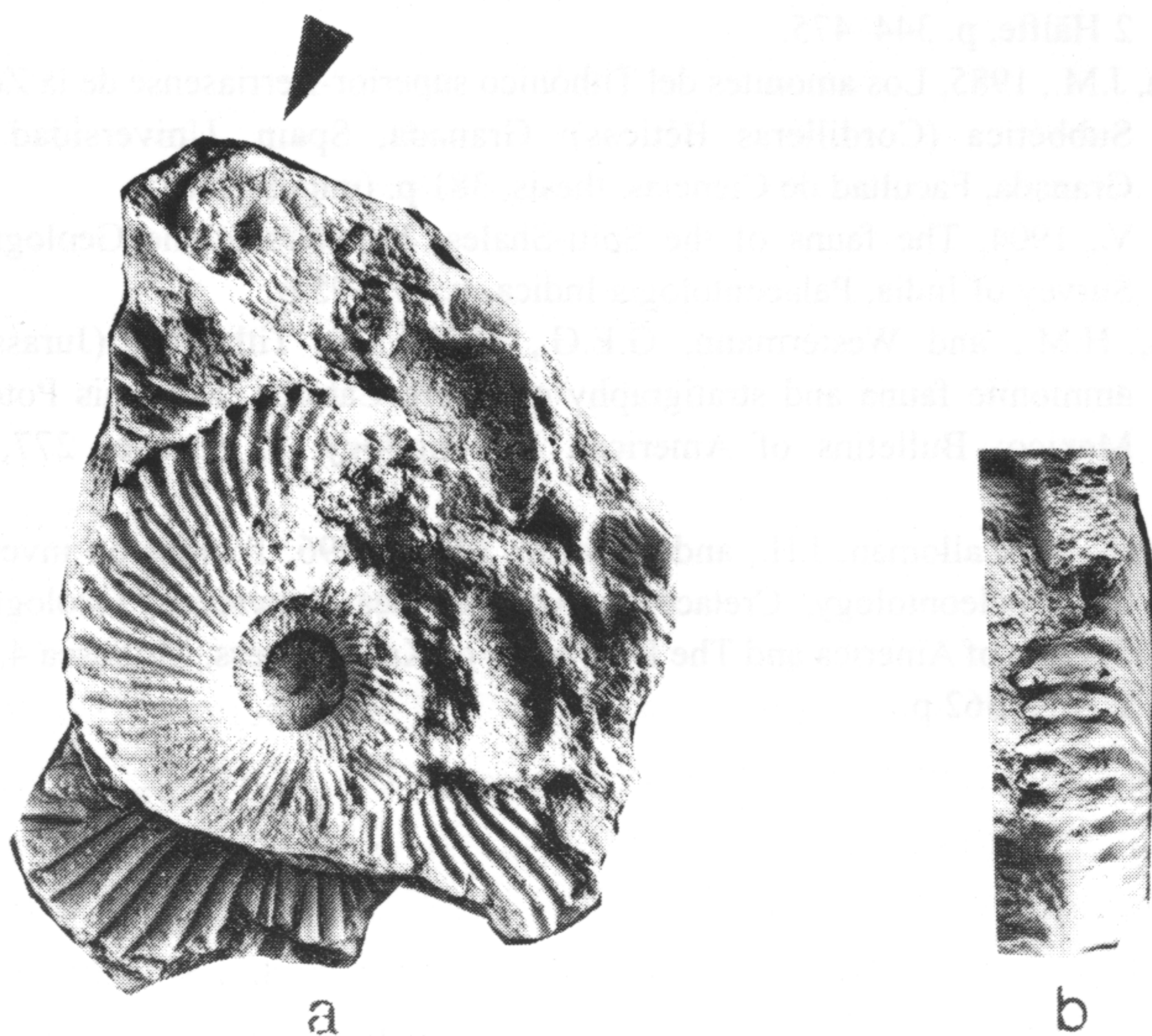


Figure 1. *Galeanites garcense* new genus and species. a, lateral and b, ventral views. Holotype, ESIA-Ac-1009, x 1. The specimen is associated with small forms of *Salinites* (arrow). La Casita Formation, upper Tithonian, Galeana, Nuevo León, northeastern Mexico.

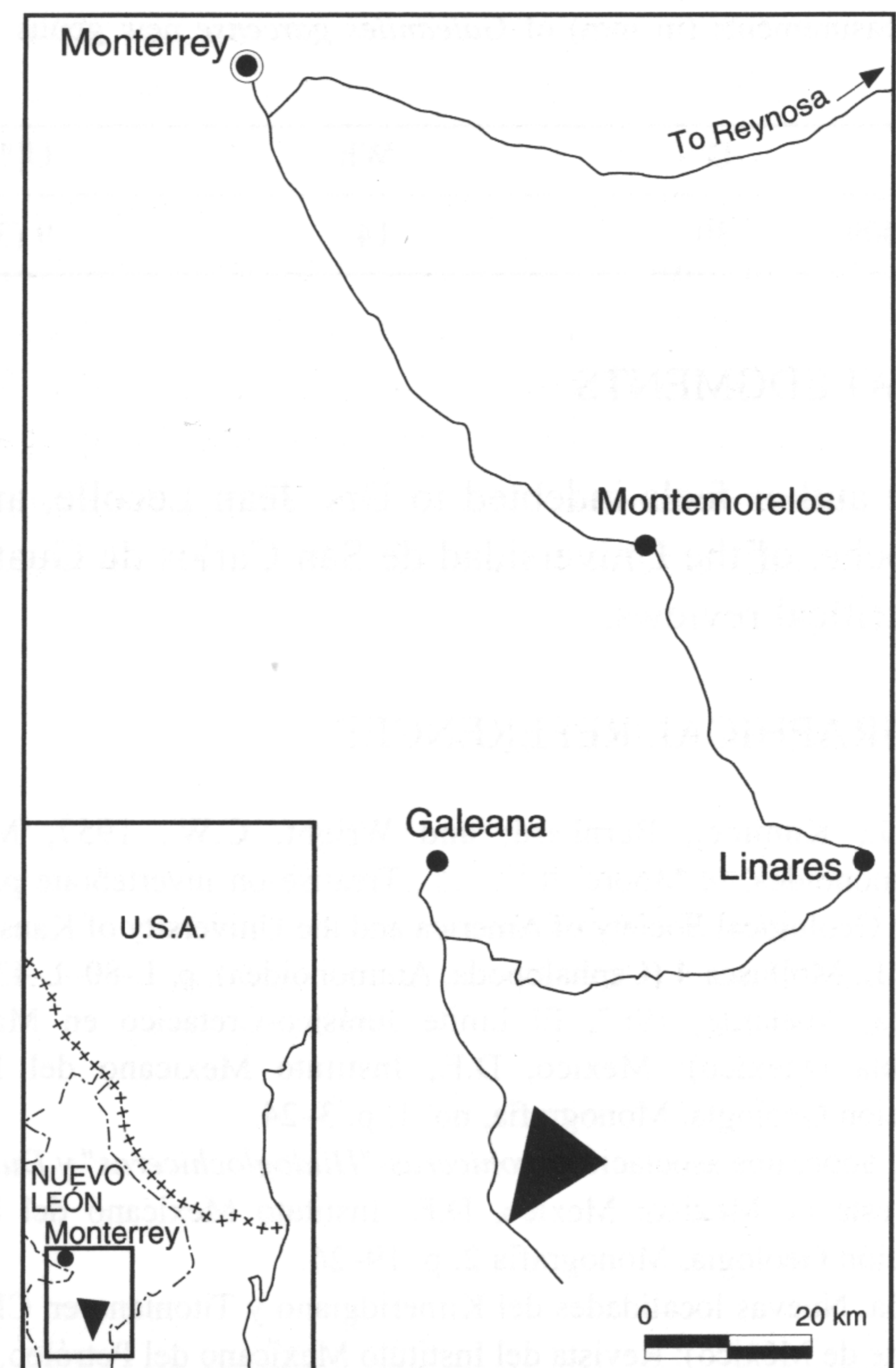


Figure 2. Locality of the *Galeanites garcense* new genus and new species, in Galeana, Nuevo León, northeastern Mexico (arrow).

**Comparisons**—Some of the observations indicated at generic level are applied here.

**Age**—*Galeanites garcense* was included in a rock that contains small specimens of *Salinites*, whose forms from the upper Tithonian are of the La Casita Formation. In effect, some forms have been found in association with *Durangites* and *Proniceras*, indicating that age (Cantú-Chapa, 1968); they originate in the same region, from Galeana, Nuevo León, as does the ammonite being studied.

Some forms of *Salinites* have been studied from oil well samples, from eastern Mexico (Cantú-Chapa, 1982, 1989) and Louisiana (Imlay and Herman, 1984); they have also been found in Cuba (Judoley and Furrzola, 1968), where they characterize the upper Tithonian (Imlay, 1942; and Cantú-Chapa, 1976b), that is the age that has been assigned to *G. garcense*.

**Type**—The only known specimen is deposited at the author's collection, Escuela Superior de Ingeniería y Arquitectura (Holotype, ESIA-Ac-1009), Geological Department, Mexico, D.F.

**Specimen dimensions**—Dimensions are given in millimeters: D = diameter of entire whorl; U = diameter of umbilicus; Wh = whorl height at given diameter, measured from the umbilical shoulder (Table 1).

**Occurrence**—Galeana, Nuevo León, northeastern Mexico.

Table 1. Measurements (in mm) of *Galeanites garcense* new genus and new species.

Specimen	D	Wh	U[%]
ESIA-Ac-1009	30	14	9 (30)

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## BIBLIOGRAPHICAL REFERENCES

- Arkell, W.J.; Kummel, Bernhard; and Wright, C.W., 1957, Mesozoic Ammonoidea, in Moore, R.C., ed., Treatise on invertebrate paleontology: Geological Society of America and the University of Kansas Press, Part L, Mollusca 4 (Cephalopoda, Ammonoidea), p. L-80-L-437.
- Cantú-Chapa, Abelardo, 1967, El límite Jurásico-Cretácico en Mazatepec, Puebla (México): Mexico, D.F., Instituto Mexicano del Petróleo, Sección Geología, Monografía, no. 1, p. 3-24.
- 1968, Sobre una asociación *Proniceras*-*Hildoglochiceras* y *Durangites*, del este de México: Mexico, D.F., Instituto Mexicano del Petróleo, Sección Geología, Monografía 2, p. 19-26.
- 1976a, Nuevas localidades del Kimeridgiano y Titioniano en Chihuahua (norte de México): Revista del Instituto Mexicano del Petróleo, v. 8, no. 2, p. 38-49.
- 1976b, El contacto Jurásico-Cretácico, la estratigrafía del Neocomiano, el hiato Hauteriviano superior-Eoceno inferior y las amonitas del pozo Bejuco 6 (centro-este de México): Boletín de la Sociedad Geológica Mexicana, v. 37, no. 2, p. 60-83.
- 1982, The Jurassic-Cretaceous boundary in the subsurface of eastern Mexico: Journal of Petroleum Geology, v. 4, no. 3, p. 311-318.
- 1989, Precisiones sobre el límite Jurásico-Cretácico en el subsuelo del este de México: Revista de la Sociedad Mexicana de Paleontología, v. 2, no. 1, p. 26-69.
- Collignon, Maurice, 1960, Atlas des fossiles caractéristiques de Madagascar: Madagascar, Service Géologique, Tananarive, Fascicule 6 (Tithonique).
- Donovan, D.T.; Callomon, J.H.; and Howarth, M.K., 1981, Classification of the Jurassic Ammonitina, in House, M.R., and Senior, J.R., eds., The Ammonoidea; the evolution, classification, mode of life and geological usefulness of a major fossil group: London-New York, Academic Press Systematics Association, Special Volume 18, p. 101-155.
- Geyssant, J.R., 1979, Evolution, systématique et dimorphisme d'un nouveau genre d'ammonite-*Beaticoceras* (Ammonitina, Simoceratinae) dans le Tithonique supérieur des Cordillères Bétiques (Espagne): Palaeontographica Abteilung A, Palaeozoologie-Stratigraphie, v. 166, nos. 1-3, p. 1-36.
- Hyatt, A., 1889, Genesis of Arietitidae: Smithsonian Institution, Smithsonian Contributions to Knowledge, v. 26, 250 p.
- Imlay, R.W., 1942, Late Jurassic fossils from Cuba and their economic significance: Geological Society of America Bulletin, v. 53, no. 10, p. 1417-1477.
- 1980, Jurassic paleobiogeography of the conterminous United States in its continental setting: U.S. Geological Survey, Professional Paper 1062, 134 p.
- Imlay, R.W., and Herran, George, 1984, Upper Jurassic ammonites from the subsurface of Texas, Louisiana and Mississippi: Society of Economic Paleontologists and Mineralogists, Gulf Coast Section, Annual Research Conference, 3<sup>rd</sup>, Baton Rouge, LA, 1982, Proceeding, p. 149-170.
- Judoley, C.M., and Furrzola, G., 1968, Estratigrafía y fauna del Jurásico de Cuba: Instituto Cubano de Recursos Minerales, Departamento de Geología, 126 p.
- Leanza, A.F., 1945, Ammonites del Jurásico Superior y del Cretáceo Inferior de la Sierra Azul, en la parte meridional de la provincia de Mendoza: Buenos Aires, Argentina, Anales del Museo de la Plata, sección Geología y Minería, v. 1, 99 p.
- Leanza, H.A., 1980, The lower and middle Tithonian ammonite fauna from Cerro Lotena, Province of Neuquen, Argentina: Zitteliana, v. 5, p. 3-49.
- Le Hégarat, Gerard, 1971, Le Berriasien du sud-est de la France: Lyon, France, Université de Lyon, Documents des Laboratoires de Géologie de la Faculté des Sciences de Lyon, v. 43, pt. 2, p. 309-357 p.
- Nikolov, T.G., 1979, A new ammonite subfamily Argentiniceratinae subfam. n. (Berriasellidae, Tithonique-Berriasian): Comptes Rendues de l'Académie Bulgare de Science, v. 32, p. 197-200.
- Nikolov, T.G., and Sapunov, I.G., 1977, Sur une nouvelle sous-famille d'ammonites-Pseudosubplanitinae subfam. nov. (Berriasellidae): Comptes Rendues de l'Académie Bulgare de Science, v. 30, 103 p.
- Oloriz, Federico, and Tavera, J.M., 1979, Nuevo Simoceratinae *Simoceras* (*Cordubiceras*) en la base del Tithónico superior de las Cordilleras Béticas (Zona Subbética): Tecniterrae, v. 29, p. 17-21.
- Patruilus, D., and Avram, E., 1976, Les céphalopodes de couches de Carhaga (Tithonique supérieur-Barrémien inférieur): Institut de Géologie et de Géophysique, Mémoires, v. 24, p. 153-201.
- Pomel, A., 1889, Les céphalopodes néocomiens de Lamerciere: Mémoire de la Carte géologique de l'Algérie, 1ère série, v. 2, p. 5-96.
- Roman, F., 1938, Les ammonites Jurassiques et Crétacées: Paris, France, Masson et Cie., ed., 554 p.
- Sapunov, I.G., 1977, Richterellinae subfam. n. (Perisphinctidae, Ammonoides; Tithonian): Comptes Rendues de l'Académie Bulgare de Science, v. 30, p. 105-107.
- Spath, L.F., 1925, Ammonites and Aptychi—the collection of fossils and rocks from Somaliland: Glasgow, Glasgow University, Monographie of the Geology Department of the Hunterian Museum, v. 1, p. 111-164.
- Steinmann, G., 1890, Elemente der Palaeontologie: Evertebrata, Cephalopoda, 2 Hälfte, p. 344-475.
- Tavera, J.M., 1985, Los amonites del Tithónico superior-Berriasense de la Zona Subbética (Cordilleras Béticas): Granada, Spain, Universidad de Granada, Facultad de Ciencias, thesis, 381 p. (unpublished).
- Uhlig, V., 1904, The fauna of the Spiti-Shales: Memoirs of the Geological Survey of India, Palaeontologia Indica, v. 15, 395 p.
- Verma, H.M., and Westermann, G.E.G., 1973, The Tithonian (Jurassic) ammonite fauna and stratigraphy of Sierra Catorce, San Luis Potosí, Mexico: Bulletin of American Paleontology, v. 63, no. 277, p. 105-320.
- Wright, C.W.; Calloman, J.H.; and Howarth, M.K., 1996, Treatise on invertebrate paleontology, Cretaceous Ammonoidea: Lawrence, Geological Society of America and The University of Kansas Press, Mollusca 4, pt. L, v. 4, 362 p.